



TAMIL NADU URBAN HABITAT DEVELOPMENT BOARD

Project Name: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project.

BIDDING DOCUMENT For Procurement of works for

**Construction of 520 (G+3) tenements including Development works
at Pallipalayam scheme in Komarapalayam Taluk at Namakkal
District.**

Under Open Competitive Bidding
(Following ADB's single stage two envelope bidding procedure)

Part 1 – Volume 1 – Technical Bid

Issued on: 02 March, 2024

Invitation for Bids No.: IRSHUPSP/NCB/04

OCB No.: IRSHUPSP/PAL/04

Employer: Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu

Country: India

Issued by Office of
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Preface

This Bidding Document for the Procurement of Works has been prepared by Tamil Nadu Urban Habitat Development Board and is based on the Standard Bidding Document for the Procurement of Works (*SBD Works*) issued by the Asian Development Bank dated **June, 2018**.

ADB's *SBD Works* has the structure and the provisions of the Master Procurement Document entitled "Bidding Documents for the Procurement of Works", prepared by multilateral development banks and other public international financial institutions, except where ADB-specific considerations have required a change.

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Section 1: Instructions to Bidders

This Section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, evaluation of bids, and award of contract.

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A. General

- 1. Scope of Bid**

 - 1.1 In connection with the Invitation for Bids (IFB) indicated in the Bid Data Sheet (BDS), the Employer, as indicated in the BDS, issues this Bidding Document for the procurement of Works as specified in Section 6 (Employer's Requirements). The name, identification, and number of contracts of the open competitive bidding (OCB) are provided in the BDS.
 - 1.2 Throughout this Bidding Document,

 - (a) the term "in writing" means communicated in written form and delivered against receipt;
 - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
 - (c) "day" means calendar day.
- 2. Source of Funds**

 - 2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
 - 2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by ADB in accordance with the terms and conditions of the Financing Agreement between the Borrower and ADB (hereinafter called "Financing Agreement"), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.
- 3. Fraud and Corruption**

 - 3.1 ADB's Anticorruption Policy (1998, as amended to date) requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB

 - (a) defines, for the purposes of this provision, the terms set forth below as follows:

 - (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
 - (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;

- (v) “abuse” means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;
 - (vi) “conflict of interest” means any situation in which a party has interests that could improperly influence that party’s performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations;
 - (vii) “obstructive practice” means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation, or deliberately making false statements to investigators, with the intent to impede an ADB investigation; (b) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to a Bank investigation or from pursuing the investigation; or (c) deliberate acts intended to impede the exercise of ADB’s contractual rights of audit or inspection or access to information; and
 - (viii) “integrity violation” is any act, as defined under ADB’s Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB’s Anticorruption Policy, including (i) to (vii) above and the following: violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB’s Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
 - (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;
 - (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB’s Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed,-administered, or -supported activities or to benefit from an ADB-financed,-administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and
 - (e) will have the right to require that a provision be included in bidding documents and in contracts financed by ADB, requiring Bidders, suppliers and contractors to permit ADB or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

¹ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

- 3.2 All Bidders, consultants, contractors, suppliers, and other third parties engaged or involved in ADB-related activities have a duty to cooperate fully in any screening or investigation when requested by ADB to do so. Such cooperation includes, but is not limited to, the following:
- (a) being available to be interviewed and replying fully and truthfully to all questions asked;
 - (b) providing ADB with any items requested that are within the party's control including, but not limited to, documents and other physical objects;
 - (c) upon written request by ADB, authorizing other related entities to release directly to ADB such information that is specifically and materially related, directly or indirectly, to the said entities or issues which are the subject of the investigation;
 - (d) cooperating with all reasonable requests to search or physically inspect their person and/or work areas, including files, electronic databases, and personal property used on ADB activities, or that utilizes ADB's Information and Communications Technology (ICT) resources or systems (including mobile phones, personal electronic devices, and electronic storage devices such as external disk drives);
 - (e) cooperating in any testing requested by ADB, including but not limited to, fingerprint identification, handwriting analysis, and physical examination and analysis; and
 - (f) preserving and protecting confidentiality of all information discussed with, and as required by, ADB.
- 3.3 All Bidders, consultants, contractors and suppliers shall ensure that, in its contract with its sub-consultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such sub-consultants, Subcontractors, and other third parties similarly undertake the foregoing duty to cooperate fully in any screening or investigation when requested by ADB to do so.
- 3.4 The Employer hereby puts the Bidder on notice that the Bidder or any Joint Venture partner of the Bidder (if any) may not be able to receive any payments under the Contract if the Bidder or any of its Joint Venture partners, as appropriate, is, or is owned (in whole or in part) by a person or entity subject to applicable sanctions.
- 3.5 Furthermore, Bidders shall be aware of the provision stated in Subclause 1.15 and 15.6 of the Conditions of Contract.

4. Eligible Bidders

- 4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5—or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. In the case of a Joint Venture,
- (a) all partners shall be jointly and severally liable; and
 - (b) the Joint Venture shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the Joint Venture during the bidding process and, in

the event the Joint Venture is awarded the Contract, during contract execution.

- 4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed Subcontractors or Suppliers for any part of the Contract including related services.
- 4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in the bidding process if any of, including but not limited to, the following apply:
- (a) they have controlling shareholders in common; or
 - (b) they receive or have received any direct or indirect subsidy from any of them; or
 - (c) they have the same legal representative for purposes of this bid; or
 - (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
 - (e) a Bidder participates in more than one bid in this bidding process, either individually or as a partner in a Joint Venture, except for alternative offers permitted under ITB 13 of the Bidding Document. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3(a)-(d) above, this does not limit the participation of a Bidder as a Subcontractor in another Bid or of a firm as a Subcontractor in more than one Bid; or
 - (f) a Bidder, Joint Venture partner, associates, parent company, or any affiliated entity, participated as a Consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
 - (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer or Borrower as Engineer for the contract; or
 - (h) a Bidder would be providing goods, works, or nonconsulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm.
- 4.4 A firm shall not be eligible to participate in any procurement activities under an ADB-financed, -administered, or -supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for

Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.

- 4.5 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not a dependent agency of the Employer.
- 4.6 A Bidder shall not be under suspension from bidding by the Employer as the result of the execution of a Bid-Securing Declaration.
- 4.7 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.8 Firms shall be excluded if by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.
- 4.9 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.
- 5. Eligible Materials, Equipment and Services**
- 5.1 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2, and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment, and services.
- 5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

- 6. Sections of Bidding Document**
- 6.1 The Bidding Document consist of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with any addenda issued in accordance with ITB 8.
- PART I Bidding Procedures**
 Section 1 - Instructions to Bidders (ITB)
 Section 2 - Bid Data Sheet (BDS)
 Section 3 - Evaluation and Qualification Criteria (EQC)
 Section 4 - Bidding Forms (BDF)
 Section 5 - Eligible Countries (ELC)
- PART II Requirements**
 Section 6 - Employer's Requirements (ERQ)
- PART III Conditions of Contract and Contract Forms**
 Section 7 - General Conditions of Contract (GCC)
 Section 8 - Particular Conditions of Contract (PCC)
 Section 9 - Contract Forms (COF)

- 6.2 The IFB issued by the Employer is not part of the Bidding Document.
- 6.3 The Employer is not responsible for the completeness of the Bidding Document and their addenda, if they were not obtained directly from the source stated by the Employer in the IFB.
- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
- 7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting**
- 7.1 A prospective Bidder requiring any clarification on the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS or raise his inquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received no later than 21 days prior to the deadline for submission of bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 22.2.
- 7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than 1 week before the meeting.
- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.

- 7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
- 8. Amendment of Bidding Document**
- 8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Document by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2

C. Preparation of Bids

- 9. Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10. Language of Bid**
- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.
- 11. Documents Comprising the Bid**
- 11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, both envelopes enclosed together in an outer single envelope.
- 11.2 The Technical Bid shall comprise the following:
- (a) Letter of Technical Bid;
 - (b) Bid Security or Bid-Securing Declaration, in accordance with ITB 19;
 - (c) alternative Bids, if permissible, in accordance with ITB 13;
 - (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
 - (e) documentary evidence in accordance with ITB 17, establishing the Bidder's qualifications to perform the contract;
 - (f) Technical Proposal in accordance with ITB 16; and
 - (g) any other document required in the BDS.
- 11.3 The Price Bid shall comprise the following:
- (a) Letter of Price Bid;
 - (b) completed Price Schedules, in accordance with ITB 12 and ITB 14;
 - (c) alternative price Bids, at Bidder's option and if permissible, in accordance with ITB 13; and

(d) any other document required in the BDS.

11.4 In addition to the requirements under ITB 11.2, Bids submitted by a Joint Venture shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement.

12. Letters of Bid and Schedules

12.1 The Letters of Technical Bid and Price Bid, and the Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Section 4 (Bidding Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested and as required in the BDS.

13. Alternative Bids

13.1 Unless otherwise indicated in the BDS, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion.

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Document must first price the Employer's design as described in the Bidding Document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.

13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section 6 (Employer's Requirements). The method for their evaluation will be stipulated in Section 3 (Evaluation and Qualification Criteria).

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Letter of Price Bid and in the Bill of Quantities shall conform to the requirements specified below.

14.2 The Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.

14.3 The price to be quoted in the Letter of Price Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.

14.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Price Bid, in accordance with ITB 12.1.

14.5 The prices shall be either fixed or adjustable as specified in the BDS.

- (a) In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price will be treated as nonresponsive and rejected.
- (b) In the case of Adjustable Price, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport, and contractor's equipment in accordance with the provisions of the Conditions of Contract. A Bid submitted with a fixed price will be treated as nonresponsive and be rejected. The Bidder shall furnish the indexes and weightings for the price adjustment formulas in the Tables of Adjustment Data included in Section 4 (Bidding Forms) and the Employer may require the Bidder to justify its proposed indexes and weightings. Any bid that omits indexes and weightings shall be subject to clarification with the Bidder.

14.6 If so indicated in ITB 1.1, bids are being invited for individual contracts or for any combination of contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all contracts are submitted and opened at the same time.

14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

15. Currencies of Bid and Payment

15.1 The unit rates and the prices shall be quoted by the Bidder entirely in the currency specified in the BDS.

15.2 Bidders shall indicate the portion of the bid price that corresponds to expenditures incurred in the currency of the Employer's country in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).

15.3 Bidders expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country and wishing to be paid accordingly may indicate the other currencies in the Schedule of Payment Currencies included in Section 4 (Bidding Forms).

15.4 The rates of exchange to be used by the Bidder for currency conversion during bid preparation shall be the selling rates for similar transactions prevailing on the date 28 days prior to the deadline for submission of bids published by the source specified in the BDS. If exchange rates are not so published for certain currencies, the Bidder shall state the rates used and the source. Bidders should note that for the purpose of payments, the exchange rates confirmed by the source specified in the BDS as the selling rates prevailing 28 days prior to the deadline for submission of Bids shall apply for the duration of the Contract so that no currency exchange risk is borne by the Bidder.

15.5 Foreign currency requirements indicated by the Bidders in the Schedule of Payment Currencies shall include but not limited to the specific requirements for

- (a) expatriate staff and labor employed directly on the Works;

- (b) social, insurance, medical and other charges relating to such expatriate staff and labor, and foreign travel expenses;
 - (c) imported materials, both temporary and permanent, including fuels, oil and lubricants required for the Works;
 - (d) depreciation and usage of imported Plant and Contractor's Equipment, including spare parts, required for the Works;
 - (e) foreign insurance and freight charges for imported materials, Plant and Contractor's Equipment, including spare parts; and
 - (f) overhead expenses, fees, profit, and financial charges arising outside the Employer's country in connection with the Works.
- 15.6 Bidders may be required by the Employer to clarify their foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Payment Currencies are reasonable and responsive to ITB 15.3 above, in which case a detailed breakdown of its foreign currency requirements shall be provided by the Bidder.
- 15.7 Bidders should note that during the progress of the Works, the foreign currency requirements of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor in order to reflect any changes in foreign currency requirements for the Contract, in accordance with Subclause 14.15 of the Conditions of Contract. Any such adjustment shall be effected by comparing the percentages quoted in the bid with the amounts already used in the Works and the Contractor's future needs for imported items.
- 16. Documents Comprising the Technical Proposal**
- 16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule, and any other information as stipulated in Section 4 (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17. Documents Establishing the Qualifications of the Bidder**
- 17.1 To establish its qualifications to perform the Contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section 4 (Bidding Forms).
- 17.2 Domestic Bidders, individually or in Joint Ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility as described in ITB 36.
- 18. Period of Validity of Bids**
- 18.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 19, it shall also be extended 28 days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its Bid.
- 19. Bid Security/Bid-Securing Declaration**
- 19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid

security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.

- 19.2 If a Bid-Securing Declaration is required pursuant to ITB 19.1, it shall use the form included in Section 4 (Bidding Forms). The Employer will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if the Bid-Securing Declaration is executed.
- 19.3 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms:
- (a) an unconditional bank guarantee,
 - (b) an irrevocable letter of credit,
 - (c) a cashier's or certified check, or
 - (d) SWIFT message in the form of MT760.
- all from a reputable source from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section 4 (Bidding Forms) or another form acceptable to the Employer. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.
- 19.4 Unless otherwise specified in the BDS, any Bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive.
- 19.5 If a bid security is specified pursuant to ITB 19.1, the bid security of unsuccessful Bidders shall be returned promptly upon the successful Bidder's furnishing of the performance security pursuant to ITB 45.
- 19.6 If a bid security is specified pursuant to ITB 19.1, the bid security of the successful Bidder shall be returned promptly once the successful Bidder has signed the Contract and furnished the required performance security.
- 19.7 The bid security may be forfeited or the Bid Securing Declaration executed, if
- (a) notwithstanding ITB 24.3, a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 18.2; or
 - (b) the successful Bidder fails to
 - (i) sign the Contract in accordance with ITB 44;
 - (ii) furnish a performance security in accordance with ITB 45;
 - (iii) accept the arithmetical correction of its Bid in accordance with ITB 34; or
 - (iv) furnish a domestic preference security, if so required.
- 19.8 If the bid security is required as per ITB 19.1, the bid security of a Joint Venture shall be in the name of the Joint Venture that submits the Bid.

If the Joint Venture has not been legally constituted at the time of bidding, the bid security shall be in the name of any or all of the Joint Venture partners. If the Bid-Securing Declaration is required as per ITB 19.1, the Bid-Securing Declaration of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the Bid-Securing Declaration shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.

20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original set of the Technical Bid and one original set of the Price Bid comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID." Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE." In addition, the Bidder shall submit copies of the Technical and Price Bids, in the number specified in the BDS, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. If a Bidder submits a deficient authorization, the Bid shall not be rejected in the first instance. The Employer shall request the Bidder to submit an acceptable authorization within the number of days as specified in the BDS. Failure to provide an acceptable authorization within the period as stated in the Employer's request shall cause the rejection of the Bid. If either the Letter of Technical Bid or Letter of Price Bid or Bid-Securing Declaration (if applicable) is not signed, the Bid shall be rejected.
- 20.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

- 21.1 Bidders may always submit their Bids by mail or by hand. When so specified in the BDS, Bidders shall have the option of submitting their Bids electronically. Procedures for submission, sealing, and marking are as follows:
- (a) Bidders submitting Bids by mail or by hand shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and each copy of the Price Bid, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL BID," "ORIGINAL - PRICE BID," and "COPY NO... - TECHNICAL BID" and "COPY NO.... - PRICE BID." These envelopes, the first containing the originals and the others containing copies, shall then be enclosed in one single envelope per set. If permitted in accordance with ITB 13, alternative Bids shall be similarly sealed, marked and included in the sets. The rest of the procedure shall be in accordance with ITB 21.2 and ITB 21.5.
 - (b) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in the BDS.
- 21.2 The inner and outer envelopes shall

- (a) bear the name and address of the Bidder;
 - (b) be addressed to the Employer in accordance with BDS 22.1; and
 - (c) bear the specific identification of this bidding process indicated in the BDS 1.1.
- 21.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid, in accordance with ITB 25.1.
- 21.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 25.7.
- 21.5 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.
- 22. Deadline for Submission of Bids**
- 22.1 Bids must be received by the Employer at the address and no later than the date and time indicated in the BDS.
- 22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 23. Late Bids**
- 23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24. Withdrawal, Substitution, and Modification of Bids**
- 24.1 A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2 (except for withdrawal notices, which do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be
- (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except for withdrawal notices, which do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION”; and
 - (b) received by the Employer no later than the deadline prescribed for submission of Bids, in accordance with ITB 22.
- 24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.
- 24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid or any extension thereof.
- 25. Bid Opening**
- 25.1 The Employer shall open the Technical Bids in public at the address, on the date and time specified in the BDS in the presence of Bidders` designated representatives and anyone who chooses to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as specified in the

BDS. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and the Price Bid are submitted together in one envelope, the Employer may reject the entire Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.

25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding Bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.

25.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 25.1. No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.

25.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 25.1.

25.5 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:

- (a) the name of the Bidder;
- (b) whether there is a modification or substitution;
- (c) the presence of a bid security or Bid-Securing Declaration, if required; and
- (d) any other details as the Employer may consider appropriate.

Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Employer attending bid opening. No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with ITB 23.1.

25.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum, the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative proposals; and the presence or absence of a bid security or Bid-Securing Declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

- 25.7 At the end of the evaluation of the Technical Bids, the Employer will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice of the opening of Price Bids.
- 25.8 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document and return their Price Bids unopened.
- 25.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
- 25.10 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:
- (a) the name of the Bidder;
 - (b) whether there is a modification or substitution;
 - (c) the Bid Prices, including any discounts and alternative offers; and
 - (d) any other details as the Employer may consider appropriate.

Only Price Bids discounts, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Price Bid and Bill of Quantities are to be initialed by at least three representatives of the Employer attending bid opening. No Bid shall be rejected at the opening of Price Bids.

- 25.11 The Employer shall prepare a record of the opening of Price Bids that shall include, as a minimum, the name of the Bidder, the Bid Price (per lot if applicable), any discounts, and alternative offers. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

26. Confidentiality

- 26.1 Information relating to the examination, evaluation, comparison, and post qualification of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on the Contract award is communicated to all Bidders.
- 26.2 Any attempt by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.

- 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.
- 27. Clarification of Bids**
- 27.1 To assist in the examination, evaluation, and comparison of the Technical and Price Bids, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Price Bids, in accordance with ITB 34.
- 27.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.
- 28. Deviations, Reservations, and Omissions**
- 28.1 During the evaluation of Bids, the following definitions apply:
- (a) "Deviation" is a departure from the requirements specified in the Bidding Document;
 - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
 - (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
- 29. Examination of Technical Bids**
- 29.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.
- 29.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer shall be rejected.
- (a) Letter of Technical Bid;
 - (b) written confirmation of authorization to commit the Bidder;
 - (c) Bid Security or Bid-Securing Declaration, if applicable; and
 - (d) Technical Proposal in accordance with ITB 16.
- 30. Responsiveness of Technical Bid**
- 30.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.
- 30.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,
- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

30.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, Technical Proposal, in particular, to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation, or omission.

30.4 If a Bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

31. Nonmaterial Nonconformities

31.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid that do not constitute a material deviation, reservation, or omission.

31.2 Provided that a Technical Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

31.3 Provided that a Technical Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section 3 (Evaluation and Qualification Criteria).

32. Qualification of the Bidder

32.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).

32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1. Unless permitted in the BDS, the determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, Subcontractors (other than Specialist Subcontractors if permitted in ITB 33.2 of the Bidding document), or any other firm(s) different from the Bidder.

32.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. The Employer reserves the right to reject the bid of any bidder found to be in circumstances described in GCC 15.2(e). A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.

33. Subcontractors

33.1 Unless otherwise stated in the BDS, the Employer does not intend for the contractor to execute any specific elements of the Works through nominated subcontractors.

33.2 If subcontractors are proposed for any of the key activities listed in Section 3 (Evaluation and Qualification) Criteria 2.4.2, they shall be

considered as “Specialist Subcontractors” and shall meet qualification requirements for the relevant key activities.

**34. Correction of
Arithmetical
Errors**

34.1 During the evaluation of Price Bids, the Employer shall correct arithmetical errors on the following basis:

- (a) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected.
- (b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
- (c) If there is a discrepancy between the bid price in the Summary of Bill of Quantities and the bid amount in item (c) of the Letter of Price Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Price Bid will be corrected.
- (d) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a), (b) and (c) above.

34.2 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its Bid shall be disqualified and its bid security may be forfeited or its Bid-Securing Declaration executed.

**35. Conversion to
Single Currency**

35.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified in the BDS.

**36. Domestic
Preference**

36.1 Unless otherwise specified in the BDS, domestic preference shall not apply.

**37. Evaluation and
Comparison of
Price Bids**

37.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

37.2 To evaluate the Price Bid, the Employer shall consider the following:

- (a) the bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including Daywork items, where priced competitively;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 34.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.4;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 35;
- (e) adjustment for nonmaterial nonconformities in accordance with ITB 31.3;
- (f) assessment whether the bid is abnormally low in accordance with ITB 38; and

(g) application of all the evaluation factors indicated in Section 3 (Evaluation and Qualification Criteria).

37.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.

37.4 If this Bidding Document allows Bidders to quote separate prices for different contracts, and the award to a single Bidder of multiple contracts, the methodology to determine the lowest evaluated price of the contract combinations, including any discounts offered in the Letter of Price Bid, is specified in Section 3 (Evaluation and Qualification Criteria).

37.5 The Employer shall compare all substantially responsive Bids to determine the lowest evaluated Bid price, in accordance with ITB 37.2.

38. Abnormally Low bids

38.1 An abnormally low bid is one where the bid price, in combination with other elements of the bid, appears to be so low that it raises concerns as to the capability of the Bidder to perform the contract for the offered bid price.

38.2 When the offered bid price appears to be abnormally low, the Employer shall undertake a three-step review process as follows:

(a) identify abnormally low costs and unit rates by comparing them with the engineer's estimates, other substantially responsive bids, or recently awarded similar contracts;

(b) clarify and analyze the bidder's resource inputs and pricing, including overheads, contingencies and profit margins; and

(c) decide whether to accept or reject the bid.

38.3 With regard to ITB 38.2 (b) above, the Employer will seek a written explanation from the bidder of the reasons for the offered bid price, including a detailed analysis of costs and unit prices, by reference to the scope, proposed methodology, schedule, and allocation of risks and responsibilities. This may also include information regarding the economy of the manufacturing process; the services to be provided, or the construction method to be used; the technical solutions to be adopted; and any exceptionally favorable conditions available to the bidder for the works, equipment or services proposed.

38.4 After examining the explanation given and the detailed price analyses presented by the bidder, the Employer may:

(a) accept the bid, if the evidence provided satisfactorily accounts for the low bid price and costs, in which case the bid is not considered abnormally low;

(b) accept the bid, but require that the amount of the performance security be increased at the expense of the bidder to a level sufficient to protect the Employer against financial loss. The amount of the performance security shall generally be not more than 20% of the contract price; or

(c) reject the bid if the evidence provided does not satisfactorily account for the low bid price, and make a similar determination for the next ranked bid, if required.

39. Unbalanced or Front-Loaded Bids

39.1 If the Bid, which results in the lowest evaluated Bid Price, is seriously unbalanced or front-loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all

items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed, as well as the pricing and sources of materials, equipment and labor.

39.2 After the evaluation of the information and detailed price analyses presented by the Bidder, the Employer may as appropriate:

- (a) accept the Bid; or
- (b) accept the Bid, but require that the total amount of the Performance Security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract subject to ITB 45.2; or
- (c) reject the Bid and make a similar determination for the next ranked bid.

40. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

40.1 The Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

41. Notice of Intention for Award of Contract

41.1 If Standstill provisions apply as specified in the BDS, the standstill period shall be defined in the BDS to specify the duration subsequent to notification of intention for award of contract (before making the actual contract award) within which any unsuccessful bidder can challenge the proposed award.

F. Award of Contract

42. Award Criteria

42.1 The Employer shall award the Contract to the Bidder whose offer has been determined in line with ITB 37 to ITB 39 above to be the lowest evaluated Bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

43. Notification of Award

43.1 Prior to the expiration of the period of bid validity and upon expiry of the standstill period specified in ITB 41.1, or upon satisfactory resolution of a complaint filed within standstill period, if applicable, the Employer shall transmit the Notification of Award using the form included in Section 9 (Contract Forms) to the successful Bidder, in writing, that its Bid has been accepted.

43.2 Unless standstill period applies, upon notification of award, unsuccessful Bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their Bids were not selected. The Employer shall promptly respond in writing and/or in a debriefing meeting to any unsuccessful Bidder who, after publication of contract award, requests a debriefing.

43.3 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

43.4 Within 2 weeks of the award of contract or expiry of the standstill period, where such period applies, or, if a complaint has been filed within the standstill period, upon receipt of ADB's confirmation of satisfactory resolution of the complaint, the borrower shall publish in an English language newspaper or widely known and freely accessible website the

results identifying the bid and lot or package numbers, as applicable and the following information:

- (a) name of each Bidder who submitted a Bid;
- (b) bid prices as read out at bid opening;
- (c) name and evaluated prices of each Bid that was evaluated;
- (d) name of Bidders whose bids were rejected and the reasons for their rejection; and
- (e) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

44. Signing of Contract

44.1 Promptly after notification, the Employer shall send the successful Bidder the Contract Agreement.

44.2 Within 28 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

45. Performance Security

45.1 Within 28 days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, subject to ITB 38 and ITB 39, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Employer. If the institution issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

45.2 Failure of the successful Bidder to submit the abovementioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. In that event, the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.

45.3 The above provision shall also apply to the furnishing of a domestic preference security if so required.

46. Bidding-Related Complaints

46.1 The procedures for dealing with Bidding-Related Complaints arising out of this bidding process are specified in the BDS.

Section 2: Bid Data Sheet

This Section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section 1 (Instructions to Bidders).

A. General

ITB 1.1	The number of the Invitation for Bids (IFB) is: IRSHUPSP/NCB/04
ITB 1.1	The Employer is: Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu. The authorized representative of the Employer is: Superintending Engineer, Project Monitoring Unit, Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project, Tamil Nadu Urban Habitat Development Board, Chennai.
ITB 1.1	The name of the open competitive bidding (OCB): Construction of 520 (G+3) tenements including Development works at Pallipalayam scheme in Komarapalayam Taluk at Namakkal District The identification number of the OCB is: IRSHUPSP/PAL/04 The number and identification of lots comprising this OCB is: None
ITB 2.1	The Borrower is: India
ITB 2.1	The name of the Project is: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu.

B. Contents of Bidding Documents

ITB 6.1	Add following at end of Para 6.1: The Bidding Document is in Two Parts. Part 1 is for Technical bid. Part 1 is in 3 Volumes. Volume 1 includes Section 1 to 9. Volume 2 includes Technical Specification; Volume 3 includes Drawings. Part 2 is for Price Bid which includes Price Bid form, Preamble to Bill of Quantities and Bill of Quantities.
ITB 6.3	The Bidding Document, its addenda and other documents and information arising out of or related to the requirements of the Bidding Document will be posted on e-procurement website (https://tntenders.gov.in)
ITB 7.1	For clarifications, bidder will submit the written queries to the procuring entity through email, and courier or deliver personally.

	<p>For <u>clarification purposes</u> only, the Employer's address is:</p> <p>The Superintending Engineer, Project Monitoring Unit, Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu, Tamil Nadu Urban Habitat Development Board, No.5, Kamarajar Salai, Chennai – 600 005, Tamil Nadu, India. E-mail: tnuhdbprocurement@gmail.com Telephone: +91 44 29862106</p> <p>Written response to queries will be published on the e-procurement website (https://tntenders.gov.in/).</p>
<p>ITB 7.4</p>	<p>A pre-bid meeting shall take place at the following date, time, and location:</p> <p>Date: 15 March, 2024</p> <p>Time: 14:00 hrs.</p> <p>Location: O/o The Superintending Engineer, Project Monitoring Unit, Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu, Tamil Nadu Urban Habitat Development Board, No.5, KamarajarSalai, Chennai-600005,</p> <p><i>Bidders are advised to either attend the pre-bid meeting, or to submit their queries to Superintending Engineer, Project Monitoring Unit by e-mail to tnuhdbprocurement@gmail.com before the date and time specified for pre-bid meeting.</i></p> <p>There will also be online (virtual) pre-bid meeting at the same date and time. Bidders interested to attend virtual pre-bid meeting should inform to the Employer through e-mail to tnuhdbprocurement@gmail.com.</p> <p>Such interested bidder should convey their details including name of bidder, mobile phone number and mail ID to connect them before 15 March, 2024 at 12.00 hrs. Meeting link will be shared to interested bidders to attend prebid meeting.</p> <p>A site visit shall not be organized by the Employer.</p>
<p>ITB 7.6</p>	<p>The Employer shall publish the Minutes of the Meeting at the Employer's e-procurement website (https://tntenders.gov.in/)</p>
<p>ITB 8.2</p>	<p>Add the following at the end of the ITB 8.2:</p> <p>The Employer shall publish the Addendum at the Employer's e-procurement website (https://tntenders.gov.in/)</p> <p>The Employer should not be faulted for bidder's failure to download the addendum or addenda.</p>

C. Preparation of Bids

ITB 10.1	The language of the Bid is: English
ITB 11.1	<p>Replace sub-clause 11.1 entirely with following:</p> <p>There are two components in the bid – Technical Bid and Price Bid. ITB 11.2 is for the Technical Bid and ITB 11.3 is for the Price Bid.</p>
ITB 11.2 (g)	<p>The Bidder shall submit with its Technical Bid the following additional documents:</p> <p>Not Applicable</p>
ITB 11.3 (d)	<p>The Bidder shall submit with its Price Bid the following additional documents:</p> <p>Not Applicable</p>
ITB 12.1	<p>The letter of Technical Bid furnished in section 4 of Technical Bid (Volume 1) and the letter of Price Bid and Bid forms furnished in Price Bid (Volume 2) of bid document shall be downloaded, typed or written in indelible ink, signed by a person duly authorized to sign on behalf of the Bidder, scan and then uploaded on e-proc website.</p> <p>The bidders will be required to enter only the rates of each item in the BOQ, in excel format. Except the rate all other cells will be locked. The BOQ template shall not be modified/replaced by the bidder.</p>
ITB 13.1	Alternative Bids Shall not be permitted.
ITB 13.2	Alternative times for completion Shall not be permitted.
ITB 13.4	<p>Alternative technical solutions shall be permitted for the following parts of the Works:</p> <p>None</p>
ITB 14.5	<p>The prices quoted by the Bidder shall be subject to adjustment. The index and weightings for the price adjustment formulas are provided in the tables of adjustment data included in Section 4 (Bidding Forms). The formula for adjusting the prices and explanatory details are specified in the Section 8: Particular Conditions of Contract, Part A – Contract Data subclause 13.8.</p> <p>However, bidder shall fill out the Tables of Adjustment Data in Section 4 (Bidding Forms).</p>

ITB 14.8	<p>Add the following new clause:</p> <p>Unit rates and prices for all items of works described in the Bill of Quantities shall be expressed in positive values. If unit rates and prices are expressed in negative values, the bid will be rejected. Any discount offered by the Bidder must be clearly stated in the Letter of Price Bid together with the Methodology of their application.</p>
ITB 15.1	<p>The unit rates and the prices shall be quoted by the Bidder entirely in currency of the Employer's country (i.e. Indian Rupees (INR))</p>
ITB 15.4	<p>The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by Reserve Bank of India or agency authorized by Reserve Bank of India".</p>
ITB 18.1	<p>The bid validity period shall be 180 (One hundred Eighty) days.</p>
ITB 19.1	<p>The Bidder shall furnish a bid security in the amount of INR. 07.05 million (Rupees Seven million and Fifty Thousand only) using the instruments specified in ITB 19.3</p> <p>The Bid-Securing Declaration shall not be permitted.</p>
ITB 19.2	<p>Clause not applicable.</p>
ITB 19.3	<p>Replace ITB19.3 with the following:-</p> <p>The bid security shall be, at the Bidder's option, in any of the following forms:</p> <ol style="list-style-type: none"> a. Online transaction in e-procurement website (https://tntenders.gov.in/) at the time of submission of bid; b. an unconditional and irrevocable bank guarantee in the name of the Executive Engineer, PID-II, Namakkal Division, Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu, Tamil Nadu Urban Habitat Development Board, Namakkal; <p>In the case of a bank guarantee, the bid security shall be submitted using the Bid Security Form included in Section 4 (Bidding Forms). The bid security shall be valid for a period of twenty-eight days (28) beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.</p> <ol style="list-style-type: none"> a. The bank guarantee shall be issued by a reputable bank located in the Employer's country, which may include scheduled banks or nationalized banks, or by a foreign reputable bank outside the Employer's country, through a correspondent bank located in the Employer's country. All such bank guarantee must necessarily be payable at Chennai b. If bid security is provided in the form of an unconditional and irrevocable bank guarantee, the same shall be scanned and uploaded by clicking "YES" to the EMD Exemption option in e-procurement website (https://tntenders.gov.in/) at the time of submission of bid and the original Bank guarantee shall be submitted to the office of Superintending Engineer, Project Monitoring Unit, 1st Floor, Tamil Nadu Urban Habitat Development Board, No. 5, Kamarajar Salai,

	Chennai-05 by 16.00 hours on 04 April, 2024 . Technical bid of only those bidders will be opened who have submitted the Bank guarantee (if applicable) in original as stated above
ITB 19.4	Subject to the succeeding sentences, any bid not accompanied by an irrevocable and callable bid security shall be rejected, by the Employer as nonresponsive. If a Bidder submits a bid security that (i) deviates in form, amount, and/or period of validity, or (ii) does not provide sufficient identification of the Bidder (including, without limitation, failure to indicate the name of the Joint Venture or, where the Joint Venture has not yet been constituted, the names of all future Joint Venture Partners), the Employer shall request the Bidder to submit a compliant bid security within fifteen (15) days of receiving such a request. Failure to provide a compliant bid security within the prescribed period of receiving such a request shall cause the rejection of the Bid.
ITB 20.1	In addition to the original Bid, the number of copies is: Not applicable
ITB 20.2	<p>The contents of clause 20.2 and 20.3 of ITB shall be replaced as below:</p> <p>The Bidders have to submit their Bids online, encrypt their Bid. The submission of Bid has to be done by submission of Bid Seals (Hashes) of all the envelopes and documents related to the Bid and is required to be uploaded as per time schedule mentioned in the key dates of the Invitation for Bid after signing of the same by the Digital signatures of appropriate authorised representative.</p> <p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <p>An organizational document, board resolution or its equivalent, or power of attorney specifying the representative's authority to sign the Bid on behalf of, and to legally bind, the Bidder. If the Bidder is an intended or an existing Joint Venture, the power of attorney should be signed by all partners and specify the authority of the named representative of the Joint Venture to sign on behalf of, and legally bind, the intended or existing Joint Venture. If the Joint Venture has not yet been formed, also include evidence from all proposed Joint Venture partners of their intent to enter into a Joint Venture in the event of a contract award in accordance with ITB 11.4.</p>
ITB 20.2	The Bidder shall submit an acceptable authorization within fourteen (14) days.

D. Submission and Opening of Bids

ITB 21.1	<p>Replace the sub-clause as:</p> <p>Bidders <u>shall</u> submit their Bids, only, electronically through e-procurement website(https://tntenders.gov.in/)</p> <p>Bids shall be digitally signed. Submission by any other mode shall render the bidder non-responsive.</p>
ITB 21.1 (b)	If Bidders shall have the option of submitting their Bids electronically, the electronic bidding submission procedures shall be:

E-Tendering” means submission of a digitally signed bid (by a valid digital certificate which has been issued by a licensed Certifying Agency, as approved by Controller of Certifying Agency) which is stored in Time Stamped electronic sealed tender box.

Special Instructions to the bidders for the e-submission of the bids online through this e-Procurement Portal - (<https://tntenders.gov.in/>)

1. The Bidders must submit bids online following the instructions appearing on the screen. Detailed guidelines for e-procurement are also available on the e-procurement portal. Bidder should do Online Enrolment in this Portal.
2. Bidder then logs into the portal giving user id / password chosen during enrollment.
3. The e-token that is registered should be used by the bidder and should not be misused by others.
4. DSC once mapped to an account cannot be remapped to any other account. It can only be Deactivated.
5. The Bidders can update well in advance, the documents such as certificates, purchase order details etc., under My Documents option and these can be selected as per tender requirements and then attached along with bid documents during bid submission. This will ensure lesser upload of bid documents.
6. After downloading / getting the schedules, the Bidder should go through them carefully and then submit the documents as per the bid document, otherwise, the bid will be rejected.
7. The BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.
8. If there are any clarifications, this may be obtained online through the e-Procurement Portal, or through the contact details given in the bid document. Bidder should take into account of the addendums published before deadline for submitting the bids online.
9. Bidder, in advance, should prepare the bid documents to be submitted as indicated in the schedule and they should be in PDF/XLS/RAR/DWF formats. If there is more than one document, they can be clubbed together.
10. Bidder should arrange for the Bid Security in the amount as specified in the bid using the instruments specified in ITB 19.3 and submit it online
11. The bidder reads the terms and conditions and accepts the same to proceed further to submit the bids
12. The bidders are advised to submit the bid online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.
13. The Maximum size of the file uploaded by the bidders shall not exceed 40 MB. . Moreover, the upload is decided on the Memory available at the Client System as well as the Network bandwidth available at the client side at that point of time. In order to reduce the file size, bidders are suggested to scan the documents in 75-100 DPI so that the clarity is maintained and also the size of file also gets reduced. This will help in quick uploading even at very low bandwidth speeds.

	<ol style="list-style-type: none"> 14. It is important to note that, the bidder has to Click on the Freeze Bid Button, to ensure that he/she completes the Bid Submission Process. Bids Which are not Frozen are considered as Incomplete/Invalid bids and are not considered for opening/evaluation purposes. 15. The Employer will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues. 16. At the time of freezing the bid, the e-Procurement system will give a successful bid updation message after uploading all the documents submitted and then a bid summary will be shown with the bid no, date & time of submission of the bid with all other relevant details. The documents submitted by the bidders will be digitally signed using the e-token of the bidder and then submitted. 17. After the bid submission, the bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid. The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening event. 18. Successful bid submission from the system means, the bids as uploaded by the bidder is received and stored in the system. System does not certify for its correctness. 19. The bidder should see that the bids submitted should be free from virus and if the documents could not be opened, due to virus, during bid opening, the bid is liable to be rejected 20. The time that is displayed from the server clock at the top of the tender Portal, will be valid for all actions of requesting bid submission, bid opening etc., in the e-Procurement portal. The Time followed in this portal is as per Indian Standard Time (IST) which is GMT+5:30. The bidders should adhere to this time during bid submission. 21. All the data being entered by the bidders would be encrypted at the client end, and the software uses PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission and not viewable by any one until the time of bid opening. Overall, the submitted bid and attachment become readable only after the tender opening by the authorized individual. 22. During transmission of bid document, the confidentiality of the bids is maintained since the data is transferred over secured Socket Layer (SSL) with 256 bit encryption technology. Data encryption of sensitive fields is also done. 23. The bidders are requested to submit the bids through online e-Procurement system well before the bid submission end date and time (as per Server System Clock). 24. Key Dates: The bidders are strictly advised to follow the time schedule (Key dates) of the bid on their side for tasks and responsibilities to participate in the bid, as all the stages of each bid are locked before the start time and date and after the end time and date for the relevant stage of the bid as set by the Department.
ITB 22.1	<p>Bids shall be submitted electronically on e-Procurement site (https://tntenders.gov.in/, between 10:00 hours on 25 March, 2024 and 16:00 hours on, 04 April, 2024</p> <p>Bid submission timelines will be defined as per the e-Procurement server clock only.</p>

ITB 23.1	<p>Sub clause 23.1 shall be replaced with:</p> <p>The e-procurement system would not allow any late submission of Bids after due date and time as per server system. After electronic online proposal submission, the system will generate a unique Identification number which is time stamped. This shall be treated as acknowledgement of the Bid submission.</p>
ITB 23.2	<p>Electronic submission system will automatically lock the tender and disallow bid submission after the deadline for submission of bids.</p>
ITB 24.1 & 24.2	<p>Replace ITB 24.1 to 24.2 with following:</p> <p>Bidders submitting their Bids electronically may withdraw substitute or modify their bids by logging at the e-Proc website indicated in ITB 6.3 of the BDS, no later than the deadline for submission of bid, as indicated in ITB 22.1.</p>
ITB 24.3	<p>Add the following at the end of sub-clause</p> <p>Bids withdrawn in accordance with above procedure shall remain encrypted.</p>
ITB 25.1	<p>Delete ITB 25.1, 25.2, 25.3, 25.4 and 25.5 and replace with the following:</p> <p>Electronic opening procedure shall be as follows:</p> <ol style="list-style-type: none"> 1. The Employer shall open the technical bids online in public in the presence of Bidders or designated representative of the Bidders, who chose to attend on: Date: 04 April, 2024 Time: 16:15 hours Location: O/o The Superintending Engineer, Project Monitoring Unit, Tamil Nadu Urban Habitat Development Board, Chennai-05. 2. Bidders have the option to view, online, the status of the bid opening at the Employer's website indicated in ITB 6.3 of the BDS. After opening of Technical Bids, Bidders will not have the option to view the bid documents of their competitors online from their respective logins under the link "(Bid Opening Live)". 3. Bids shall be opened one at a time on the e-procurement portal, reading out the name of the bidder, the presence or absence of a Bid Security, remittance of cost towards procurement of bidding document, and any other details as the Employer may consider appropriate. 4. The Employer shall prepare a record of the opening of Technical Bids that shall include salient details as above. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. 5. The Price Bids will remain unopened and encrypted in the Employer's website indicated in ITB 1.2 of the BDS, until the specified time of their opening. <p>If the Technical Bid and the Price Bid are submitted together in the same on-line folder, the Employer will reject the entire Bid.</p>

ITB 25.5	The Letter of Technical Bid shall be initialed by atleast two representatives of the Employer attending Bid opening.
ITB 25.10	The Letter of Price Bid and priced bill of quantities shall be initialed by two representatives of the Employer attending Bid opening.

E. Evaluation and Comparison of Bids

ITB 27.1	<p>Add the following at the end of ITB 27.1</p> <p>Communication during bid evaluation for the purpose of clarification will be done electronically with the normal restrictions against modification of the substance and price of the bid.</p> <p>There is a separate heading of Clarifications in the portal and mode will be only through the e-procurement site. The Provision is available in the software and can be enabled, if required. If enabled, the clarifications can be obtained online and all logs of such online communications through the application are stored in the system</p>
ITB 32.2	The qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, shall not be permitted.
ITB 33.1	The Employer does not intend for the contractor to execute any specific elements of the Works through nominated subcontractors.
ITB 35.1	<p>The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Indian Rupee</p> <p>The source of selling exchange rate shall be: Reserve Bank of India or agency authorized by Reserve Bank of India"</p> <p>The date for the selling exchange rate shall be: 28 days prior to bid submission deadline.</p>
ITB 36.1	Domestic preference shall not apply.
ITB 38.4(b)	<p>Add following at end of subclause:</p> <p>"In case of a low bid price, the amount of additional performance security will be calculated as follows:</p> <p>Amount of additional performance security = 0.9 x engineer's estimate – evaluated bid price of the bidder."</p> <p>The amount of additional performance security due to abnormally low bid and unbalanced or front-loaded bid shall be subjected to maximum of 10% of contract amount</p>
ITB 41.1	Standstill provisions shall apply. The duration of standstill period will be fifteen (15) days from the date of notice of intention for award of contract.

	<p>The Employer shall, at the start of the standstill period, notify in writing each bidder that submitted a bid, of its intention to award a contract to the successful bidder at the end of standstill period. The notification (using the form included in Section 9 (Contract Forms)) shall include the following information:</p> <ul style="list-style-type: none"> (a) the name of each Bidder who submitted a Bid; (b) the bid prices as read out at bid opening; (c) the name and evaluated prices of each Bid that was evaluated; (d) the name of bidders whose bids were rejected and the reasons for their rejection; (e) the name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded; and (f) a statement of the reason(s) the bid of the unsuccessful bidder to whom the notification is addressed was unsuccessful, unless the price information under (e) of this paragraph already reveals the reason.
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F. Award of Contracts

<p>ITB 43.4</p>	<p>Insert the following as instruction on the publication of contract award.</p> <p>The Employer shall publish the Contract Award Notice at the Employer's website www.tnuhdb.tn.gov.in</p>
<p>ITB 46.1</p>	<p>The procedures for Bidding-Related Complaints are referenced in the "Procurement Regulations for ADB Borrowers (Appendix 7)." The Bidder should submit its complaint following these procedures, in writing, to:</p> <p>Attention: Chief Engineer, North, Tamil Nadu Urban Habitat Development Board, No.5, Kamarajar Salai, Chennai – 600 005, Tamil Nadu, India. e-mail: tnuhdbprocurement@gmail.com Telephone: +91 44 29862106</p>

Section 3 - Evaluation and Qualification Criteria

- Without Prequalification -

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1. Evaluation

In addition to the criteria listed in ITB 37.2 (a)–(f), other relevant factors are as follows:

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section 6 (Employer's Requirements).

Non-compliance with equipment and personnel requirements described in Section 6 (Employer's Requirements) shall not normally be a ground for bid rejection and such non-compliance will be subject to clarification and rectification prior to contract award.

1.2 Completion Time

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows: Alternative Completion Time not permitted.

1.3 Technical Alternatives

Technical alternatives, if permitted under ITB 13.4, will be evaluated as follows: Technical alternatives not Permitted.

1.4 Specialist Subcontractors

Only the specific experience of Specialist Subcontractors for key activities specified in criterion 2.4.2 Construction Experience in Key Activities will be considered. The experience of similar size and nature and financial resources of the Specialist Subcontractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

1.5 Quantifiable Nonconformities and Omissions

Subject to ITB 14.2 and ITB 37.2, the evaluated cost of quantifiable nonconformities including omissions, is determined as follows:

"Pursuant to ITB 31.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, including omissions in Daywork where competitively priced but excluding omission of prices in the Bill of Quantities. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of Bids."

1.6 Domestic Preference

If domestic preference is provided for under ITB 36.1, the following procedure shall apply: **Not applicable**

1.7 Multiple Contracts: Not Applicable

2. Qualification

2.1 Eligibility

Criteria	Compliance Requirements			Documents	
	Single Entity	Joint Venture		Submission Requirements	
All Partners Combined		Each Partner	One Partner		
2.1.1 Nationality					
Nationality in accordance with ITB Sub clause 4.2.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI - 1; ELI - 2 with attachments
2.1.2 Conflict of Interest					
No conflicts of interest in accordance with ITB Sub clause 4.3.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
2.1.3 ADB Eligibility					
Not having been declared ineligible by ADB, as described in ITB Sub clause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
2.1.4 Government-Owned Entity					
Bidder required to meet conditions of ITB Sub clause 4.5.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI - 1; ELI - 2 with attachments
2.1.5 United Nations Eligibility					
Not having been excluded by an act of compliance with a United Nations Security Council resolution in accordance with ITB Sub clause 4.8.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.2 Historical Contract Non-Performance

2.2.1 History of Non-Performing Contracts

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Nonperformance of a contract ^a did not occur as a result of contractor default since 1st Jan, 2021 .	Must meet requirement	Must meet requirement	Must meet requirement ^b	N/A	Form CON-1

^a Nonperformance, as decided by the Employer, shall include all contracts where (i) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract; and (ii) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where the Employer's decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

^b This requirement also applies to contracts executed by the Bidder as Joint Venture member.

2.2.2 Suspension Based on Execution of Bid-Securing Declaration

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Not under suspension based on execution of a Bid-Securing Declaration pursuant to ITB 4.6.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid

2.2.3 Pending Litigation and Arbitration

Pending litigation and arbitration criterion shall apply.

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
All pending litigation and arbitration, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 50 % of the Bidder's net worth calculated as the difference between total assets and total liabilities.	must meet requirement	not applicable	must meet requirement	not applicable	Form CON - 1

2.3 Financial Situation

2.3.1 Historical Financial Performance

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last 3 Years (Financial Year *2020-21, 2021-22 and 2022-23; or as per international practice to demonstrate the current soundness of the Bidder's financial position. As a minimum, the Bidder's net worth for the last year calculated as the difference between total assets and total liabilities should be positive.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 1 with attachments

* The fiscal year (FY) of the Government of India and its agencies begins on 1 April and ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year starts, e.g., FY2020-21 begins on 1 April 2020 and ends on 31 March 2021. Foreign bidders may use other internationally accepted Financial year (FY). In case of non availability of data for the current year, data of previous year will be considered.

2.3.2 Average Annual Construction Turnover

Criteria Requirement	Compliance Requirements				Documents
	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Minimum average annual construction turnover, of INR 703 million calculated as total certified payments received for contracts in progress or completed, within the last 3 years (Financial Year 2020-21, 2021-22 and 2022-23)*. or as per International practice).	must meet requirement	must meet requirement	must meet 25 percent of the requirement	must meet atleast 40 percent of the requirement	Form FIN - 2

Note:

- (1) The fiscal year (FY) of the Government of India and its agencies begins on 1 April and ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year starts, e.g., FY2020-21 begins on 1 April 2020 and ends on 31 March 2021.
- (2) In case of non-availability of audited statement for the current year, statement of previous years will be considered.

2.3.3 Financial Resources

Criteria Requirement	Compliance Requirements				Documents Submission Requirements
	Single Entity	Joint Venture			
		All Partners Combined	Each Partner	One Partner	
For Single Entities: The Bidder must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its current contract commitments defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of INR 117 million .	must meet requirement	not applicable	not applicable	not applicable	Form FIN – 3 and Form FIN – 4
For Joint Ventures: (1) One partner must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its own current contract commitments defined in FIN - 4, meet or exceed its required share of INR 47 million from the total requirement for the Subject Contract. AND	not applicable	not applicable	not applicable	must meet requirement	Form FIN – 3 and Form FIN – 4
(2) Each partner must demonstrate that its financial resources defined in FIN - 3, less its financial obligations for its own current contract commitments defined in FIN - 4, meet or exceed its required share of INR 29 million from the total requirement for the Subject Contract. AND	not applicable	not applicable	must meet requirement	not applicable	Form FIN – 3 and Form FIN – 4
(3) The joint venture must demonstrate that the combined financial resources of all partners defined in FIN - 3, less all the partners' total financial obligations for the current contract commitments defined in FIN - 4, meet or exceed the total requirement for the Subject Contract of INR 117 million .	not applicable	must meet requirement	not applicable	not applicable	Form FIN – 3 and Form FIN – 4

2.4 Construction Experience

2.4.1 Contracts of Similar Size and Nature

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Participation as a contractor, Joint Venture partner, or Subcontractor, in at least one contract that has been successfully or substantially* completed within the period from 1 September, 2016 up to the bid submission date and that is similar to the proposed works, where the value of the Bidder's participation exceeds INR 352 million . The similarity of the Bidder's participation shall be based on project of multistory (2 storied or more) residential/commercial building etc	Must meet requirement	Not applicable	Not applicable	Must meet requirement	Form EXP - 1

* substantially completed means (i) the contractor has completed the works but could not commission the same because of hindrances beyond the control of contractor or (ii) contractor has completed and commissioned the works at least for the amount required for qualification, out of large size contract.

2.4.2 Construction Experience in Key Activities

May be complied with by the Bidder or by Specialist Subcontractor. In case of a Joint Venture Bidder, at least one of the partners must have experience in key activities if the Bidder itself will carry out the relevant key activity. In case if Specialist Subcontractors are proposed by the Bidder for key activities, each Specialist Subcontract must have experience in related key activity as a single entity.

Criteria	Compliance Requirements		Documents
	Requirement	Single Entity	Joint Venture	Submission Requirements
For the above or other contracts executed during the period stipulated in 2.4.1 above, a minimum construction experience in the following key activities:	must meet requirement	must meet requirement	Form EXP - 2
Construction of 0.4 MLD STP or Construction experience in decentralize waste water system with 0.4 MLD capacity as an alternative for construction of STP.			

Note:

1. Experience of the bidder earned by him as the JV partner or subcontractor will be considered to the limit of its share in the completed works shown in that JV or consortium agreement.
2. If the key activity is to be undertaken by a Specialist Subcontractor, for which specialist subcontractor is agreed, the Employer shall require evidence of the subcontracting agreement from the Bidder.

Section 4: Bidding Forms

- Without Prequalification -

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Letter of Technical Bid

The Bidder must accomplish the Letter of Technical Bid on its letterhead clearly showing the Bidder's complete name and address.

Date:

OCB No.: IRSHUPSP/PAL/04

Invitation for Bids No.: IRSHUPSP/NCB/04

The Superintending Engineer,
Project Monitoring Unit,
Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu
Tamil Nadu Urban Habitat Development Board,
No.5, Kamarajar Salai, Chennai – 600 005, Tamil Nadu, India.

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to execute in conformity with the Bidding Documents the following Works: Construction of 520 (G+3) tenements including Development works at Pallipalayam scheme in Komarapalayam Taluk at Namakkal District.
- (c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of ____ days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (d) Our firm, including any Subcontractors or Suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.
- (e) We, including any Subcontractors or Suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.
- (f) We are not participating, as a Bidder, either individually or as partner in a Joint Venture, in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (g) Our firm, Joint Venture partners, associates, parent company, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, are not subject to, or not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Asian Development Bank or a debarment imposed by the Asian Development Bank in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the Asian Development Bank and other development banks.¹

¹ These institutions include African Development Bank, European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB), and the World Bank Group. According to paragraph 9 of the Agreement, other international financial institutions may join upon the consent of all Participating Institutions and signature of a Letter of Adherence by the international financial institution substantially in the form provided (Annex B to the Agreement). Upon adherence, such international

- (h) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the Contract, are not, or have never

been, temporarily suspended, debarred, declared ineligible, or blacklisted by the Employer's country, any international organization, and other donor agency.

If so debarred, declared ineligible, temporarily suspended, or blacklisted, please state details (as applicable to each Joint Venture partner, associate, parent company, affiliate, subsidiaries, Subcontractors, and/or Suppliers):

- (i) Name of Institution: _____
 - (ii) Period of debarment, ineligibility, or blacklisting [*start and end date*]: _____
 - (iii) Reason for the debarment, ineligibility, or blacklisting: _____
- (i) Our firm's, Joint Venture partners, associates, parent company's affiliates or subsidiaries, including any Subcontractors or Suppliers key officers and directors have not been [*charged or convicted*] of any criminal offense (including felonies and misdemeanors) or infractions/violations of ordinance which carry the penalty of imprisonment.

If so charged or convicted, please state details:

- (i) Nature of the offense/violation: _____
 - (ii) Court and/or area of jurisdiction: _____
 - (iii) Resolution [*i.e. dismissed; settled; convicted/duration of penalty*]: _____
 - (iv) Other relevant details [*please specify*]: _____
- (j) We understand that it is our obligation to notify ADB should our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, be temporarily suspended, debarred or become ineligible to work with ADB or any other MDBs, the Employer's country, international organizations, and other donor agencies, or any of our key officers and directors be charged or convicted of any criminal offense or infractions/violations of ordinance which carry the penalty of imprisonment.
- (k) Our firm, Joint Venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, are not from a country which is prohibited to export goods to or receive any payments from the Employer's country by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations.
- (l) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB 4.5].²
- (m) We have not been suspended nor declared ineligible by the Employer based on execution of a Bid-Securing Declaration in accordance with ITB 4.6.
- (n) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

financial institution shall become a Participating Institution for purposes of the Agreement. Bidders are advised to check www.adb.org/integrity for updates.

² Use one of the two options as appropriate.

- (o) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.

- (p) We understand that any misrepresentation that knowingly or recklessly misleads, or attempts to mislead may lead to the automatic rejection of the Bid or cancellation of the contract, if awarded; and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015, as amended from time to time).

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

Letter of Price Bid

(Letter of Price bid provided in Volume 2: Price bid of document. The Bidder must accomplish the Letter of Price Bid on its letterhead clearly showing the Bidder's complete name and address)

Bid Security Bank Guarantee

*[Bank's name, and address of issuing branch or office]*³

Beneficiary: *[Name and address of the Employer]*

Date:

Bid Security No.:

We have been informed that *[name of the Bidder]* (hereinafter called "the Bidder") has submitted to you its bid dated *[please specify]* (hereinafter called "the Bid") for the execution of *[name of contract]* under Invitation for Bids No. *[please specify]* ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we *[name of bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[amount in words]* *[amount in figures]* upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Letters of Technical and Price Bid; or
- (b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
- (c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB, or (iii) fails or refuses to furnish a domestic preference security, if required.

This guarantee will expire (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder, or (ii) 28 days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.⁴

[Authorized signature(s) and bank's seal (where appropriate)]

³ All italicized text is for use in preparing this form and shall be deleted from the final document.

⁴ Or 758 as applicable.

Technical Proposal

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Personnel

Form PER – 1: Proposed Personnel

Bidder should provide the details of the proposed personnel and their experience record in the relevant Information Forms below for each candidate:

1.	Title of position
	Name
2.	Title of position
	Name
3.	Title of position
	Name
4.	Title of position
	Name
5.	Title of position
	Name
6.	Title of position
	Name
etc.	Title of position
	Name

-- Note --

All titles of positions will be as listed in Section 6 (Employer's Requirements).

Equipment

Form EQU: Equipment

The Bidder shall provide adequate information and details to demonstrate clearly that it has the capability to meet the equipment requirements indicated in Section 6 (Employer's Requirements), using the Forms below. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Bidders Qualification

To establish its qualifications to perform the contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the following information requested in the corresponding Information Sheets.

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of a Joint Venture, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone number(s), fax number(s), e-mail address)	
<p>Attached are copies of the following documents:</p> <p><input type="checkbox"/> 1. In case of a single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2.</p> <p><input type="checkbox"/> 2. Authorization to represent the firm or Joint Venture named above, in accordance with ITB 20.2.</p> <p><input type="checkbox"/> 3. In case of a Joint Venture, a letter of intent to form a Joint Venture or Joint Venture agreement, in accordance with ITB 4.1.</p> <p><input type="checkbox"/> 4. In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5.</p>	

Form ELI - 2: Joint Venture Information Sheet

Each member of the Joint Venture and Specialist Subcontractor must fill out this form separately.

Joint Venture / Specialist Subcontractor Information	
Bidder's legal name	
Joint Venture Partner's or Specialist Subcontractor's legal name	
Joint Venture Partner's or Specialist Subcontractor's country of constitution	
Joint Venture Partner's or Specialist Subcontractor's year of constitution	
Joint Venture Partner's or Specialist Subcontractor's legal address in country of constitution	
Joint Venture Partner's or Specialist Subcontractor's authorized representative information (name, address, telephone number(s), fax number(s), e-mail address)	
Attached are copies of the following documents. <ul style="list-style-type: none"> <input type="checkbox"/> 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2. <input type="checkbox"/> 2. Authorization to represent the firm named above, in accordance with ITB 20.2. <input type="checkbox"/> 3. In the case of a government-owned enterprise, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5. 	

Form CON - 1: Historical Contract Nonperformance

Each Bidder must fill out this form in accordance with Criteria 2.2.1 and 2.2.3 of Section 3 (Evaluation and Qualification Criteria) to describe any history of nonperforming contracts and pending litigation or arbitration formally commenced against it.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Table 1: History of Nonperforming Contracts			
Choose one of the following: <input type="checkbox"/> No nonperforming contracts. <input type="checkbox"/> Below is a description of nonperforming contracts involving the Bidder (or each Joint Venture member if Bidder is a Joint Venture).			
Year	Description	Amount of Non performed Portion of Contract (INR equivalent)	Total Contract Amount (INR equivalent)
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Reason(s) for nonperformance: [indicate main reason(s)]	[insert amount]	[insert amount]

Table 2: Pending Litigation and Arbitration			
Choose one of the following: <input type="checkbox"/> No pending litigation and Arbitration. <input type="checkbox"/> Below is a description of all pending litigation and Arbitration involving the Bidder (or each Joint Venture member if Bidder is a Joint Venture).			
Year	Matter in Dispute	Value of Pending Claim in INR Equivalent	Value of Pending Claim as a Percentage of Net Worth
[insert year]	Contract Identification: [indicate complete contract name/ number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Matter of Dispute: [indicate full description of dispute] Party who initiated the dispute: [indicate "Employer" or "Contractor"] Status: [indicate status of dispute]	[insert amount]	[insert amount]

Note -
 Table 2 of this form shall only be included if Criterion 2.2.3 of Section 3 (Evaluation and Qualification Criteria) is applicable.

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Financial Data for Previous _____ Years [INR Equivalent]		
Year 3: FY 2022-23	Year 2: 2021-22	Year 1: FY 2020-21

Information from Balance Sheet

Total Assets (TA)			
Total Liabilities (TL)			
Net Worth = TA – TL			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital = CA - CL			

Most Recent Working Capital		To be obtained for most recent year and carried forward to FIN - 3 Line 1; in case of Joint Ventures, to the corresponding Joint Venture Partner's FIN – 3.
-----------------------------	--	---

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

- Attached are copies of financial statements (balance sheets including all related notes and income statements) for the last 3 years, as indicated above, complying with the following conditions:
- Unless otherwise required by Section 3 of the Bidding Document, all such documents reflect the financial situation of the legal entity or entities comprising the Bidder and not the Bidder's parent companies, subsidiaries, or affiliates.
 - Historical financial statements must be audited by a certified accountant.
 - Historical financial statements must be complete, including all notes to the financial statements.
 - Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN - 2: Average Annual Construction Turnover

Each Bidder must fill out this form.

The information supplied should be the Annual Turnover of the Bidder or each member of a Joint Venture in terms of the amounts billed to clients for each year for work in progress or completed, converted to INR at the rate of exchange at the end of the period reported.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Annual Turnover Data for the Last 3 Years (Construction only)			
Year	Amount Currency	Exchange Rate	INR Equivalent
FY 2020-21			
FY 2021-22			
FY 2022-23			
Average Annual Construction Turnover			

Form FIN – 3: Availability of Financial Resources

Bidders must demonstrate sufficient financial resources, comprising of Working Capital supplemented by credit line statements or overdraft facilities to meet the Bidder's financial requirements for

- (a) its current contract commitments, and
- (b) the subject contract.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Financial Resources		
No.	Source of financing	Amount (INR equivalent)
1	Working Capital (to be taken from FIN – 1 for latest year)	
2	Credit line available with the bidder ^a	
3	Credit Line specific to the subject contract (must be substantiated by FIN - 3A) ^b	
Total Available Financial Resources		

^a To be considered, available Credit Line must be substantiated by a letter from the bank providing the line of credit stating unutilized line of credit available at the time of submission of bid. Any letter or document not complying with this requirement shall not be considered as supplementary financial resources.

^b To be considered, Credit Line must be substantiated by a letter from the bank issuing the line of credit, specific for the subject contract, as prescribed in Form FIN-3A. Any letter or document not complying with this requirement shall not be considered as supplementary financial resources.

Form FIN – 3A: Evidence of Availability of Credit Line Financial Resources

Project Name:

Bidding Package Name and Identification Number: (to be filled in as indicated in ITB 1.1) ...

BANK CERTIFICATE

This is to certify that M/s is a reputed company with a good financial standing.

If the contract for the work, namely..... is awarded to the above firm, we shall be able to provide overdraft / credit facilities to the extent of INR to meet their working capital requirements for executing the above contract.

___Sd.____
Name of Bank: _____
Senior Bank Manager _____
Address of the Bank _____

[In case of Joint Venture, change the text as follows:]

This is to certify that M/s who has formed a Joint Venture with M/s and M/s for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely..... is awarded to the above joint venture, we shall be able to provide overdraft / credit facilities to the extent of INR to M/s to meet their working capital requirements for executing the above contract.

Form FIN- 4: Financial Requirements for Current Contract Commitments

Bidders (or each Joint Venture partner) should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Current Contract Commitments						
No	Name of Contract	Employer's Contact (Address, Tel, Fax)	Contract Completion Date	Outstanding Contract Value (X)^a	Remaining Contract Period in months (Y)^b	Monthly Financial Resources Requirement (X / Y)
1						
2						
3						
4						
Total Monthly Financial Requirement for Current Contract Commitments						INR

^a Remaining outstanding contract values to be calculated from 28 days prior to the bid submission deadline (INR equivalent based on the foreign exchange rate as of the same date).

^b Remaining contract period to be calculated from 28 days prior to bid submission deadline.

Form FIN - 5: Self-Assessment Tool for Bidder’s Compliance to Financial Resources (Criterion 2.3.3 of Section 3)

This form requires the same information submitted in Forms FIN - 3 and FIN - 4. All conditions of “Available Financial Resources Net of CCC \geq Requirement for the Subject Contract” must be satisfied to qualify.

Form FIN - 5A: For Single Entities

For Single Entities: (A)	Total Available Financial Resources from FIN – 3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [D must be greater than or equal to E] (F)
_____ (Name of Bidder)				

Form FIN - 5B: For Joint Ventures

For Joint Ventures: (A)	Total Available Financial Resources from FIN – 3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [D must be greater than or equal to E] (F)
One Partner:					
_____ (Name of Partner)				.....
Each Partner:					
_____ (Name of Partner 1)				.....
_____ (Name of Partner 2)				.....
_____ (Name of Partner 3)				.....
All partners combined	$\Sigma D =$ Sum of available financial resources net of current contract commitments for all partners		$\Sigma D =$ _____	.....

Form FIN – 5 is made available for use by the bidder as a self-assessment tool, and by the Employer as an evaluation work sheet, to determine compliance with the financial resources requirement as stated in 2.3.3. Failure to submit Form FIN - 5 by the Bidder shall not lead to bid rejection.

Form EXP – 1: Contracts of Similar Size and Nature

Fill out one (1) form per contract.

The exchange rate to be used to calculate the value of the contract for conversion to a specific currency shall be the selling rate of the Borrower's national bank on the date of the contract.

Contract of Similar Size and Nature		
Contract No of	Contract Identification	
Award Date	Completion Date	
Total Contract Amount	INR	
If partner in a Joint Venture or Subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the Similarity in Accordance with Criterion 2.4.1 of Section 3 (Evaluation and Qualification Criteria)		
Participation as a contractor, Joint Venture partner, or Subcontractor, in at least one contract that has been successfully or substantially* completed within the period from 1 Sept, 2016 up to the bid submission date and that is similar to the proposed works, where the value of the Bidder's participation exceeds INR 352 million The similarity of the Bidder's participation shall be based on project of multistory (2 storied or more) residential/commercial building etc		

Note: Experience to be substantiated by a Certificate from the Concerned Client. The certificates should be signed by the Executive Engineer or above rank officer.

Form EXP - 2: Construction Experience in Key Activities

Fill out one (1) form per contract. Each Bidder

must fill out this form.

If complied by Specialist Subcontractor, each Specialist Subcontractor must fill out this form and provide the Specialist Subcontractor's name:

Specialist Subcontractor: _____

Contract with Similar Key Activities		
Contract No of	Contract Identification	
Award Date	Completion Date	
Total Contract Amount	INR	
If partner in a Joint Venture or Subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail		
Description of the Key Activities in Accordance with Criterion 2.4.2 of Section 3 (Evaluation and Qualification Criteria)		
Construction of 0.4 MLD STP or Construction experience in decentralize waste water system with 0.4 MLD capacity as an alternative for construction of STP.		

Schedules

Schedule of Payment Currencies – Not applicable

Forinsert name of Section of the Works

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. In such a case, the Employer should prepare separate tables for each Section of the Works.

	A	B	C	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent $C = A \times B$	Percentage of Net Bid Price (NBP) $\frac{100 \times C}{NBP}$
Local Currency		1.00		
Foreign Currency #1				
Foreign Currency #2				
Foreign Currency #3				
Net Bid Price				100.00
Provisional Sums Expressed in Local Currency	7,06,77,000	1.00		
BID PRICE				

- Note -

The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the source specified in BDS 15.

Tables of Adjustment Data

Table A.1

Index Code (1)	Index Description (2)	Source of Index (3)	Base Value and Date (4)	Amount (5)	Weighting (as a minimum) (6)	Weighting (to be quoted by the bidder) (7)
	Nonadjustable	—	—	—	0.15	
a	Labour Component (L):	Consumer Price Index for Industrial labour for Salem, Tamil Nadu issued by Labour Bureau, Shimla	Indices applicable on 28 days prior to deadline for bid submission	As per cost of work done	0.25 -0.30	
b	Cement (C)	Wholesale Price Index for Cement and Lime issued by Reserve Bank of India	Indices applicable on 28 days prior to deadline for bid submission	As per cost of work done	0.05 - 0.10	
c	Metallic Iron (M)	Wholesale Price Index for metallic iron issued by Reserve Bank of India	Indices applicable on 28 days prior to deadline for bid submission	As per cost of work done	0.15-0.10	
d	Other Materials (O)	Wholesale Price Index for all commodities issued by Reserve Bank of India	Indices applicable on 28 days prior to deadline for bid submission	As per cost of work	0.40-0.35	
				Total	1.00	

Note: Bidders shall quote their own weighting in col. 7 within the range indicated in col 6 above.

Bill of Quantities

(Provided in Part 2- Price bid)

Section 5

Eligible Countries

Section 5 - Eligible Countries

1.	AFG	Afghanistan	35.	FSM	Micronesia, Federated States of
2.	ARM	Armenia	36.	MON	Mongolia
3.	AUS	Australia	37.	MYA	Myanmar
4.	AUT	Austria	38.	NAU	Nauru
5.	AZE	Azerbaijan	39.	NEP	Nepal
6.	BAN	Bangladesh	40.	NET	The Netherlands
7.	BEL	Belgium	41.	NZL	New Zealand
8.	BHU	Bhutan	42.	NU	Niue
9.	BRU	Brunei Darussalam	43.	NOR	Norway
10.	CAM	Cambodia	44.	PAK	Pakistan
11.	CAN	Canada	45.	PAL	Palau
12.	PRC	China, People's Republic of	46.	PNG	Papua New Guinea
13.	COO	Cook Islands	47.	PHI	Philippines
14.	DEN	Denmark	48.	POR	Portugal
15.	FIJ	Fiji	49.	SAM	Samoa
16.	FIN	Finland	50.	SIN	Singapore
17.	FRA	France	51.	SOL	Solomon Islands
18.	GEO	Georgia	52.	SPA	Spain
19.	GER	Germany	53.	SRI	Sri Lanka
20.	HKG	Hong Kong, China	54.	SWE	Sweden
21.	IND	India	55.	SWI	Switzerland
22.	INO	Indonesia	56.	TAJ	Tajikistan
23.	IRE	Ireland	57.	TAP	Taipei,China
24.	ITA	Italy	58.	THA	Thailand
25.	JPN	Japan	59.	TIM	Timor-Leste
26.	KAZ	Kazakhstan	60.	TON	Tonga
27.	KIR	Kiribati	61.	TUR	Turkey
28.	KOR	Korea, Republic of	62.	TKM	Turkmenistan
29.	KGZ	Kyrgyz Republic	63.	TUV	Tuvalu
30.	LAO	Lao PDR	64.	UKG	United Kingdom
31.	LUX	Luxembourg	65.	USA	United States
32.	MAL	Malaysia	66.	UZB	Uzbekistan
33.	MLD	Maldives	67.	VAN	Vanuatu
34.	RMI	Marshall Islands	68.	VIE	Viet Nam

Section 6: Employer's Requirements

This Section contains the Specifications, Drawings, Supplementary Information that describe the Works to be procured, Personnel Requirements, and Equipment Requirements.

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6.2	Specifications of work
6.3	Drawings
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6.5	Personnel Requirements
6.6	Equipment Requirements
	Annex A: Draft Initial Environmental Examination and Environmental Management Plan
	Annex B: Draft Resettlement Plan

6.1 - Scope of Services

The Scope of Work primarily includes Construction of 520 (G+3) tenements including Development works at Pallipalayam scheme in Komarapalayam Taluk at Namakkal District under IRSHUPS project, Tamil Nadu.

Whereas, apart from construction of housing units, the associated infrastructure / development works include the following:

- 1) Providing fire fighting arrangements
- 2) Formation of BT Roads
- 3) Construction of sump and pump room for drinking water
- 4) Providing external water supply arrangement for drinking water
- 5) Construction of Sewage Treatment Plant (STP) of 0.4 MLD capacity
- 6) Provision for disposal of treated water from STP (within the project site)
- 7) Providing external sewage arrangement system
- 8) Construction of Rain Water Harvesting structures
- 9) Providing Outdoor Gym (1No), Outdoor Seating arrangements (1No), Outdoor Kiosks (1No)
- 10) Construction of Pergola (2 Nos)
- 11) Construction of Anganwadi (1 No.), Library (1 No.) and Livelihood Center (1 No.)
- 12) Construction of Convenience shops (5 Nos) and Ration Shop (1 No)
- 13) Construction of compound wall
- 14) Providing Gathering hub, Yoga space (1 No)
- 15) Construction of Pavement around building including vehicle parking area
- 16) Development of Green Belt, OSR Native planting and Native plant buffer.
- 17) Earth filling of the project site

The Scope of services (works & all associated infrastructure works) in concise includes the following:

- (i) The Construction of housing units and its all associated infrastructure works should be carried out in accordance with drawings issued by the Employer.
- (ii) The Contractor shall carry out all works, wholly, in accordance with the terms and conditions of the contract to fulfil the requirement of the project. All the materials used and the equipment installed shall be as per the specifications defined in the contract and in accordance to the relevant I.S. Specifications.
- (iii) The Contractor shall execute all components of the system to meet the minimum requirements and specifications stated in Employer's Requirement, Technical Specifications etc in conformity to the relevant I.S. Specifications.
- (iv) The Contractor shall supply all plants, construction materials, manufactured goods, labour, machineries, equipment, etc necessary for execution of the works in accordance with Employer's Requirement and Specifications. The said plants and materials shall include, but not limited to the following:
 - a) All excavations as per required sections with safety and security
 - b) Materials for concrete, grout, brickwork mortar and similar products.
 - c) Steel reinforcement.
 - d) All materials, forms and appurtenances.
 - e) All works, plants, equipment etc. shall also conform to specifications incorporated in the bid documents.
 - f) All materials and services required for procurement of the whole works.
 - g) All materials including water, required for testing, flushing.
 - h) All machineries, equipment and labour required for installations of the works.

Section 6: Employer's Requirements

- i) All materials used for permanent installation in the works shall be new and shall conform to the respective clauses of the specifications and if not specified they shall conform to good standards of construction practice.
 - (v) The Employer holds the right to construct any work or any part thereof on, over, under, in or through the site. Employer may use or occupy any part of the permanent work.
 - (vi) The Contractor will provide site office in the project area having sufficient space for contractor staff and atleast 150 sqft for TNUHDB PIU staff. Office shall be properly furnished, air conditioned and with toilet facilities. Office will have all office equipment and computer, printer etc. For PIU office, Contractor will provide one Almiraha, two tables, 8 chairs, two computers, printers, Internet facility and fully functional office.
 - (vii) The drawings issued with the tender documents are Tender Drawings and they prepared in such a detail to give comprehensive idea of the work. The good for construction drawing will be issued by the Employer during the construction stage based on the requirements and as per the construction program submitted by the contractor.
 - (viii) Contractor will prepare as built computerized drawing for all structures and shall be submitted both in hard and soft copies as well as digital data.
 - (ix) Approval by the Engineer in charge of the Contract works shall not relieve the contractor from the responsibility for the accuracy of the dimension and detail, nor shall such mutual agreement and compliance to his working drawing shall constitute an acceptance by the employer of the correctness and adequacy of the drawings.
 - (x) Contractor will set level and alignment, slope etc for all works with full accuracy and will be fully responsible for all accuracies. Discrepancies in the alignment and levels etc., noticed during the construction and on /or completion shall be rectified by the contractor at his own cost. Engineers approval of work doesn't relieve him from his responsibilities.
 - (xi) All costs, both for water and power supply and temporary installations for the work shall be borne by the contractor.
 - (xii) The Contractor shall store a daily updated progress information on a computer at the site office, for the review of the Engineer/QAQC personnel. Throughout the whole period as specified below during which the site office is being occupied and used by the Contractor, he shall provide, pay for all charges and maintain at his own expense electricity, water and telephone facilities for the site office. The Contractor shall provide constant supply of potable water for the site office at all times. The site office with all those provisions mentioned above shall be provided and maintained by the Contractor throughout the whole construction period and until three months after the issuance of the Preliminary Handing Over Certificate or until all the work required under the Contract are in the opinion of the Engineer 100% (one hundred percent) completed, which ever period is the later one.
 - (xiii) The contractor shall establish a field laboratory may be at site office or may be at other location but within project area. It will have all testing facilities. All the instruments and equipment for lab testing should have valid calibration. Certificates and periodical calibrations to be done as per BIS norms.
 - (xiv) All the materials used in construction works need to be tested as per the relevant codes by the contractor from his own source in presence of Engineer in charge. Mix design should be got approved by the Anna University, Chennai / IIT Madras / other reputed Government institutions before execution.
 - (xv) QAQC agency/Consultant appointed by the Tamil Nadu Urban Habitat Development Board shall be permitted to use the contractor's lab to perform all the tests pertaining to the contract on behalf of Tamil Nadu Urban Habitat Development Board.
 - (xvi) Strong measures to ensure safety of workers and plant at site shall be taken by the Contractor.
-

Section 6: Employer's Requirements

- (xvii) The Contractor shall designate a Safety Officer who will be in charge of all Safety Measures. The cost of all safety equipment and the cost of providing a safety officer at site would be deemed to be included in various Items of the Bill of quantities.
- (xviii) The Contractor shall prepare as Built Drawings both in hard copy and in digital format. The drawings shall be prepared for any given section of the work as soon as the work for that particular section is completed. Preparation of As Built Drawings shall keep pace with the work and shall not be left over towards the end of the project. 3 hard copies and one soft copy of all drawings shall be submitted.

(xix) WORK PLAN:

The Contractor shall prepare the work plan for the execution of works, which includes procurement of material, excavation, commencement of concreting, before starting of the works. The Contractor shall submit the Work plan (Survey, Construction, Quality control, and Commissioning) within 10 days after signing of agreement and take necessary approvals for the same. The Work plan shall indicate, resources such as material, manpower, cash-flow etc. to complete the works as per agreed time. The Work plan shall include all allowances to guard against delays caused due to inclement weather or its effects (such as floods or draughts), fire or industrial disputes, unless such events could not reasonably have been foreseen by an experienced Contractor.

The Intended Completion Date for the whole of the Works shall be 18 months. Contractor will maintain progress in such a way that all milestones are achieved and contract is completed in given timeframe.

6.2 Technical Specifications (provided in Volume 2)

6.3 Drawings (provided in Volume 3)

Supplementary Information Regarding Works to Be Procured

(The supplementary information as given hereunder are extracts of project Detailed Project Reports and for knowledge of the bidders only. The bidders may use the information at their own risk and the employer shall not have any binding for their correctness)

Project area:

The project area of the proposed construction work is located in Survey. No. 378/2 of Pallipalayam Municipality in Komarapalayam Taluk at Namakkal District. in Tamil Nadu, India. The project site is located at 11° 20',53.6" N Latitude and 77° 45', 54.7"E longitude. The Pallipalayam is located around 7 km from the Erode Junction.

City Profile & Topography:

The Pallipalayam town is a Municipal Corporation (11° 20',53.6" N & 77° 45', 54.7"E) is located in around 400 Km southwest of the state capital Chennai. The average elevation of the Pallipalayam is 200 meters above MSL. Pallipalayam is situated in on one side of River Cauvery, while Erode is on the other side. The average temperatures range from 66.2 °F (19 °C) in January to 89.6 °F (32 °C). Summer rains are sparse and the first monsoon, the South-West monsoon, commences in June and continues till September. North-East monsoon begins October and continues till January. Pallipalayam gets rainfall during both South West and North East monsoon winds The average rainfall is 36.6 inches (930 mm). Roadways are the major means of transportation, while the city also has rail connectivity. The nearest airport is Salem Regional Airport, located at a distance of 76.7 km (47.66 mi).

Soil Type:

The soil investigations (Standard Penetration Test) were carried out in the project area. Soil samples were collected by drilling trial bores to analyze the soil characteristics. The estimated safe bearing capacity of the soil is 250 KN/m². Based on the recommendations specified in the Geotechnical Investigation Report, the type of the foundation is being considered for adoption as Isolated Individualfooting at a minimum depth of 3 m from the existing ground level.

Resource availability:

The availability / distances of the raw materials specified hereunder shall be considered only for indicative purposes. However, before submission of bids, the Bidder, in person should visit the project site and its nearby localities to analyze the availability of the raw materials and its respective accurate distances. The employer shall not have any binding for their accuracy.

- a) Fine aggregate – around 40 Km from project site
 - b) Coarse aggregate - around 40 Km from project site
 - c) Fly ash Bricks - around 15 Km from project site
 - d) Quarry Dust - around 40 Km from project site
 - e) Gravel - around 5 Km from project site
 - f) Solar Reflective Ceramic Tiles - around 10 Km from project site
 - g) Lime - around Km from project site
-

6.5 Personnel Requirements

Using Form PER - 1 and PER - 2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

Sl. No.	Position	Qualification	Total Work Experience (years)	Minimum number of years of experience (in housing projects)	Numbers required
1.	Project Manager	B.E. Civil. He/she should possess experience in construction industries	15	10	1
2.	Construction Manager	B.E. Civil	12	8	1
3.	Civil Engineer	B.E. Civil	5	3	2
4.	Quality Control Engineer	B.E. Civil	5	3	1
5.	Electrical Engineer	Diploma in Electrical Engineering	7	5	1
6.	Civil Supervisor	ITI (Build Const) / Diploma in Civil Engineering	5	3	4
7.	Environmental Officer	Post graduate degree in Environmental science/Engineer. Also, he/she should possess experience in dealing in environment issues in construction industries.	8	5	1
8.	Labour Welfare officer and Safety Engineer	B.E with Certificate equivalent to IOSH / EHS. He/she should possess experience in dealing in health and safety in construction industries	8	5	1

6.6 Equipment Requirements

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

No.	Equipment Type and Characteristics	Minimum Number Required
1	Tipper with adequate capacity to suit site conditions and Construction schedule.	2
2	Transit Mixers – 4 Cum / 6 Cum	4
3	Excavator	1
4	Concrete Batching plant of capacity 30 cu.m/hr	1
5	Structural Element Mould (Each Variety)	10
6	Trucks	4
7	Water lorries	2

Annex A: Draft Environmental Management Plan

Annex B: Draft Resettlement Plan

Section 7: General Conditions of Contract

The Conditions of Contract consists of two parts, this Section 7 (General Conditions of Contract) and the following Section 8 (Particular Conditions of Contract).

Red Book:

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”) Second edition 2017” published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following Section 8 “Particular Conditions of Contract.”

An original copy of the above FIDIC publication i.e. “Conditions of Contract for Building and Engineering Works Designed by the Employer” must be obtained from FIDIC.

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Section 8: Particular Conditions of Contract

The following Particular Conditions of Contract (PCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Part A – Contract Data

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
1.1.20 Percentage of Profit	Where the Contract allows for Cost Plus Profit, percentage profit to be added to the Cost	5%
1.1.27	Defects Notification Period	365 days
1.1.31	Employer's name and address	The Superintending Engineer, Project Monitoring Unit, Tamil Nadu Urban Habitat Development Board (TNUHDB), No.5, Kamarajar Salai, Chepauk, Chennai – 600 005
1.1.35	Engineer's name and address	Mr. R.Sudharsan, Executive Engineer, PID-II, Namakkal Division, Tamil Nadu Urban Habitat Development Board, Namakkal. e-mail id: tnuhdbnkldn@gmail.com
1.1.73	Sections	Not Applicable
1.1.84	Time for Completion	549 days
1.1.89	Bank's name	Asian Development Bank
1.1.90	Borrower's name	India
1.3 (a) (ii)	Electronic transmission system	The electronic transmission system shall be through email and the email address for communication is: tnuhdbprocurement@gmail.com

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
1.3(d)	Address of Employer for communications:	The Superintending Engineer, Project Monitoring Unit, Tamil Nadu Urban Habitat Development Board (TNUHDB), No.5, Kamarajar Salai, Chepauk, Chennai – 600 005
1.3(d)	Address of Engineer for communications:	Mr. R.Sudharsan, Executive Engineer, PID-II, Namakkal Division, Tamil Nadu Urban Habitat Development Board, Namakkal. e-mail id: tnuhdbnkldn@gmail.com
1.3(d)	Address of Contractor for communications:	[Insert electronic transmission systems]
1.4	Governing Law	The law of India (the Borrower's country)
1.4	Ruling language	English
1.4	Language for communications	English
1.8	Number of additional paper copies of Contractor's Documents	Two
1.15	Total liability of the Contractor to the Employer under or in connection with the Contract	Accepted Contract Amount
2.1	Time for access to the Site	7 days from the commencement date
2.4	Employer's Financial Arrangements	The contract shall be financed through a loan with the Asian Development Bank (77.5% of financing) and counterpart financing from the Government of India (22.5%).
3.2	Engineer's Duties and Authority	Variations resulting in an increase of the Accepted Contract Amount in excess of Rs. 5 lacs for each item or overall 1 % of Contract amount shall require approval of the Employer.
4.2	Performance Security	The Performance Security shall be in the form of an unconditional bank guarantee in the amount of 5% of the Accepted Contract Amount, issued by a reputable bank located in the Employer's country, which may include

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
		<p>scheduled banks or nationalized banks, or by a foreign reputable bank outside the Employer's country. If the performance security is issued by a reputable bank or financial institution outside of India, it must have a correspondent financial institution located in India to make it enforceable.</p> <p>If the employer determines that the lowest evaluated bid price is seriously low or unbalanced or front loaded the Employer at its discretion, may increase the Performance Security to a level sufficient to protect it against financial loss.</p> <p>The Additional Performance Security, if any determined under ITB 38 (Abnormally low bid) and ITB 39 (Unbalanced or Front- Loaded Bid) shall be in the form of an unconditional bank guarantee in the amount (% of the Accepted Contract Amount) denominated in the currency/ies stated in the bid of the successful bidder, issued by a reputable bank located in the Employer's country. The Employer shall return 100% of the Additional Performance Security at the end of retention period.</p>
4.7.2 (a)	Period for notification of errors in the items of reference	28 days
4.8	Safety Procedures	<p>After bullet point (b), add the following:</p> <p>"In particular, the Contractor is responsible for providing site workers with safe and healthy working conditions and establish an operating system to prevent accidents, injuries, and disease."</p>
4.18	Protection of the Environment	<p>At the end of the sub-clause in 4.18 Protection of the Environment, add the following paragraphs:</p> <p>" The Contractor shall comply with all applicable national, provincial, and local environmental laws and regulations.</p>

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
		<p>The Contractor shall also comply with all reasonable requests of the national and local authorities responsible for enforcing environmental controls.</p> <p>Within 28 days of the Commencement Date the Contractor shall submit a detailed Site Specific Environmental Management Plan (SSEMP) for the Engineer’s no objection showing how he/she intends to comply with environmental laws and regulations and other specific requirements prescribed in the Contract, addressing all the monitoring and mitigation measures set forth in the Environmental Impact Assessment (“EIA”) and the Environmental Management Plan (“EMP”) of the project attached in Section 6- Employer’s Requirements. Work shall not commence on the Site until the no objection of SSEMP has been obtained from the Engineer and is being implemented. Such acceptance by the Engineer shall not relieve the Contractor of any of his obligations or responsibilities under the Contract.</p> <p>The Contractor shall (a) establish an operational system for managing environmental impacts, (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures, requirements and actions are carried out, (d) submit semi-annual reports on the compliance of such measures to the Employer.</p> <p>Where unanticipated environmental risks or impacts become apparent during the Contract, the Contractor is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the Engineer’s approval.”</p>

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
4.19	Period of payment for temporary utilities	30 days
4.20	Number of additional paper copies of progress reports	Two copies
5.1(a)	Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount)	50%
5.1(b)	Parts of the Works for which subcontracting is not permitted	None
6.5	Normal working hours	9.00 hours to 18.00 hours with one hour break. Each worker will be given rest for at least one day in a week.
6.7	Health and Safety	After the first paragraph of 6.7 Health and Safety, add the following: "The Contractor is responsible for establishment of preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks of the construction site work to the health and safety of local communities. Within 28 days of the Commencement Date the Contractor shall submit a detailed Site Specific Health and Safety Management Plan (SSHSM) for the Engineer's no objection showing how he/she intends to comply with the local Health and Safety laws and regulations and other specific requirements prescribed in the Contract, taking into account the Supplementary Information in Section 6- Employer's Requirements. Work shall not commence on the Site until the confirmation of no objection of the SSHSM has been obtained from the Engineer and is being implemented. Such confirmation of no objection by the Engineer shall not relieve the Contractor of any of his/her obligations or responsibilities under the Contract.

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
		<p>Where unanticipated health and safety hazards or risks become apparent during the Contract, the Contractor is required to update the SSHSMP to outline the potential impacts to site works and associated mitigation measures for the Engineer’s no objection.</p> <p>The Contractor shall comply with the approved SSHSMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSHSMP.</p> <p>In particular, the Contractor is required to provide all personnel on site including Employer’s Personnel and visitors with personal protective equipment, including protection for feet (safety boots), head, eyes, ears (safety helmets) and hands, etc. , in accordance with the Contractor’s SSHSMP. The Contractor should ensure that his Subcontractors comply with the SSHSMP and provide all such necessary equipment to their personnel.</p> <p>The Contractor shall bear the costs to ensure that such measures, requirements and actions are carried out. The Contractor shall submit semi-annual reports on the compliance of such measures to the Employer.”</p> <p>Add after the third paragraph the following:</p> <p>“In the event of a significant injury involving medical treatment or hospitalization and fatal accident the Contractor shall notify the Engineer immediately by verbal communication and submit a formal report as soon as practicable after its occurrence. For all accidents, whether fatal or not, the Contractor shall also notify the appropriate local authorities in accordance with the Laws of the Country.”</p>

Ref. Sub- Clause (Col 1)	Conditions (Col 2)	Data (Col 3)
8.3	Number of additional paper copies of program	Two copies
8.8	Delay damages payable for each day of delay	<u>0.05</u> % of the Accepted Contract Amount.
8.8	Maximum amount of delay damages	5% of the Accepted Contract Amount.
12.2	Method of measurement	Shall be in accordance with the Bill of Quantities, other applicable Schedule(s), or other relevant provisions of the Contract
12.3	Percentage profit	5%
12.3	Valuation of the Works	Replace sub-paras (b) (i) to (iii) with the following; (i) the measured quantity of the item is changed by more than 25% from the quantity of this item in the Bill of Quantities or other Schedule, (ii) this change in quantity multiplied by the rate or price specified in the Bill of Quantities or other Schedule for this item exceeds 1% of the Accepted Contract Amount
13.4 (b)(ii)	Percentage rate to be applied to Provisional Sums for overhead charges and profit	5%

13.7	Adjustments for Changes in Cost:	<p>Add following at the end of sub clause:</p> <p>Increase or decrease in the cost of Labour and materials shall be calculated quarterly. The first statement of price adjustment shall be prepared at the end of quarter in which the work was awarded and the work done from the date of start to the end of quarter (3 months) shall be taken into account. For subsequent statement, cost of work done during every quarter shall be taken into account. At the completion of work, the work done during the last quarter or fraction, thereof, shall be taken into account.</p> <p>For the purpose of reckoning the work done during any period, invoices prepared during the period shall be considered. Dates of recording measurements in the Measurement Book by the Engineer shall be the guiding factor to decide the bills relevant to any period. The date of completion, as finally recorded by the Engineer in the Measurement Book, shall be the criterion.</p> <p>The index relevant to any quarter, for which such compensation is paid, shall be the arithmetical average of the indices relevant of the calendar month.</p> <p>The amount to be added to or be deducted from the Payment Certificates for changes in cost shall be determined from formulae as stated below:</p> <p>a) Labour</p> $VL = 0.85 \times L / 100 \times R \times (IL1 - IL0) / IL0$ <p>VL = Increase or decrease in the cost of work during the quarter under consideration.</p> <p>R = Value of the work done during the quarter under consideration.</p> <p>IL0= Base Price which is Consumer Price Index for Industrial labour for Salem, Tamil Nadu issued by Labour Bureau, Shimla on the base date.</p>
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		<p>IL1= Final price (average for the quarter under consideration) which is Consumer Price Index for Industrial labour for Salem issued by Labour Bureau, Shimla.</p> <p>L= Percentage of labour components.</p> <p>(Note: In case of revision of minimum wages by the Government or other competent authority, nothing extra would be payable except the price escalation permissible under this Clause).</p> <p>(b) Cement (excluding material supplied by the department).</p> $V_c = 0.85 \times C / 100 \times R (L_{cl} - L_{c0}) / L_{c0}$ <p>Vc= Increase or decrease in the cost during the quarter under consideration.</p> <p>R= Value of the work done during the quarter under consideration excluding the cost of material supplied by the department.</p> <p>Lc0= Base price which is Wholesale Price Index for Cement and Lime issued by Reserve Bank of India Journal on the base date</p> <p>Lcl= Final price (average for the quarter under consideration) which is the Wholesale Price Index for Cement and Lime issued by Reserve Bank of India</p> <p>C= Percentage of Cement component.</p> <p>(c) Metallic Iron (excluding material supplied by the department).</p> $V_s = 0.85 \times M / 100 \times R (L_{ml} - L_{m0}) / L_{m0}$ <p>Vs= Increase or decrease in the cost during the quarter under consideration.</p>
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		<p>R= Value of the work done during the quarter under consideration excluding the cost of material supplied by the department.</p> <p>LMo= Base price which is the Wholesale Price Index for metallic iron issued by Reserve Bank of India on the base date</p> <p>LMi= Final price (average for the quarter under consideration) which is the Wholesale Price Index for Metallic Iron by Reserve Bank of India</p> <p>M= Percentage of Metallic Iron component.</p> <p>d) Other Material:</p> $VM = 0.85 \times O / 100 \times R \times (IM1 - IM0) / IM0$ <p>VM= Increase or decrease in the cost during the quarter under consideration.</p> <p>R= Value of the work done during the quarter under consideration excluding the cost of materials supplied by the department.</p> <p>IM0=Base price which is Wholesale price index for all commodities published in Reserve Bank of India Journal on the base date.</p> <p>IM1= Final price (average for the quarter under consideration) which is the wholesale price index (all commodities) published in Reserve Bank of India Journal.</p> <p>O=Percentage of other material components</p> <p>The cost indices or reference prices stated in the table of adjustment data in section 4 shall be used.</p> <p>Adjustment for changes in Cost will be applicable for amount of work carried out by the Contractor within stipulated completion</p>
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		<p>period or extended contract period for which delay is not attributable to the Contractor. The indices shall be considered of the quarter in which the work is actually executed.</p> <p>Adjustment for the work items valued on the basis of Cost or current prices or new rate items shall be applicable from the next quarter in which new rate has been given.</p> <p>Adjusted Amount: The adjusted amount of each Payment Certificate may be subject to any deductions therefrom for liquidated damages, and any other monies due to the Employer from the Contractor including the recovery of advance amounts, if any. Price adjustment shall be applicable on the amount of entire work done during the stipulated /extended period not attributable to the contractor, excluding provisional sum.</p>
14.2	Total Advance Payment	5% of the Accepted Contract Amount payable in the currencies and proportions in which the Accepted Contract Amount is payable
14.2.3	Repayment of Advance payment	(a) exceeds 15% of the portion of the Accepted Contract Amount payable in that currency less Provisional Sums; and (b) deductions shall be made at the amortization rate of 15%; provided that the advance payment shall be completely repaid prior to the time when 80 percent (80%) of the Accepted Contract Amount less Provisional Sums has been certified for payment.
14.3	Period of payment	After the end of each month
14.3(b)	Number of additional paper copies of Statements	Two
14.3(iii)	Percentage of retention	The proportion of payments retained (Retention Money) shall be 5% from each bill.

14.3(iii)	Limit of Retention Money (as a percentage of Accepted Contract Amount)	Maximum of 5% of final contract price.
14.5(b)(i) 14.5(c)(i)	Plant and Materials for payment when shipped:	Not Applicable
	Plant and Materials for payment when delivered to the Site:	Not Applicable
14.6.2	Minimum Amount of Interim Payment Certificates	0.75% of the Accepted Contract Amount
14.7(a)	Period of payment of Advance Payment to the Contractor	no later than 28 days after submission of advance payment guarantee
14.7b(i)	Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 (interim Payment)	56 days
14.7b(ii)	Period for the Employer to make the Final Payment to the Contractor under Sub-Clause 14.13	28 days
14.7(c)	Period for the Employer to make final payment to the Contractor	56 days
14.8	Financing charges for delayed payment (percentage points above the average bank short-term lending rate as referred to under sub-paragraph (a))	3%
14.11.1(b)	Number of additional paper copies of draft Final Statement	Three
17.2(d)	Forces of nature, the risks of which are allocated to the Contractor	None

19.1	Permitted deductible limits	insurance required for the Works: INR 0.5 million insurance required for Goods: INR 0.2 million insurance required for liability for breach of professional duty: INR 0.2 million insurance required against liability for fitness for purpose (if any is required): Not Applicable insurance required for injury to persons and damage to property: INR 0.5 million insurance required for injury to employees: INR 0.5 million other insurances required by Laws and by local practice: None
19.2.1(b)	Additional amount to be insured (as a percentage of the replacement value, if less or more than 15%)	None
19.2.1(iv)	List of Exceptional Risks which shall not be excluded from the insurance cover for the Works	None
19.2.2	Extent of insurance required for Goods	Full replacement value including delivery to the Site
	Amount of insurance required for Goods	INR 5 million
19.2.3(a)	Amount of insurance required for liability for breach of professional duty	Not Applicable
19.2.3(b)	Insurance required against liability for fitness for purpose	None
19.2.3	Period of insurance required for liability for breach of professional duty	Not Applicable
19.2.4	Amount of insurance required for injury to persons and damage to property	INR 10 million
19.2.6	Other insurances required by Laws and by local practice (give details)	None

21.1	Time for appointment of Dispute Avoidance/Adjudication Board (DAAB) member (s)	28 days after the representation made by any parties regarding dispute.
21.1	The DAAB shall comprise	One sole Member
21.1	List of proposed members of DAAB	To be determined after selection of Contractor
21.2	Appointment (if not agreed) to be made by	President, The Institution of Engineers (India), Tamil Nadu Chapter.
21.6 (a)(i)	Rules of arbitration and administration of arbitration proceedings	Indian Council of Arbitration
21.6 (a)(ii)	Number of arbitrators	One
21.6 (a)(iii)	Place of arbitration	Chennai, Tamil Nadu

Table: Summary of Sections

Description of parts of the Works that shall be designated a Section for the purposes of the Contract (Sub-Clause 1.1.73)	Value of works :	Time for Completion (Sub-Clause 1.1.84)	Delay Damages on per day basis (Sub-Clause 8.8)
NA			

Part B – Special Provisions

Clause/Sub-Clause	Special Provisions
Sub-Clause 1.1.10 Contract	"the Contractor's Proposal" is deleted
Sub-Clause 1.1.16 Contractor's Equipment	The following is added at the end of the definition. The Contractor's Equipment include, but not limited to the equipment stated in the Specification.
Sub-Clause 1.1.74 Site	The Sub-Clause is replaced with: "Site" means the places where the Permanent Works are to be executed, including storage and working area, and to which Plant and Materials are to be delivered, and any other places specified in the Contract as forming part of the Site."
Sub-Clause 1.1.76 Specification	The following is added to the definition. The Specification includes Environment, Health and Safety Management Plan; Key Personnel requirement; and Equipment requirements.
Sub-Clause 1.1.77 Statement	On the second line after "Payment Certificate under...", add "Sub-Clause 14.2.1 [Advance Payment Guarantee] (if applicable),".
Sub-Clause 1.1.81 Tender	"the Contractor's Proposal" is deleted.
New Sub-Clause 1.1.89 Bank	"Bank" means the financing institution (if any) named in the Contract Data
New Sub-Clause 1.1.90 Borrower	"Borrower" means the person (if any) named as the borrower in the Contract Data
New Sub-Clause 1.1.90 Specialist Subcontractor	Specialist Subcontractor means the Contractor proposed by the Bidder and accepted by the Employer against the Construction Experience in Key Activity (clause 2.4.2 of section 3) and named in the Contract as a Specialized Subcontractor for execution of the key activity and; the legal successor of that Contractor.
Sub-Clause 1.2 Interpretation	Sub-paragraph (a) is replaced with the following: "Words indicating one gender include all genders; "he/she" is replaced with: "it"; "him/her" is replaced with "it"; "his" and "his/her" are replaced with: "its"; "himself/herself" are replaced with: "itself"." Further, "and" is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).

Clause/Sub-Clause	Special Provisions
	<p>sub-paragraph (k) is added:</p> <p>(k) "The word "tender" is synonymous with "bid" or "proposal", the word tenderer with "bidder" or "proposer" and the words "tender documents" with "request for bids documents" or "request for proposal documents", as applicable."</p>
<p>Sub-Clause 1.5 Priority of Documents</p>	<p>Delete sub-paragraphs from (a) to (k) and replace with the following;</p> <p>(a) the Contract Agreement; (b) the Letter of Acceptance; (c) the Letter of Technical and Financial Bid; (d) the Particular Conditions Part A – Contract Data; (e) the Particular Conditions Part B – Special Provisions; (f) the Particular Conditions Part C – Corrupt and Fraudulent Practices; (g) the Particular Conditions Part D - Environmental, Health, and Safety (EHS) Metrics for Progress Reports; (h) List of Eligible Countries as defined by the Bank; (i) these General Conditions; (j) the Specification including EMP, EHS, personnel and equipment requirements; (k) the Drawings; (l) the Schedules; (m) Environment, Health and Safety Code of Conduct for Contractor's Personnel; (n) Environment, Health and Safety Management Plan (EHSMP); (o) the Joint Venture Undertaking (if the Contractor is a Joint Venture); and (p) any other documents forming part of the Contract</p>
<p>Sub-Clause 1.6 Contract Agreement</p>	<p>The last paragraph is replaced with:</p> <p>"If the Contractor comprises a Joint Venture, the authorized representative of the Joint Venture shall sign the Contract Agreement in accordance with Sub-Clause 1.14 [Joint and Several Liability]."</p>
<p>Sub-Clause 1.12 Confidentiality</p>	<p>The following is added at the end of the second paragraph: "The Contractor shall however be permitted to disclose such particulars if required to establish its qualifications to compete for other projects."</p> <p>"or" at the end of (b) is deleted.</p> <p>"or" at the end of (c) is added.</p> <p>The following is then added as (d): "is required to be provided to the Bank."</p>
<p>New Sub-Clause 1.17</p>	<p>The following Sub-Clause is added after Sub-Clause 1.16:</p>

Clause/Sub-Clause	Special Provisions
Inspections & Audit by the Bank	<p>“Pursuant to paragraph 2.1(e) of Particular Conditions - Part C- [Corrupt and Fraudulent Practices], the Contractor shall permit and shall cause its agents (whether declared or not), Subcontractors, subconsultants, service providers, suppliers, and personnel, to permit the Bank and/or persons appointed by the Bank to inspect the Site, assets and/or the accounts, records and other documents relating to the procurement process, selection and/or Contract execution/performance, and to have such accounts, records, and other documents audited by auditors appointed by the Bank. The Contractor’s and its Subcontractors’ and subconsultants’ attention is drawn to Part C [Corrupt and Fraudulent Practices] which provides, inter alia, that obstructive practice constitutes an integrity violation subject to Contract termination (as well as to a determination of ineligibility pursuant to the Bank’s Anticorruption Policy and Integrity Principles and Guidelines, both as amended from time to time).”</p> <p>The Bank’s right to inspect the Site, assets and/or the Contractor’s accounts, records and other documents relating to the procurement and performance of the Contract stated in Sub-Clause 1.17 and Part C shall survive termination and/ or expiration of this Contract.</p>
Sub-Clause 2.1 Right of Access to the Site	<p>Add after the first sentence of the first paragraph:</p> <p>“For any part of the Site (or the whole Site as the case may be) for which the Contractor is to be given access to, and possession of, there shall be no physical works at the Site or any part thereof (as the case may be) unless the Employer shall give a Notice to the Contractor stating that all relevant provisions of the applicable Resettlement Plan (RP) were complied with and confirming that all compensation to the affected persons have been duly paid as per the RP. This Notice shall specify the date on which access to, and possession of the part of the Site (or the whole Site as the case may be) shall be given to the Contractor.”</p>
Sub-Clause 2.4 Employer’s Financial Arrangements	<p>The first paragraph is replaced with:</p> <p>“The Employer shall submit, before the Commencement Date, reasonable evidence that financial arrangements have been made for financing the Employer’s obligations under the Contract.”</p> <p>The following sub-paragraph is added at the end of Sub-Clause 2.4:</p> <p>“In addition, if the Bank has notified to the Borrower that the Bank has suspended disbursements under its loan, which finances in whole or in part the execution of the Works, the Employer shall give notice of such suspension to the Contractor with detailed particulars, including the date of such notification, with a copy to the Engineer, within 7 days of the Borrower having received the suspension notification from the Bank. If alternative funds will be available in appropriate currencies to the Employer to continue making payments to the Contractor beyond 60 days after the date of Bank notification of the suspension, the Employer shall provide reasonable evidence in its notice of the extent to which such funds will be available.”</p>
Sub-Clause 3.1	Add the following at the end of first paragraph

Clause/Sub-Clause	Special Provisions
The Engineer	"The Engineer shall be a third party capable of acting neutrally between the Parties".
Sub-Clause 3.2 Engineer's Duties and Authority	<p>Add the following at the end of the third paragraph:</p> <p>The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:</p> <p>a) Sub-Clause 13.2 [Value Engineering]: stating consent or otherwise to a value engineering proposal submitted by the Contractor in accordance with Sub-Clause 13.2; or</p> <p>b) Sub-Clause 13.3 [Variation Procedure]: instructing a Variation, except:</p> <p>(i) if, in the opinion of the Engineer, an emergency situation occurs that may affect the safety of life or of the Works or of adjoining property. In such a situation, the Engineer may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work, or to do all such things, as may, in the opinion of the Engineer, be necessary to abate or reduce the risk and the Contractor shall forthwith comply with such instruction; or</p> <p>(ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.</p>
Sub-Clause 3.3 Engineer's Representative	<p>Add the following third paragraph after paragraph 2.</p> <p>"The Engineer shall obtain the consent of the Employer before appointing or replacing an Engineer's Representative."</p>
Sub-Clause 3.4 Delegation by the Engineer	<p>The following is added at the end of the second paragraph:</p> <p>"If any assistants are not fluent in this language, the Engineer shall make competent interpreters available during all working hours, in a number sufficient for those assistants to properly perform their assigned duties and/or exercise their delegated authority."</p>
Sub-Clause 4.1 Contractor's General Obligations	<p>Replace the first paragraph with the following:</p> <p>"The Contractor shall execute the Works in accordance with the Contract. All Contractor's Equipment, Material, and services to be incorporated in or required for the Works shall have their origin in any Eligible Country as defined by the Bank. The Contractor undertakes that the execution of the Works and the completed Works will be in accordance with the documents forming the Contract, as altered or modified by Variations, <i>and</i> with the Site-Specific Environment Management Plan (as per Sub-Clause 4.18) and Site-Specific Health and Safety Management Plan (as per Sub-Clause 4.8)."</p> <p>The following is inserted after the fourth paragraph:</p> <p>"The Contractor has the obligation to notify the Employer of any changes in connection with the representations made in the Letter of Bid. If the Contractor is debarred or temporarily suspended by ADB, it shall inform the Employer of such debarment or suspension.</p>

Clause/Sub-Clause	Special Provisions
	<p>The following is added as (g); and the current (g) and (h) of the Sub-Clause are then renumbered as (h) and (i) respectively.</p> <p>(g) “if so stated in the Specification, the Contractor shall:</p> <ul style="list-style-type: none"> (i) design structural elements of the Works taking into account climate change considerations; (ii) apply the concept of universal access (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances); (iii) consider the incremental risks of the public’s potential exposure to operational accidents or natural hazards, including extreme weather events; and (iv) any other requirement stated in the Specification.”
Sub-Clause 4.2.1 Contractor's obligations	<p>The first paragraph is replaced with:</p> <p>“The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance and shall send a copy to the Engineer. The Performance Security shall be issued by a reputable bank or financial institution selected by the Contractor and shall be in the form annexed to the Particular Conditions, as stipulated by the Employer in the Contract Data, or in another form approved by the Employer.”</p>
Sub-Clause 4.2.2 Claims under the Performance Security	<p>In the first paragraph after the words “is entitled under the Contract”, replace “in the event of” with “including in, but not limited to, the event of:”.</p>
Sub-Clause 4.2.3 Return of Performance Security	<p>In sub-paragraph (a) “21 days” is replaced with: “28 days”</p>
Sub-Clause 4.3 Contractor's Representative	<p>The following is added at the end of the last paragraph: “If any of these persons is not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number that the Engineer considers to be sufficient for those persons to properly perform their delegated powers, function, and/or authority.”</p>
Sub-Clause 4.4.1 Preparation and Review	<p>In the first paragraph, delete the word “and” at the end of sub-paragraph (c), at the end of sub-paragraph (d) replace “.” with “; and” and add sub-paragraph(e) as follows:</p> <p>“(e) described in Sub-Clause 4.4.4 [Site-Specific Health and Safety Management Plan] and Sub-Clause 4.4.5 [Site-Specific Environment Management Plan]; and”</p>
Sub-Clause 4.4.4 ⁵	<p>Add the following Sub-Clause:</p>

⁵For projects categorized as Category C for environment for which no EMP has been prepared, this Sub-Clause should be deleted.

Clause/Sub-Clause	Special Provisions
Site-Specific Health and Safety Management Plan	<p>“The Contractor shall prepare, and keep up-to-date, the Site-Specific Health and Safety Management Plan (SSHSMP) as per Sub-Clause 4.8 [Health and Safety Obligations] showing how the Contractor will manage the health and safety risks related to the Works.</p> <p>The initial SSHSMP shall be submitted to the Engineer for Review, and no physical Works shall commence on Site until the Engineer has given (or is deemed to have given) a Notice of No-objection under sub-paragraph (i) of Sub-Clause 4.4.1 [Preparation and Review].</p> <p>Thereafter, the Contractor shall update the SSHSMP at the request of the Engineer but at not less than 6- month intervals to ensure that it contains measures appropriate to the Works. The updated SSHSMP shall be submitted to the Engineer for Review as per the process outlined in Sub-Clause 4.4.1 [Preparation and Review].”</p>
Sub-Clause 4.4.5 Site-Specific Environment Management Plan	<p>Add the following Sub-Clause:</p> <p>“The Contractor shall prepare, and keep up-to-date, the Site-Specific Environment Management Plan (SSEMP) as per Sub-Clause 4.18 [Protection of the Environment] showing how the Contractor will manage the environment risks and impacts related to the Works (e.g., excavation, earth works, bridge and structure works, stream and road diversions, quarrying or extraction of materials, concrete batching, and asphalt manufacture).</p> <p>The initial SSEMP shall be submitted to the Engineer for Review, and no works shall commence on Site until the Engineer has given (or is deemed to have given) a Notice of No-objection under sub-paragraph (i) of Sub-Clause 4.4.1 [Preparation and Review].</p> <p>Thereafter, the Contractor shall update the SSEMP at the request of the Engineer but at not less than 6-month intervals to ensure that it contains measures appropriate to the Works. The updated SSEMP shall be submitted to the Engineer for Review as per the process outlined in Sub-Clause 4.4.1 [Preparation and Review].”</p>
Sub-Clause 4.6 Co-operation	<p>On the penultimate line of the first paragraph before “Contractor’s,” add “of the.”</p> <p>The following is added after the first paragraph:</p> <p>“The Contractor shall also, as stated in the Specification or as instructed by the Engineer, cooperate with and allow appropriate opportunities for the Employer’s Personnel to conduct any environmental and social assessment.”</p>
Sub-Clause 4.7 Setting out	<p>In the second bullet-point of sub-paragraph (b) of Sub-Clause 4.7.3:</p>

Clause/Sub-Clause	Special Provisions
	<p>Before “if the items of reference”, the following is added: “when examining the items of reference within the period stated in sub-paragraph (a) of Sub-Clause 4.7.2.”.</p> <p>On the second and third lines, the following is deleted “and the contractor’s Notice is given after the period stated in sub-paragraph (a) of Sub-Clause 4.7.2”.</p>
<p>Sub-Clause 4.8 Health and Safety Obligations</p>	<p>The following is included after deleting “and” at the end of (f) and replacing “.” with “;” at the end of (g):</p> <ul style="list-style-type: none"> (h) “provide health and safety induction training of Contractor’s Personnel as appropriate and maintain training records; (i) actively engage the Contractor’s Personnel in promoting understanding, and methods for, the implementation of health and safety requirements, as well as in providing information to the Contractor’s Personnel, and provision of personal protective equipment without expense to the Contractor’s Personnel; (j) put in place workplace processes for Contractor’s Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation that they have reasonable justification to believe presents an imminent and serious danger to their life or health; (k) ensure that Contractor’s Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken and Contractor’s Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal; (l) subject to Sub-Clause 4.6 [Co-Operation], collaborate with the entities and Personnel under paragraph (a), (b), and (c) of Sub-Clause 4.6 [Co-Operation], in applying the health and safety requirements without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; (m) establish and implement a system for regular (not less than every 6th month) review of health and safety performance and the working environment and related reporting on incidents and accidents as per Sub-Clause 4.20 [Progress Reports]; (n) establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks of the construction site work to the health and safety of local communities; and (o) conduct an awareness program concerning the risk of sexually transmitted infections (STIs) and sexually transmitted diseases (STDs) including HIV/AIDS via an approved service provider, and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of HIV between and among the Contractor’s Personnel and the local community, to promote early diagnosis and to assist affected individuals.

Clause/Sub-Clause	Special Provisions
	<p>Delete all the paragraphs after the first paragraph and replace with the following:</p> <p>As soon as practicable after the Contractor has been given access to, and possession of, the first part of the Site (or the whole Site, as the case may be), the Contractor shall submit to the Engineer for Review a detailed SSHSMP showing how the Contractor intends to comply with health and safety requirements prescribed in the Contract. The SSHSMP shall include measures the Contractor proposes to manage the health and safety risks and impacts related to the Works, provide site workers with safe and healthy working conditions and establish an operating system to prevent accidents, injuries, and disease. At a minimum, it shall be based on the Environment, Health, and Safety Management Plan (EHSMP) and Environment, Health, and Safety (EHS) Code of Conduct for Contractor's Personnel submitted as part of the Contractor's Tender and agreed as part of the Contract, and address requirements in the Environmental Management Plan (EMP) of the project.</p> <p>The procedures for Review of the SSHSMP and its updates shall be as described in Sub-Clause 4.4.1 [Preparation and Review].</p> <p>The Contractor shall, as stated in the Specification and as the Engineer may reasonably require, maintain records and make reports (in compliance with the applicable health and safety regulations and Laws) concerning the health and safety of persons and any damage to property.</p>
<p>Sub-Clause 4.13 Rights of Way and Facilities</p>	<p>Add the following at the end of the second paragraph:</p> <p>"For any such additional facilities that the Contractor may need to obtain, the Contractor shall comply with:</p> <ul style="list-style-type: none"> (a) the measures and requirements relevant to the Contractor, which are set forth in the Resettlement Plan ("RP") attached hereto as Annex to the Particular Conditions of Contract, to the extent it concerns impacts on affected people during construction; and (b) any corrective or preventive actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor implementation of the Resettlement Plan. <p>The Accepted Contract Amount is deemed to include all expenses to ensure compliance with these measures, requirements, and actions."</p>
<p>Sub-Clause 4.15 Access Route</p>	<p>The following is added at the end of Sub-Clause 4.15:</p> <p>"The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party, associated with the use of, if any, the Contractor's Equipment on access routes and other public roads or other infrastructure.</p>

Clause/Sub-Clause	Special Provisions
	<p>The Contractor shall monitor road safety incidents and accidents to identify safety issues and establish and implement necessary measures to resolve them.</p> <p>The Contractor shall adequately record the condition of roads, agricultural land adjacent to access route and other infrastructure prior to the start of transporting Goods.</p> <p>The Contractor shall be liable for the reinstatement of all such access routes, agricultural land, and other public roads and infrastructure to the extent any such damages were caused by the Contractor. “</p>
<p>Sub-Clause 4.18 Protection of the Environment</p>	<p>Sub-Clause 4.18 [Protection of the Environment] is replaced with:</p> <p>“The Contractor shall take all necessary measures to fulfill the following obligations under the Contract to protect the environment, including (but not limited to):</p> <ul style="list-style-type: none"> (a) protect the environment (both on and off the Site); and (b) limit damage and nuisance to people, property, and protected areas and habitat of threatened species (if any) resulting from pollution, noise, and other results of the Contractor’s operations and/or activities. <p>The Contractor shall ensure that emissions, surface discharges, effluent, and any other pollutants from the Contractor’s activities shall exceed neither the values indicated in the Specification, nor those prescribed by applicable Laws.</p> <p>In the event of damage to the environment, property, and/or nuisance to people, on or off Site as a result of the Contractor’s operations, the Contractor shall agree with the Engineer the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Engineer.</p> <p>As soon as practicable after the Contractor has been given access to, and possession of, the first part of the Site (or the whole Site, as the case may be), the Contractor shall submit to the Engineer for Review a detailed Site-Specific Environment Management Plan (SSEMP) which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works.</p> <p>The SSEMP shall include measures the Contractor proposes to manage the environmental risks and impacts of the Works. At a minimum, it shall be based on the EHSMP and EHS Code of Conduct for Contractor’s Personnel submitted as part of the Contractor’s Tender and agreed as part of the Contract, and address requirements in the EMP of the project.</p>

Clause/Sub-Clause	Special Provisions
	<p>The SSEMP shall be in addition to any other similar document required under applicable environmental regulations and Laws, and shall set out all the requirements for the protection of the environment that:</p> <ul style="list-style-type: none"> (i) are stated in the Specification; and (ii) comply with all the Contractor's environmental obligations under the Contract. <p>The procedures for Review of the SSEMP shall be as described in Sub-Clause 4.4.1 [Preparation and Review].</p>
<p>Sub-Clause 4.20 Progress Reports</p>	<p>Replace 4.20 (g) with: "the Environmental, Health and Safety (EHS) Metrics for Progress Reports set out in Particular Conditions - Part D"</p> <p>The following is added at the end of the Sub-Clause:</p> <p>"In addition to the reporting requirement of this sub-paragraph (g) of Sub-Clause 4.20 [Progress Reports] upon becoming aware of its occurrence, the Contractor shall inform the Engineer within 24 hours of any allegation, incident or accident, which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel or Contractor's Personnel. This includes, but is not limited to, any incident or accident-causing fatality or serious injury; significant adverse effects or damage to private property or to the natural environment, including protected areas and habitat of threatened species.</p> <p>The Contractor, upon becoming aware of the incident or accident, shall also inform the Engineer within 24 hours of any such incident or accident on the Subcontractors' or suppliers' premises relating to the Works that has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer's Personnel or Contractor's, its Subcontractors' and suppliers' personnel.</p> <p>The notification shall provide sufficient detail regarding such incidents or accidents. The Contractor shall provide full details of such incidents or accidents to the Engineer within the timeframe outlined in the SSEMP and SSHSMP or as agreed with the Engineer.</p> <p>The Contractor shall require its Subcontractors and suppliers to notify the Contractor of any incidents or accidents referred to in this Sub-Clause within the timeframe outlined in the SSEMP and SSHSMP or as agreed with the Engineer."</p>
<p>Sub-Clause 4.21 Security of the Site</p>	<p>At the end of Sub-Clause 4.21 the following paragraphs are added:</p> <p>"If required in the Specification, further to conducting a site security risk assessment, the Contractor shall submit for the Engineer's No-objection a security management plan that sets out the security arrangements for the Site.</p>

Clause/Sub-Clause	Special Provisions
	<p>The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's Personnel, Employer's Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specification.</p> <p>The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.</p> <p>In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Specification."</p>
Sub-Clause 4.22 Contractor's Operations on Site	On the third line of the second paragraph before "4.17", "Sub- Clause" is added.
Sub-Clause 4.23 Archaeological and Geological Findings	<p>The first paragraph is replaced with the following:</p> <p>"All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural, or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:</p> <ul style="list-style-type: none"> a. take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor's Personnel or other persons from removing or damaging any of these findings; b. train relevant Contractor's Personnel on appropriate actions to be taken in the event of such findings; and c. implement any other action consistent with the requirements of the Specification and relevant Laws."
Sub-Clause 4.24 ⁶ Environment, Health, and Safety Code of Conduct	<p>New Sub-Clause 4.24 is added as following:</p> <p>"The Contractor shall adhere to the EHS Code of Conduct for the Contractor's Personnel submitted as part of the Contractor's Tender.</p> <p>The Contractor shall take all necessary measures to ensure that each Contractor's Personnel is made aware of the of EHS Code of Conduct including specific behaviors that are prohibited and understands the consequences of engaging in such prohibited behaviors.</p>

⁶For projects categorized as Category C for environment for which no EMP has been prepared, the last paragraph should be deleted.

Clause/Sub-Clause	Special Provisions
	<p>These measures include providing instructions and documentation that can be understood by the Contractor's Personnel and seeking to obtain, as part of the site induction training, that person's signature acknowledging receipt of such instructions and/or documentation, as appropriate. The Contractor shall keep record of such acknowledgement of receipt.</p> <p>The Contractor shall also ensure that the EHS Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project affected people. The posted EHS Code of Conduct shall be provided in languages comprehensible to Contractor's Personnel, Employer's Personnel, and the local community.</p> <p>The Contractor's SSEMP (as per Sub-Clause 4.8 [Health and Safety Obligations] and SSHSMP (as per Sub-Clause 4.18 [Protection of the Environment] shall include appropriate processes for the Contractor to verify compliance with these obligations."</p>
<p>Sub-Clause 5.1 Subcontractors</p>	<p>The following is added at the end of the third paragraph of Sub-Clause 5.1:</p> <p>"When requesting such a prior consent, the Contractor shall submit, in addition to any other required document, an undertaking from each proposed Subcontractor to confirm that they have read, understand and shall comply with the EHS obligations set out in Sub-Clause 4.24 and EHS Code of Conduct.</p> <p>The following is added at the end of the last paragraph of Sub-Clause 5.1: The Contractor shall ensure that the requirements imposed on the Contractor by Sub-Clause 1.12 [Confidentiality] apply equally to each Subcontractor.</p> <p>Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.</p> <p>All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under sub-paragraph (a) of Sub-Clause 15.2.3 [After Termination]."</p>
<p>Sub-Clause 5.2.2 Objection to Nomination</p>	<p>In sub-paragraph (a), on the first line before "Subcontractor", "nominated" is added.</p> <p>In sub-paragraph (c):</p> <p>"and" is deleted from the end of (i);</p> <p> "." at the end of (ii) is replaced with: ", and".</p> <p>The following is then added as (iii):</p>

Clause/Sub-Clause	Special Provisions
	“(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [Payment to nominated Subcontractors].”
Sub-Clause 6.1 Engagement of Staff and Labor	<p>The following paragraphs are added at the end of the Sub-Clause:</p> <p>“The Contractor shall provide the Contractor’s Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labor Laws applicable to the Contractor’s Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specification. The Contractor’s Personnel shall be informed when any material changes to their terms or conditions of employment occur.</p> <p>The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.”</p>
Sub-Clause 6.2 Rates of Wages and Conditions of Labor	<p>The following paragraphs are added:</p> <p>“The Contractor shall inform the Contractor’s Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances, and any benefits as are subject to tax under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.</p> <p>The Contractor shall have paid its staff and labor all due wages and entitlements on or before the end of their engagement or employment.”</p>
Sub-Clause 6.5 Working Hours	<p>The following is inserted at the end of the Sub-Clause:</p> <p>“The Contractor shall provide the Contractor’s Personnel annual holiday and sick, maternity, and family leave, as required by applicable Laws or as stated in the Specification.”</p>
Sub-Clause 6.6 Facilities for Staff and Labor	<p>The following is added as the last paragraph:</p> <p>“If stated in the Specification, the Contractor shall give access to or provide services that accommodate the physical, social, and cultural needs of the Contractor’s Personnel. The Contractor shall also provide similar facilities for the Employer’s Personnel as stated in the Specification.”</p>
Sub-Clause 6.7 Health and Safety of Personnel	<p>In the second paragraph, “The Contractor” is replaced with:</p> <p>“Except as otherwise stated in the Specification, the Contractor...”</p> <p>The following is added after the third paragraph:</p>

Clause/Sub-Clause	Special Provisions
	<p>HIV/AIDS Prevention. The Contractor shall conduct an HIV/AIDS awareness program via an approved service provider and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the virus between and among the Contractor's Personnel and the local community, to promote early diagnosis and to assist affected individuals.</p> <p>The Contractor shall conduct health and safety programs for workers employed under the project and shall include information on the trafficking of workers and the risk of sexually transmitted diseases, including HIV/AIDS, in such programs.</p> <p>The Contractor shall, throughout the contract (including the Defects Notification Period): (i) conduct information, education, and communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Subcontractors, and any other Contractor's or Employer's personnel, and all truck drivers and crew making deliveries to the Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to, sexually transmitted diseases (STDs) or sexually transmitted infections (STIs) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labor as appropriate; and (iii) provide for STIs and HIV/AIDS screening, diagnosis, counselling, and referral to a dedicated national STIs and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.</p> <p>The Contractor shall include in the program to be submitted for the execution of the Works under Sub-Clause 8.3 an alleviation program for Site staff and labor and their families in respect of STIs and STDs including HIV/AIDS. The STIs, STDs, and HIV/AIDS alleviation program shall indicate when, how, and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related subcontracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.</p>
Sub-Clause 6.9 Contractor's Personnel	<p>The Sub-Clause is replaced with:</p> <p>"The Contractor's Personnel (including Key Personnel, if any) shall be appropriately qualified, skilled, experienced, and competent in their respective trades or occupations.</p> <p>The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative and Key Personnel (if any), who:</p> <ul style="list-style-type: none"> a) persists in any misconduct or lack of care; b) carries out duties incompetently or negligently; c) fails to comply with any provision of the Contract;

Clause/Sub-Clause	Special Provisions
	<p>d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment;</p> <p>e) based on reasonable evidence, is determined to have engaged in any of the conducts defined in 2.1 (a) of Particular Conditions Part C (Corrupt and Fraudulent Practices) during the execution of the Works;</p> <p>f) has been recruited from the Employer's Personnel in breach of Sub-Clause 6.3 [Recruitment of Persons]; and</p> <p>g) undertakes behavior that breaches the EHS Code of Conduct for Contractor's Personnel as stated in Sub-Clause 4.24 [EHS Code of Conduct].</p> <p>If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience. In the case of replacement of the Contractor's Representative, Sub-Clause 4.3 [Contractor's Representative] shall apply. In the case of replacement of Key Personnel (if any), Sub-Clause 6.12 [Key Personnel] shall apply.</p> <p>Subject to the requirements in Sub-Clause 4.3 [Contractor's Representative] and 6.12 [Key Personnel], and notwithstanding any requirement from the Engineer to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor's Personnel who engages in (a), (b), (c), (d), (e), or (g) above or has been recruited as stated in (f) above."</p>
Sub-Clause 6.12 Key Personnel	<p>The following is inserted at the end of the last paragraph:</p> <p>"If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer."</p>
	<p>The following Sub-Clauses 6.13 to 6.28 are added after Sub-Clause 6.12</p>
Sub-Clause 6.13 Foreign Personnel	<p>The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.</p>
Sub-Clause 6.14 Supply of Foodstuffs	<p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for</p>

Clause/Sub-Clause	Special Provisions
	the Contractor's Personnel for the purposes of or in connection with the Contract.
Sub-Clause 6.15 Supply of Water	The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.
Sub-Clause 6.16 Measures against Insect and Pest Nuisance	The Contractor shall at all times, take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including on the use of appropriate insecticide.
Sub-Clause 6.17 Alcoholic Liquor or Drugs	The Contractor shall not, otherwise in accordance with the Laws of the Country, import, sell, give, barter, or dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter, or disposal thereto by the Contractor's Personnel.
Sub-Clause 6.18 Arms and Ammunition	The Contractor shall not give, barter, or dispose of, to any person, any arms or ammunition of any kind, or allow the Contractor's Personnel to do so.
Sub-Clause 6.19 Festivals and Religious Customs	The Contractor shall respect the Country's recognized festivals, days of rest, and religious or other customs including those practiced by communities adjacent to the Site.
Sub-Clause 6.20 Funeral Arrangements	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
Sub-Clause 6.21 Forced Labor	<p>The Contractor shall not employ or engage forced labor. Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.</p> <p>The Contractor shall not employ persons who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring, or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.</p> <p>The Contractor shall ensure that its Subcontractors and suppliers comply with all the obligations under this Sub-Clause.</p>
Sub-Clause 6.22 Child Labor	<p>The Contractor shall not employ or engage a child whose age is below the Country's statutory minimum age of employment or a child in contravention of International Labour Organization, Convention no. 138 (Minimum Age Convention).</p> <p>The Contractor shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</p> <p>The Contractor shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been</p>

Clause/Sub-Clause	Special Provisions
	<p>conducted by the Contractor with the Engineer's consent. The Contractor shall be subject to regular monitoring by the Engineer that includes monitoring of health, working conditions, and hours of work.</p> <p>Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work</p> <ul style="list-style-type: none"> (a) with exposure to physical, psychological, or sexual abuse; (b) underground, underwater, or working at heights or in confined spaces; (c) with dangerous machinery, equipment, or tools, or involving handling or transport of heavy loads; (d) in unhealthy environments exposing them to hazardous substances, agents, or processes, or to temperatures, noise, or vibration damaging to their health; or (e) under difficult conditions such as working for long hours, during the night, or in confinement on the premises of the employer. <p>The Contractor shall ensure that its Subcontractors and suppliers comply with all the obligations under this Sub-Clause.</p>
Sub-Clause 6.23 Employment Records of Workers	The Contractor shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].
Sub-Clause 6.24 Workers' Organizations	In countries where the relevant labor laws recognize workers' rights to form and join workers' organizations of their choosing and to bargain collectively without interference, the Contractor shall comply with such laws. In such circumstances, the role of legally established workers' organizations and legitimate workers' representatives will be respected, and they will be provided with information needed for meaningful negotiation in a timely manner. Where the relevant labor laws substantially restrict workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. The Contractor shall not seek to influence or control these alternative means. The Contractor shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and collective bargaining or alternative mechanisms. Workers' organizations are expected to fairly represent the workers in the workforce.
Sub-Clause 6.25	The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the

Clause/Sub-Clause	Special Provisions
<p>Non-Discrimination and Equal Opportunity</p>	<p>employment of the Contractor's Personnel on the principle of equal opportunity and fair treatment and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination.</p> <p>The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, indigenous peoples and/or ethnic minorities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).</p>
<p>Sub-Clause 6.26 Contractor's Personnel Grievance Mechanism</p>	<p>The Contractor shall have a grievance mechanism for Contractor's Personnel, and where relevant, the workers' organizations stated in Sub-Clause 6.24 [Workers' Organizations], to raise workplace concerns. The grievance mechanism shall be proportionate to the nature, scale, risks, and impacts of the Contract. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned in a language they understand, without any retribution, and shall operate in an independent and objective manner.</p> <p>The Contractor's Personnel shall be informed of the grievance mechanism at the time of engagement for the Contract, and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all Contractor's Personnel.</p> <p>The grievance mechanism shall not impede access to other judicial or administrative remedies that might be available or substitute for grievance mechanisms provided through collective agreements.</p> <p>The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and implemented, address concerns promptly, and are readily accessible to Contractor's Personnel. Existing grievance mechanisms may be supplemented as needed with Contract-specific arrangements.</p>
<p>Sub-Clause 6.27 Training of Contractor's Personnel</p>	<p>The Contractor shall provide appropriate training to relevant Contractor's Personnel on obligations set out in Sub-Clause 4.8 [Health and Safety Obligations], 4.18 [Protection of the Environment] and Sub-Clause 6.28 [Respectful Work Environment] respectively.</p>
<p>Sub-Clause 6.28 Respectful Work Environment</p>	<p>The following sentence shall apply:</p> <p>The Contractor shall ensure that its employees and Subcontractors observe the highest ethical standards and refrain from any form of bullying, discrimination, misconduct and harassment, including sexual harassment; and shall, at all times, behave in a manner that creates an environment free</p>

Clause/Sub-Clause	Special Provisions
	<p>of unethical behavior, bullying, misconduct, and harassment, including sexual harassment. The Contractor shall take appropriate action against any employees or subcontractors, including suspension or termination of employment or subcontract, if any form of unethical or inappropriate behavior is identified.</p> <p>The Contractor shall conduct training programs for its employees and Subcontractors to raise awareness on and prevent any form of bullying, discrimination, misconduct, and harassment including sexual harassment, and to promote a respectful work environment. The Contractor shall keep an up-to-date record of its employees and Subcontractors who have attended and completed such training programs and provide such records to the Employer or the Engineer at their first written request.</p>
Sub-Clause 7.7 Ownership of Plant and Materials	<p>The following is added before the first paragraph:</p> <p>“Except as otherwise provided in the Contract,”</p>
Sub-Clause 8.1 Commencement of Work	<p>The first paragraph is replaced with the following:</p> <p>“The Engineer shall give a Notice to the Contractor stating the Commencement Date, not less than 14 days before the Commencement Date. This Notice shall be issued promptly after the Engineer determines the fulfillment of the following conditions:</p> <ul style="list-style-type: none"> (a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country; (b) delivery to the Contractor of reasonable evidence of the Employer’s financial arrangements (under Sub-Clause 2.4 [Employer’s Financial Arrangements]; (c) except if otherwise specified in Sub-Clause 2.1 in the Contract Data, effective access to and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 [Compliance with Laws] as required for the commencement of the Works; (d) receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 [Advance Payment] provided that the conditions set out under Sub-Clause 14.2.2(a) and (b) have been fulfilled by the Contractor within 28 days from the receipt of the Letter of Acceptance. Otherwise, this sub-paragraph (d) shall not apply.
Sub-Clause 8.3 Programme	<p>Add the following at the end of sub-paragraph (b):</p> <p>“, it being understood that the sequence of construction activities should take into account, to the extent possible, the constraints due to land acquisition as set out in the resettlement plan.”</p>
Sub-Clause 13.3.1	<p>Sub-paragraph 13.3.1 (a) is replaced with: “a description of the varied work performed or to be performed, including details of the resources and</p>

Clause/Sub-Clause	Special Provisions
Variation by Instruction	methods adopted or to be adopted by the Contractor, and sufficient information to enable an evaluation of environment, health, and safety risks and impacts;”
Sub-Clause 13.4 Provisional Sums	<p>The following is inserted as the penultimate paragraph:</p> <p>“A specific Provisional Sum for the work of the DAAB shall be used to cover the Employer’s share of the DAAB members’ fees and expenses, in accordance with Clause 21 [Dispute and Arbitration]. Notwithstanding the foregoing, no prior instruction of the Engineer shall be required for use of this specific Provisional Sum. The Contractor shall submit the DAAB members’ invoices and satisfactory evidence of having paid 100% of such invoices as part of supporting documents of those Statements submitted under Sub-Clause 14.3 [Application for Interim Payment]. No overhead and profit shall be paid to the Contractor in respect of the Provisional Sum”.</p> <p>The following is added at the end of the first paragraph:</p> <p>If the Bill of Quantities includes Provisional Sums for contingencies, it shall be used, in whole or part, at the discretion, and in accordance with the instructions, of the Engineer, to meet any of the Employer’s payment obligations in connection with or arising out of the Contract.</p>
Sub-Clause 13.6 Adjustments for Changes in Laws	<p>The following paragraph is added at the end of the Sub-Clause:</p> <p>“Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].”</p>
Sub-Clause 14.1 The Contract Price	<p>“Notwithstanding the provisions of sub-paragraph (b), Contractor’s Equipment, including essential spare parts, imported by the Contractor for the sole purpose of executing the Contract shall be temporarily exempt from the payment of import duties and taxes upon initial importation, provided the Contractor shall post with the customs authorities at the port of entry an approved export bond or bank guarantee, valid until the Time of Completion plus 6 months, in an amount equal to the full import duties and taxes that would be payable on the assessed imported value of such Contractor’s Equipment and spare parts, and callable in the event the Contractor’s Equipment is not exported from the Country on completion of the Contract. A copy of the bond or bank guarantee endorsed by the customs authorities shall be provided by the Contractor to the Employer upon the importation of individual items of Contractor’s Equipment and spare parts. Upon export of individual items of the Contractor’s Equipment or spare parts, or upon the completion of the Contract, the Contractor shall prepare, for approval by the customs authorities, an assessment of the residual value of the Contractor’s Equipment and spare parts to be exported, based on the depreciation scale(s) and other criteria used by the customs authorities for such purposes under the provisions of the applicable Laws. Import duties and taxes shall be due and payable to the customs authorities by the Contractor on (a) the difference between the initial imported value and the residual</p>

Clause/Sub-Clause	Special Provisions
	value of the Contractor's Equipment and spare parts to exported; and (b) on the initial imported value of the Contractor's Equipment and spare parts remaining in the Country after the completion of the Contract. Upon payment of such dues within 28 days of being invoiced, the bond or bank guarantee shall be reduced or released accordingly, otherwise the security shall be called in the full amount remaining."
Sub-Clause 14.2.1 Advance Payment Guarantee	The first paragraph is replaced with: "The Contractor shall obtain (at the Contractor's cost) an Advance Payment Guarantee in amounts and currencies equal to the advance payment and shall submit it to the Employer with a copy to the Engineer. This guarantee shall be issued by reputable bank or financial institution selected by the Contractor and shall be based on the sample form annexed to the Particular Conditions or in another form agreed by the Employer (but such agreement shall not relieve the Contractor from any obligation under this Sub-Clause)."
Sub-Clause 14.3 Application for Interim Payment	Sub-paragraph (vi) is replaced with the following; "(vi) any other additions and/or deductions that have become due under the Contract or otherwise, including those under Sub-Clause 3.7 [Agreement or Determination], any amount due to the Contractor under Sub-Clause 21.4.3 (i) and any reimbursement due to the Contractor under Sub-Clause 9.5 of the General Conditions of the DAAB Agreement."
Sub-Clause 14.9 Release of Retention Money	The following is added at the end of Sub-Clause 14.9: "Unless otherwise stated in the Contract, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a reputable bank or financial institution selected by the Contractor, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security under Sub-Clause 4.2. On receipt by the Employer of the required guarantee, the Engineer shall certify and pay the second half of the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release after the latest of the expiry dates of the Defects Notification Periods. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate. If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under it when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security, when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security."

Clause/Sub-Clause	Special Provisions
Sub-Clause 14.12 Discharge	On the seventh line of the first paragraph, "Sub-Clause 21.6 [Arbitration]" is replaced with: "Clause 21 [Disputes and Arbitration]"
Sub-Clause 14.15 Currencies of Payment	Throughout Sub-Clause 14.15, "Contract Data" is replaced with: "Schedule of Payment Currencies or the Bill of Quantities (in case the use of various currencies is stated in the Bill of Quantities itself), as applicable".
Sub-Clause 15.1 Notice to Correct	<p>"and" is deleted at the end of (b) and "." is replaced by: "; and" in (c).</p> <p>The following is then added as (d):</p> <p>"(d) specify the time within which the Contractor shall respond to the Notice to Correct."</p> <p>In the third paragraph, "shall immediately respond" is replaced with: "shall respond within the time specified in (d)".</p> <p>Further, at the end of the third paragraph, "to comply with the time specified in the Notice to Correct." is replaced with: "to comply with the time specified in (c)."</p>
Sub-Clause 15.2.1 Notice	Sub-paragraph (h) is replaced with: "is found, based on reasonable evidence, to have engaged in Corrupt and Fraudulent Practices as defined in Paragraph 2.1 (a) of Part C of the Particular Conditions [Corrupt and Fraudulent Practices], in competing for or in executing the Contract."
Sub-Clause 15.8 Fraud and Corruption	<p>The following new Sub-Clause is added:</p> <p>"15.8.1 The Bank requires compliance with the Bank's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), as set forth in Particular Conditions - Part C- Corrupt and Fraudulent Practices.</p> <p>15.8.2 The Employer requires the Contractor to disclose any commissions, gratuities, or fees that may have been paid or are intended to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity, or fee."</p>
Sub-Clause 16.2.1 Notice	<p>At the end of sub-paragraph (i): "; or" is replaced with: "."</p> <p>sub-paragraph (f) is replaced with:</p> <p>"(f) the Contractor does not receive a Notice of the Commencement Date under Sub-Clause 8.1 [Commencement of Works] within 182 days after receiving the Letter of Acceptance, for reasons not attributable to the Contractor;"</p> <p>Sub-paragraph (j) is replaced with: "the Employer is found, based on reasonable evidence, in accordance with the Bank's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time) to have incurred in integrity violations, such as those defined in Part C [Corrupt and Fraudulent Practices] of the Particular Conditions of Contract at any time in relation to work or the Contract."</p>
Sub-Clause 16.2.2	The following is added at the end of Sub-Clause 16.2.2:

Clause/Sub-Clause	Special Provisions
Termination	<p>“In the event the Bank suspends the loan or grant from which part or whole of the payments to the Contractor are being made, if the Contractor has not received the sums due to him by the expiry of 14 days after the relevant time period referred to in Sub-Clause 14.7 [Payment], issuance of the Interim Payment Certificates to which they relate, the Contractor may, without prejudice to the Contractor's entitlement to financing charges under Sub-Clause 14.8 [Delayed Payment], take one of the following actions: (i) suspend work or reduce the rate of work under Sub-Clause 16.1 above, or (ii) terminate the Contract by giving Notice to the Employer, with a copy to the Engineer, such termination to take effect 14 days after giving the Notice.”</p>
Sub-Clause 17.1 Responsibility for Care of the Works	<p>On the fourth and fifth lines of the first paragraph, replace “Date of Completion of the Works” with “issue of the Taking-Over Certificate for the Works”.</p>
Sub-Clause 17.3 Intellectual and Industrial Property Rights	<p>On the first line of the second paragraph, replace “notice” with “a Notice”.</p>
Sub-Clause 17.7 Use of Employer's Accommodation/Facilities	<p>The following Sub-Clause is added as 17.7:</p> <p>“The Contractor shall take full responsibility for the care of the Employer-provided accommodation and facilities, if any, as detailed in the Specification, from the respective dates of handover to the Contractor until cessation of occupation (where handover or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works).</p> <p>If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at its own cost, rectify the loss or damage to the satisfaction of the Engineer.”</p>
Sub-Clause 18.1 Exceptional Events	<p>“Sub-paragraph (c) is substituted with</p> <p>(c) riot, commotion, disorder, or sabotage by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors;”</p>
Sub-Clause 18.4 Consequences of an Exceptional Event	<p>The following is added at the end of sub-paragraph (b) after deleting the “.”:</p> <p>“, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [Insurance to be provided by the Contractor].”</p>
Sub-Clause 18.5 Optional Termination	<p>In sub-paragraph (c), “and necessarily” is inserted after “was reasonably”.</p>
Sub-Clause 19.1	<p>The following paragraphs are added after the first paragraph:</p>

Clause/Sub-Clause	Special Provisions
General Requirements	<p>“Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms acceptable to the Contractor. These terms shall be consistent with terms (if any) agreed by both Parties before the date of the Letter of Acceptance.</p> <p>This agreement of terms shall take precedence over the provisions of this Clause.</p>
Sub-Clause 19.2 insurance to be provided by the Contractor	<p>The following is inserted as the first sentence in Sub-Clause 19.2:</p> <p>“The Contractor shall be entitled to place all insurances relating to the Contract (including, but not limited to the insurance referred to in Clause 19) with insurers from the List of Eligible Countries as stated in Sub-Clause 1.5.”</p>
Sub-Clause 19.2.1 The Works	<p>On the last line of the second paragraph, “Clause 12 [Tests after completion]” is deleted.</p>
Sub-Clause 19.2.5 Injury to employees	<p>The second paragraph is replaced with:</p> <p>“The Employer and the Engineer shall also be indemnified under the policy of insurance, against liability for claims, damages, losses, and expenses (including legal fees and expenses) arising from injury, sickness, disease, or death of any person employed by the Contractor or any other of the Contractor’s Personnel, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer’s Personnel.”</p>
Sub-Clause 20.1 Claims	<p>In a): “any additional payment” is replaced with “any payment”.</p>
Sub-Clause 20.2 Claims for Payment and/or EOT	<p>The first paragraph is replaced with:</p> <p>“If either Party considers that it is entitled to claim under Sub-Clause 20.1 (a) or (b), the following claim procedure shall apply:”</p>
Sub-Clause 20.2.7 General requirements	<p>In the first paragraph, replace “until” with “after” and delete “reasonably”.</p>
Sub-Clause 21.1 Constitution of the DAAB	<p>First paragraph: the second sentence is replaced with: “The Parties shall jointly appoint the member(s) of the DAAB within 28 days after the representation made by any parties regarding dispute., unless stated otherwise in the Contract Data.”</p> <p>In the second paragraph, at the end of the first sentence after deleting: “.”, the following is added: “, each of whom shall meet the criteria set forth in Sub-Clause 3.3 of Appendix- General Conditions of Dispute Avoidance/ Adjudication Agreement.”</p> <p>After the second paragraph insert the following paragraph: “If the Contract is with a foreign Contractor, the DAAB members shall not have the same nationality as the Employer or the Contractor.”</p>
Sub-Clause 21.4.3	<p>Item (i) of penultimate paragraph is deleted and replaced as follows:</p>

Clause/Sub-Clause	Special Provisions
The DAAB's decision	(i) subject to sub-paragraph (ii) below, this amount shall be due and payable in the next Payment Certificate, for which the Engineer is obliged to certify, and the Employer is obliged to make payment; and
Sub-Clause 21.6 Arbitration	<p>In the first paragraph, delete starting from: "international arbitration" up to the end of (c), and replace with the following: "arbitration. Arbitration shall be conducted as follows:</p> <p>(a) If the Contractor, or if the leader of the Joint Venture in case the Contractor is a Joint Venture, is from outside the Country, unless otherwise specified in the Contract Data:</p> <p>(i) the Dispute shall be finally settled under the Rules of Arbitration of the Singapore International Arbitration Centre (SIAC), with proceedings administered by SIAC;</p> <p>(ii) the Dispute shall be settled by one or three arbitrators appointed in accordance with these Rules; and</p> <p>(iii) the place of arbitration shall be Singapore or any other neutral place mutually agree by both the Employer and the Contractor.</p> <p>The arbitration shall be conducted in the ruling language defined in Sub-Clause 1.4 [Law and Language].</p> <p>(b) If the Contract is with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country."</p>
	APPENDIX- GENERAL CONDITIONS OF DISPUTE AVOIDANCE/ADJUDICATION AGREEMENT
Title	General Conditions of Dispute Avoidance/Adjudication Agreement" is replaced with "General Conditions of DAAB Agreement".
1. Definitions	<p>Sub-Clause 1.2: In both the first and third lines, "DAA Agreement" is replaced with "DAAB Agreement".</p> <p>Sub-Clause 1.3:</p> <p>-In the first line, "Dispute Avoidance/Adjudication Agreement" or "DAA Agreement" means" is replaced with:</p> <p>"DAAB Agreement" is as defined under the Contract and is".</p> <p>- In the first line of sub-paragraph (c), "DAA Agreement" is replaced with "DAAB Agreement".</p> <p>- In sub-paragraph (c)(ii), "chairman" is replaced with "chairperson".</p>

Clause/Sub-Clause	Special Provisions
	<p>Sub-Clause 1.7 to 12: Replace all instances of "DAA Agreement" with "DAAB Agreement".</p> <p>In Sub-Clause 1.8 a(i): "authorized representative of the Contractor or of the Employer" is replaced with: "Contractor's Representative or authorized representative of the Employer".</p>
2. General Provisions	Sub-Clause 2.2 is deleted in its entirety.
7. Confidentiality	<p>In Sub-Clause 7.3: "or" is deleted from the end of sub-paragraph (b); "." at the end of sub-paragraph (c) is replaced with: ", or".</p> <p>The following is then added as (d):</p> <p>"(d) is required by the Bank."</p>
10. Resignation and Termination	In Sub-Clause 10.3: "the DAA Agreement" is replaced with: "a DAAB member's DAAB Agreement".
11. Challenge	<p>In Sub-Clause 11.1: on the second line, delete the text:</p> <p>", or in the case of a three-member DAAB the Other Members jointly,".</p>
Annex- DAAB Procedural Rules	
Rule 4.2	On the fourth line, "chairman" is replaced with "chairperson".
Rules 8.3	On the sixth line, "chairman" is replaced with "chairperson".
Form of Dispute Avoidance/Adjudication Agreement	
<p>All instances of "DAA Agreement" are replaced with: "DAAB Agreement".</p> <p>In C (b): "chairman" is replaced with "chairperson".</p>	

Part C – Corrupt and Fraudulent Practices

1. Purpose

1.1 ADB's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time) and this annex apply with respect to procurement under ADB-financed activities.

2. Requirements

2.1 ADB requires Borrowers (including beneficiaries of ADB-financed activity) and their personnel, as well as firms and individuals participating in an ADB-financed activity, including but not limited to, Bidders, Suppliers and Contractors, agents, subcontractors, subconsultants, service providers, subsuppliers, manufacturers (including their respective officers, directors, employees and personnel) under ADB-financed contracts to observe the highest standard of ethics during the procurement and execution of such contracts in accordance with ADB's Anticorruption Policy (1998, as amended from time to time). In pursuance of this policy, ADB

(a) defines, for the purposes of this provision, the terms set forth below as follows:

- (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
- (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
- (v) "abuse" means theft, waste, or improper use of assets related to ADB-related activity, either committed intentionally or through reckless disregard;
- (vi) "conflict of interest" means any situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations;
- (vii) "integrity violation" means any act, as defined under ADB's Integrity Principles and Guidelines (2015, as amended from time to time), which violates ADB's Anticorruption Policy, including (i) to (vi) above and the following: obstructive practice, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standards.

(b) will reject a proposal for award if it determines that the Bidder recommended for award or any of its officers, directors, employees, personnel, subconsultants, subcontractors, service providers, suppliers or manufacturers has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;

(c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB financing engaged in corrupt, fraudulent,

collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation, including by failing to inform ADB in a timely manner at the time they knew of the integrity violations;

- (d) will impose remedial actions on a firm or an individual at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines, including declaring ineligible, either indefinitely or for a stated period of time, to participate⁷ in activities financed, administered, or supported by ADB or to benefit from a contract financed, administered, or supported by ADB or otherwise, if it, at any time, determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and
- (e) will have the right to require that a provision be included in bidding documents and in contracts financed, administered, or supported by ADB, requiring Bidders, suppliers, contractors, consultants, manufacturers, service providers and other third parties engaged or involved in ADB-related activities, and their respective officers, directors, employees and personnel, to permit ADB or its representative to inspect the site and their assets, accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

2.2 All Bidders, consultants, contractors, suppliers, manufacturers, service providers, and other third parties engaged or involved in ADB-related activities and their respective officers, directors, employees and personnel, are required to cooperate fully in any investigation when requested by ADB to do so. As determined on a case-by-case basis by ADB, such cooperation is set out in detail in the Integrity Principles and Guidelines.

2.3 All Bidders, consultants, contractors and suppliers shall require their officers, directors, employees, personnel, agents to ensure that, in its contracts with its subconsultants, Subcontractors, and other third parties engaged or involved in ADB-related activities, such subconsultants, Subcontractors, and other third parties similarly are required to cooperate fully in any investigation when requested by ADB to do so.

2.4 The Contractor undertakes that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the bid, have been given or received in connection with the procurement process or in the contract execution.⁸

⁷ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

⁸ The undertaking also applies during the period of performance of the contract.

Part D- Environmental, Health and Safety (EHS)

Metrics for Progress Reports

Metrics for regular reporting:

a. Incidents for Non-Conformance

- (i) Environmental incidents or non-conformance with contract requirements, including contamination, pollution, or damage to ground or water supplies
- (ii) Health and safety incidents, accidents, injuries that require treatment, and all fatalities
- (iii) Interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none)

b. Status of All Permits and Agreements:

- (i) Work permits: number required, number received, and actions taken for those not received
- (ii) Status of permits and consents:
 - (a) List areas and facilities with permits required (quarries, asphalt, and batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), and status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.).
 - (b) List areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, and dates submitted to resident engineer (or equivalent).
 - (c) Identify and highlight major activities and environment, health, and safety activities undertaken in each area in the reporting period (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation).
 - (d) For quarries: indicate status of relocation and compensation (completed, or details of activities and current status in the reporting period).
 - (e) List parts of the Site for which Notice to commence work and confirmation by the Employer as per Sub-Clause 2.1 was received by the Contractor and the other parts of the Site for which such Notice is pending.

c. Compliance⁹

- (i) Compliance status for conditions of all relevant consents and permits for the Work, including quarries, etc.: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- (ii) Compliance status of SSHSMP (as per Sub-Clause 4.8 [*Health and Safety Obligations*]) and SSEMP (as per Sub-Clause 4.18 [*Protection of the Environment*]): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- (iii) Other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc.; cross-reference other sections as needed

⁹For projects categorized as Category C for environment for which no EMP has been prepared, the item (ii) should be deleted.

d. Supervision

- (i) Environmental Supervision
 - (a) Environmental specialist: number of days worked, areas inspected, number of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities and findings (including violations of environmental requirements/best practices, actions taken), and reports to environmental specialist, construction, and site management
 - (b) Community liaison person(s): number of days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), and reports to specialist, construction, and site management

- (ii) Health and Safety Supervision
 - (a) Health and Safety specialist: number of days worked, number of full and partial inspections, and reports to construction and project management
 - (b) Number of workers, work hours, metric of personal protection equipment (PPE) use (percentage of workers with full PPE, partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, and follow-up actions taken (if any)
 - (c) Number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, work site, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental, health and safety requirements observed, actions taken), and reports to health and safety specialist/construction/site management

e. Worker Accommodations:

- (i) Number of expats housed in accommodations and number of locals
- (ii) Date of last inspection and highlights of inspection including status of accommodations' compliance with national and local laws and good practice, including sanitation, space, etc.
- (iii) Actions taken to recommend or require improved conditions, or to improve conditions

f. Training:

- (i) Number of new workers, number receiving induction training, and dates of induction training
 - (ii) Number and dates of toolbox talks, number of workers receiving training related to Environment, Health and Safety (EHS)
 - (iii) Number and dates of communicable diseases (including sexually transmitted diseases [STDs]) sensitization and/or training, number of workers receiving training (in the reporting period and in the past), and same questions for gender sensitization and flag person training
 - (iv) Number and date of EHS-related prevention sensitization and/or training events, including number of workers receiving training on EHS Code of Conduct for Contractor's Personnel (in the reporting period and in the past), etc.
-

g. Grievances:

List of EHS-related grievances: grievances from affected communities and Worker grievances as recorded in the Contractor's grievance redress mechanism; traffic, road safety, and vehicles/equipment(health and safety or safeguard or environmental specialist needs to provide these requirements),

- (i) Traffic and road safety incidents and accidents involving project vehicles and equipment: provide date, location, damage, cause, follow-up
- (ii) Traffic and road safety incidents and accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, and follow-up
- (iii) Overall condition of vehicles or equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

h. Mitigations and Issues (what has been done):

- (i) Environmental Mitigations
 - (a) Dust: number of working bowsters, number of watering per day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); percentage of rock and spoil lorries with covers, and actions taken for uncovered vehicles
 - (b) Erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, and emergency repairs needed to control erosion or sedimentation
 - (c) Quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken in the reporting period at each, and highlights of environmental protection—land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, and decommissioning implementation
 - (d) Blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), and incidents of off-site damage or complaints (cross-reference other sections as needed)
 - (e) Spill clean-ups, if any: material spilled, location, amount, actions taken, and disposal (report all spills that result in water or soil contamination)
 - (f) Waste management: types and quantities generated and managed, including amount taken off-site (and by whom) or reused, recycled, or disposed on-site
 - (g) Details of tree plantings and other mitigations required undertaken in the reporting period
 - (h) Details of water and swamp protection mitigations required undertaken in the reporting period
 - (i) The Contractor shall identify and report on any special or temporary right of way and any additional facility that have temporary and/or permanent impacts on affected persons' assets, access to assets and/or livelihoods (income sources). It shall put in place corresponding mitigation measures, and implement them.
 - (ii) Health and Safety Mitigations
 - (a) Details of hazard prevention and control mitigations required undertaken in the reporting period.
-

Annex to the Particular Conditions

Form of Performance Security

(Note: See corresponding form in Section 9 of bidding documents)

Form of Advance Payment Bank Guarantee

(Note: See corresponding form in Section 9 of bidding documents)

Form of Retention Money Guarantee

(Note: See corresponding form in Section 9 of bidding documents)

Resettlement Plan (RP)

Initial Environmental Examination:

Section 9: Contract Forms

This section contains forms which, once completed, will form part of the Contract. The forms for Performance Security, Advance Payment Guarantee and Retention Money Security, when required, shall only be completed by the successful Bidder after contract award.

Table of Forms

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Notice of Intention for Award of Contract

[on letterhead paper of the Employer]

[date of notification]

To: [name of the Bidder]
 Attention: [insert name of the Bidder's authorized representative]
 Address: [insert address of the Bidder's authorized representative]
 Telephone/Fax numbers: [insert telephone/fax numbers of the Bidder's authorized representative]
 E-mail Address: [insert e-mail address of the Bidder's authorized representative]

This is to notify you of our intention to award the contract [insert name of the contract and identification number, as given in the Bid Data Sheet]. You have [insert number of days as specified in ITB 41.1 of the BDS] days from the date of this notification to (i) request for a debriefing in relation to the evaluation of your Bid; and/or (ii) submit a bidding-related complaint in relation to the intention for award of contract, in accordance with the procedures specified in ITB 46.1.

The summary of the evaluation are as follows:

1. List of Bidders

Name of Bidder	Bid Price as Read Out at Opening	Evaluated Bid Price

2. Reason/s Why Your Bid Was Unsuccessful

.....

3. The Successful Bidder

Name of Bidder:	
Address:	
Accepted Contract Amount:	
Duration of Contract:	
Scope of the Contract Awarded:	
Amount Performance Security Required:	

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Letter of Acceptance

[on letterhead of Employer]

[date]

To: [Name and address of the contractor]

Subject: Contract No. [please specify]

This is to notify you that your Bid dated [date] for execution of the [name of the contract and identification number, as given in the Bid Data Sheet] for the Accepted Contract Amount in the equivalent of [amount in words and figures and name of currency], as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract and any additional security required as a result of the evaluation of your bid, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

Contract Agreement

THIS CONTRACT AGREEMENT made the [date] day of [month], [year], between [name of the Employer] (hereinafter “the Employer”), of the one part, and [name of the contractor] (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works known as [name of the contract] should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein.

The Employer and the Contractor agree as follows:

1. In this Contract Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Contract Agreement. This Contract Agreement shall prevail over all other Contract documents.
 - (a) the Contract Agreement
 - (b) Letter of Acceptance,
 - (c) Letter of Technical Bid,
 - (d) Letter of Price Bid,
 - (e) the Particular Conditions – Part A – Contract Data,
 - (f) the Particular Conditions – Part B – Special Provisions,
 - (g) the Particular Conditions – Part C – Corrupt and Fraudulent Practices,
 - (h) the Particular Conditions – Part D – Environmental, Health and Safety (EHS) Metrics for Progress Reports,
 - (i) List of Eligible Countries as defined by the Bank,
 - (j) General Conditions of Contract,
 - (k) the Specifications,
 - (l) the Drawings,
 - (m) completed Schedules including Bill of Quantities,
 - (n) Environment, Health and Safety Code of Conduct for Contractor’s Personnel,
 - (o) Environment, Health and Safety Management Plan (EHSMP),
 - (p) the Joint Venture Undertaking (If Contract is a Joint Venture), and
 - (q) any other documents shall be added here.¹⁰
3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Contract Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

¹⁰Tables of Adjustment Data may be added if the contract provides for price adjustment (see GCC 13.7).

- 4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Contract Agreement to be executed in accordance with the laws of [name of the borrowing country] on the day, month and year indicated above.

Signed by
for and on behalf of the Employer

Signed by.....
for and on behalf the Contractor

in the presence of

in the presence of

Witness, Name, Signature, Address, Date

Witness, Name, Signature, Address, Date

Performance Security

[Bank's name, and address of issuing branch or office]¹¹

Beneficiary: [Name and address of the Employer]

Date:

Performance Guarantee No.:

We have been informed that [name of the contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name of contract and brief description of works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we [name of the bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [name of the currency and amount in words]¹² [amount in figures] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the [date] day of [month], [year],¹³ and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.¹⁴

.....
[Signature(s) and seal of bank (where appropriate)]

NOTE TO THE BIDDER

If the bank issuing performance security is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

¹¹ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

¹² The guarantor shall insert an amount representing the percentage of the accepted contract amount specified in the contract and denominated either in the currency(ies) of the contract or in any freely convertible currency acceptable to the Employer.

¹³ Insert the date 28 days after the expected expiry of defect notification period. The Employer should note that in the event of an extension of the time for completion of the contract, the Employer would need to request an extension of this guarantee from the guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months] [1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

¹⁴ Or the employer may use "Uniform Rules for Demand Guarantees (URDG), ICC Publication No. 458, except that sub-paragraph (ii) of Sub-article 20(a) is hereby excluded" as appropriate.

Advance Payment Guarantee

[Bank's name, and address of issuing branch or office]¹⁵

Beneficiary: [Name and address of the Employer]

Date:

Advance Payment Guarantee No.:

We have been informed that [name of the contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name of contract and brief description of works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum [name of the currency and amount in words]¹⁶ [amount in figures] is to be made against an advance payment guarantee.

At the request of the Contractor, we [name of the bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [name of the currency and amount in words]¹⁷ [amount in figures] upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor:

- (a) used the advance payment for purposes other than the costs of mobilization and cash flow support in respect of the Works; or
- (b) has failed to repay the advance payment when it has become due and payable in accordance with the conditions of the Contract, specifying the amount payable by the Contractor.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number [Contractor's account number] at [name and address of the bank].

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety percent (90%) of the Contract Price has been certified for payment, or on the [date] day of [month], [year],¹⁸ whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

¹⁵ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

¹⁶ The guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in any freely convertible currency acceptable to the Employer.

¹⁷ Footnote 1.

¹⁸ Insert the expected expiration date of the time for completion. The Employer should note that in the event of an extension of the time for completion of the contract, the Employer would need to request an extension of this guarantee from the guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months] [1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.¹⁹

.....
[Signature(s) and seal of bank (where appropriate)]

NOTE TO THE BIDDER

If the bank issuing advance payment guarantee is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

¹⁹ Or the employer may use "Uniform Rules for Demand Guarantees (URDG), ICC Publication No. 458, except that sub-paragraph (ii) of Sub-article 20(a) is hereby excluded" as appropriate.

Retention Money Security

[Bank's name, and address of issuing branch or office]²⁰

Beneficiary: [Name and address of the Employer]

Date:

Retention Money Guarantee No.:

We have been informed that [name of the contractor] (hereinafter called "the Contractor") has entered into Contract No. [reference number of the contract] dated [date] with you, for the execution of [name of contract and brief description of works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of [insert the amount of the second half of the Retention Money or, if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security] is to be made against a Retention Money guarantee.

At the request of the Contractor, we [name of the bank] as Guarantor hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [name of the currency and amount in words]²¹ [amount in figures] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

It is a condition for any claim and payment under this Guarantee to be made that the second half of the Retention Money referred above must have been received by the Contractor on its account number [Contractor's account number] at [name and address of the bank].

This Guarantee shall expire, no later than the [date] day of [month], [year],²² and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.²³

²⁰ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

²¹ The Guarantor shall insert an amount representing the amount of the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and denominated either in the currency(ies) of the second half of the Retention Money as specified in the Contract, or in a freely convertible currency acceptable to the Beneficiary.

²² Insert the date 28 days after the expected latest of the expiry dates of Defect Notification Periods. The Employer should note that in the event of an extension of the Time for Completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months] [1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

²³ Or the employer may use "Uniform Rules for Demand Guarantees (URDG), ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded" as appropriate.

.....

[Signature(s) and seal of bank (where appropriate)]

NOTE TO THE BIDDER

If the bank issuing retention money security is located outside the Employer's country, it shall be counter-guaranteed or encashable by a bank in the Employer's country.

Annexure-A

Environmental Management and Monitoring Plan

Project Number: 46282-001

February 2024

**IND: Inclusive, Resilient and Sustainable Housing
for the Urban Poor Sector Project in Tamil Nadu
(IRSHUPSP) – Pallipalayam subproject**

I. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

1. The Environmental Management Plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. Unlike other projects, two EMPs have been prepared for the subproject activities, which are planned to be implemented.

- (i) Environmental Management Plan for Construction Site
- (ii) Environmental Management Plan for Operation/ Maintenance

2. The EMP will guide environmentally-sound practices at the time of construction and operation of the subprojects and ensure efficient lines of communication between TNUHDB PMU, Namakkal Division (Implementation Division), and contractors. The EMPs will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The EMPs includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. The IEE and EMP will be included in the bid and contract documents to ensure compliance to the conditions set out in this document.

3. The contractor will be required to submit to Namakkal Division (Implementation Division), for review and approval, a Site Environmental Management Plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per EMP and (iv) prepare a COVID Response and Management Plan (C-R&MP). No works are allowed to commence prior to approval of SEMP. A copy of the EMP and approved SEMP will be kept on site during the construction period at all times.

4. For civil works, the contractor will be required to (i) carry out all the mitigation and monitoring measures set forth in the approved SEMP; and (ii) implement any corrective or preventative actions set out in environmental monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and SEMP. The contractor shall allocate budget for compliance with these SEMP measures, requirements and actions.

5. The following table shows the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring.

Table 1: Environmental Management Plan for Construction Site - Pallipalayam, Namakkal District

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
1.	Location Impacts				
1.1	<p>Location impacts pertain to siting of facilities for construction of new buildings/ dwelling units at Pallipalam, Namakkal District</p> <ul style="list-style-type: none"> • Clearing of wild vegetation • Maintain slope for natural drain • Excess earth disposal 	<ul style="list-style-type: none"> • The siting of facilities will be in line with the DTCP approved Master Plan. • The site allotted for the construction of new buildings / dwelling units at Pallipalayam belongs to Tamil Nadu Urban Habitat Development Board (TNUHDB). Hence there is no land acquisition Issues anticipated. • There are a few trees identified in the project site, which have to be preserved through design considerations or it shall be transplanted to the designated landscaping area. 	<ul style="list-style-type: none"> • List of tree species • Tree cutting permit / permission from the competent authority • Identification of Disposal site for disposing debris and excavated soil 	Namakkal Division (Implementation Division)	PMU
1.2	Lack of sufficient planning to assure long term sustainability of the developments	<ul style="list-style-type: none"> • In accordance with the provisions in the sub-project selection criteria, the sub-project design shall include adequate provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long-term sustainability of the sites. • The designs will be worked out and implemented in accordance with the provisions. • No construction activity of any kind shall be taken up in the OSR area 	<ul style="list-style-type: none"> • DPR and designs Approved from competent authority • Work plan prepared and approved by Namakkal Division (Implementation Division) 	Namakkal Division (Implementation Division)	PMU
1.3	Land acquisition (Socio economic Impacts)	<ul style="list-style-type: none"> • No additional land will be required, the proposed project (construction of 520 residential units) at Pallipalayam is designed to be implemented within the available 1.62 ha land area • Resettlement and/or land acquisition problems are not anticipated in the construction activities. 	<ul style="list-style-type: none"> • Revenue records 	Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> In case of any additional land acquisition, the compensation as per the Entitlement matrix given in the Resettlement Framework (RF) shall be adopted. 			
1.4	Clearing of trees/ Removal of vegetation	<ul style="list-style-type: none"> All reasonable measures shall be undertaken to ensure that no native fauna is harmed or placed at risk during the course of the clearing activities As per the proposed design, felling of trees is not envisaged at any stage of the project. However, under unavoidable conditions if any of the trees are required to be cut/felled, then prior permission as per existing procedure from TN Forest department, ensuring appropriate compensation including compensatory plantation at 1:10 ratio as stipulated by the High Court of Madras (WP No 7811/2010 and MP No 1/2010 dated 25/06/2010). 	<ul style="list-style-type: none"> Tree count information and compensation ratio 	Namakkal Division (Implementation Division)	PMU
1.5	Impact to the seasonal canal	<ul style="list-style-type: none"> Construction camp and workers camp (stockpile areas, storage areas, washrooms/toilets and disposal areas,) should be at a distance of 500m away from the seasonal canal. The location, layout and basic facility provision of each camp shall be submitted to TNUHDB prior to construction Damaging vegetation surrounding the canal should be prohibited Silt trap should be provided near the canal to control the sediment runoff from the construction site entering the canal water Dumping of waste (MSW and C&D) should be strictly prohibited, 	<ul style="list-style-type: none"> Visual observation on the dumping of MSW or the C&D waste Distance between the canal and construction camp Approach tracks to the canal Contractor documentation 	Namakkal Division (Implementation Division)/ Contractor	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> Fishing activities should also be prohibited during the monsoon season (when the canal has water) 			
2.	Design and Pre-Construction Impacts				
2.1	Increased storm water runoff from alterations of the site's natural drainage patterns due to excavation works in the Pallipalayam resettlement site, construction of residential units, Anganwadi, Ration shop, addition of paved surfaces and approach roads.	<ul style="list-style-type: none"> Design of proposed building components will enable efficient drainage of the sites and maintain natural drainage patterns. The siting of the project components, involving physical construction shall be done to ensure no disruption of natural drainage patterns or flows into the nearby drain/nallah. Construction activities (including excavation and trenching works) shall be restricted during the monsoon season. The Contractor shall discuss with the Namakkal Division (Implementation Division) to carryout necessary construction activities in the monsoon season by providing appropriate safety measures to the satisfaction of the Namakkal Division (Implementation Division). 	<ul style="list-style-type: none"> Site drainage plan to be prepared and applied Construction of drains to prevent water logging at site during rains 	Namakkal Division (Implementation Division)	PMU
2.2	Consents, permits, clearances, NOCs, etc.	<ul style="list-style-type: none"> All the necessary approvals/ permissions/ clearances/ NoCs as given in the Environmental Clearance (EC) for Pallipalayam Resettlement Site should be obtained by the PMU before start of the construction activities or as per the conditions given in the EC. This includes STP design approval from a third party. The findings and recommendations from the source sustainability study¹, including water 	<ul style="list-style-type: none"> General Conditions and Specific Condition as mentioned in the Environmental Clearance Source sustainability study Consultation meeting outcomes and records 	Namakkal Division (Implementation Division)	PMU

¹The water source sustainability study should indicate the project shall utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall), avoid polluted water sources, avoid water use conflicts by not abstracting water that is used for other purposes and ensure water quality

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<p>quality testing, has to be completed and incorporated into the IEE prior to a contractor being appointed by TWAD.</p> <ul style="list-style-type: none"> • Meaningful consultations with communities to keep them informed of anticipated activities and associated impacts 			
2.3	Water supply pipeline laying activities shall have direct air and noise impacts to the public as well as other construction impacts.	<ul style="list-style-type: none"> • The impacts of the water supply pipeline will need to be assessed once enough information is available and this IEE and EMP should be revised and submitted to ADB for concurrence prior to a contractor being appointed. • The contractor appointed for water supply will be required to adopt the EMP. 	<ul style="list-style-type: none"> • Revised IEE and EMP • IEE and EMP including in bid and contract award documentation. • Contractor records 	Namakkal Division (Implementation Division) and TWAD	PMU
2.4	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the visual appeal of the buildings	<ul style="list-style-type: none"> • Designs to be worked out in such a manner that exposed steel and concrete structures are avoided • The design brief for all building components proposed will strictly conform to the TNUHDB requirements. • Any new landscaping elements will only utilize native species to protect local biodiversity 	<ul style="list-style-type: none"> • list of approved quarry sites and source of material • List of trees/ shrubs for landscaping • List of materials to be procured for construction works included in BOQ 	Namakkal Division (Implementation Division)	PMU
2.5	Integration of energy efficiency and energy conservation programs in design of building components	<ul style="list-style-type: none"> • The detailed designs for the building components shall ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization etc. are integrated, and designs accordingly worked out. • All the electrical and mechanical equipment used in the construction works shall be 	<ul style="list-style-type: none"> • DPR and designs approved from competent authority • Use of energy efficient and ISO certified equipment in construction works • PUC for all construction vehicles 	Namakkal Division (Implementation Division)	PMU

provided complies with national drinking water standards at all times through regular monitoring. This requires identification of all users of the water source and that the water source can be appropriately recharged. The water source sustainability study to be conducted and should be incorporated into the relevant IEE and EMP.

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		energy efficient and ISO certified as per BOQ provisions.			
2.6	Odour / smell from Sewage Treatment Plant, Solid waste collection area	<ul style="list-style-type: none"> The detailed design/ layout should have designated STP and the MSW areas, which should be located away from the settlement to prevent the odour nuisance 	<ul style="list-style-type: none"> DPR and designs approved from competent authority MSW should be collected frequently 	Namakkal Division (Implementation Division)	PMU
2.7	Noise pollution from the pumps used for lifting water to the OHTs	<ul style="list-style-type: none"> Pump house should be located away from the residential blocks and it should be acoustic proof 	<ul style="list-style-type: none"> Regular maintenance is required conducting frequent Noise monitoring 	Namakkal Division (Implementation Division)	PMU
2.8	Sourcing of water for construction activities	<ul style="list-style-type: none"> Contractor shall purchase water from Alapalayam Special Grade Town Panchayat or TWAD for the construction activities. The agreement/ MoU have to be shared with the Namakkal Division (Implementation Division). Use of groundwater for construction purpose is prohibited Water demand during construction should be reduced by use of premixed concrete, curing agents and other best practices prevalent. Tapping of surface water from river sources should not affect the downstream water users (appropriate permission for the same from the TWAD/ PWD should be obtained) Tapping of surface water from tanks/ ponds should be in consultation with the local communities and the same records should be submitted to the Namakkal Division (Implementation Division) and PMU. For any other arrangements for the source of water, the evidence for the same has to be furnished to the Namakkal Division (Implementation Division) 	<ul style="list-style-type: none"> Regular monitoring is required Feedback from the local communities 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
2.9	Installation of Diesel Generators	<ul style="list-style-type: none"> • As per the CPCB norms, place the Diesel Generators (DG's) in an acoustic enclosure or other sound insulation • Place the DG's at least 100 m from the nearest new building for housing • Low Sulphur Diesel shall be used for operating diesel generator • Ensure DG sets comply with the noise standards prescribed by the CPCB 	<ul style="list-style-type: none"> • Standards prescribed by the CPCB • Conducting frequent noise monitoring 	Contractor and Namakkal Division (Implementation Division)	PMU
3.	Pre-Construction Activities by Contractor				
3.1	Submission of updated EMP / SEMP; EMP implementation and reporting	<ul style="list-style-type: none"> • Appoint Environment, Health and Safety Supervisor to ensure EMP implementation • Submission of updated EMP/ SEMP prior to starting of work, • Timely submission of monthly monitoring reports including documentary evidence on EMP implementation such as photographs and consultation records. • SEMP documents shall include information about site restoration, noise and dust control, wastewater management, spills response, community and site health and safety, traffic control, tree cutting, construction of labour camps, storage areas, hauling roads, regulatory permissions, disposal areas for solid and hazardous wastes, sensitive features like schools and hospitals • Provide project-related information to stakeholders, communities and/or affected people before and during construction works including at least 7 days prior to the start of works and again at least 1 day prior to works through issuing a pamphlet booklet to affected persons. 	<ul style="list-style-type: none"> • Unsatisfactory compliance with EMP • Contractor consultation records • Approved SEMP from Namakkal Division (Implementation Division)/PMU • Safeguard status in the monthly monitoring report 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
3.2	Consents, permits, clearances, NOCs, etc.	<ul style="list-style-type: none"> • Obtain all necessary consents, permits, clearance, NOCs, etc. prior to the award of civil works. • Ensure that all necessary approvals for construction to be obtained by the contractor are in place before the start of construction • Acknowledge in writing and provide a report on compliance of all obtained consents, permits, clearance, NOCs, etc. 	All the project related clearances should be obtained.	Contractor/ Namakkal Division (Implementation Division)	PMU
3.3	Sources of construction materials (Impact on natural land contours, vegetation, disturbance to natural drainage patterns, water logging, and water pollution.)	<ul style="list-style-type: none"> • Maximize the re-use of earth-cut materials, spoils, and construction & demolition debris / wastes • Specify materials that are recycled, have recycled content or are from sustainable sources • Obtain construction materials only from government-approved quarries with prior approval of Namakkal Division (Implementation Division) • Namakkal Division (Implementation Division) to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval • Contractor to submit to Namakkal Division (Implementation Division) the documentation every month with the details of the material obtained from each source (quarry/ borrow pit) • Avoid the creation of new borrow areas, quarries, etc., for the project; if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance (EC) prior to 	Contractor to prepare a list of approved quarry sites and sources of materials with the approval of Namakkal Division (Implementation Division) before any construction commences	Contractor/ Salem PID Division	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		approval by Namakkal Division (Implementation Division)			
3.4	Construction Camps – Location, Selection, Design and Layout	<ul style="list-style-type: none"> • The construction camps will be located at 500m away from settlements and water bodies (seasonal canal in the southern direction to the project site). The construction camps including separate female and male sanitation facilities, shelter, electricity, canteen, potable water (as per IS 10500), first aid, health care, day crèche facilities must be adequately drained, and must not be subject to periodic flooding. • The camps must be located such that the drainage from and through the camps will not risk any domestic or public water supply. • All sites must be graded, ditched and rendered free from depressions such that water may not get stagnant and cause a nuisance. • The contractor shall provide the dispenser for the disposal of Sanitary Napkins • MSW and domestic sewage generated from the construction camp should be disposed on day to day basis. The collection of waste and sewage shall be done by Alapalayam Special Grade Town Panchayat for which the contractor should get approval from the Panchayat with the assistance from the Namakkal Division (Implementation Division). • Potable water (as per IS 10500 standard) to the labours/ construction workers should be provided by the Contractor 	<ul style="list-style-type: none"> • Location of construction camp approved by Namakkal Division (Implementation Division) • Construction camp having all the basic amenities with proper sanitary conditions drainage and water supply • Safeguard status in the monthly monitoring report 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> • Comply with the ban on one time use and throwaway plastics under Tamil Nadu Government Order • First Aid Room shall be provided in the project site during the entire construction and operation phases of the project 			
3.5	Stockpiling of materials	<ul style="list-style-type: none"> • Storage of construction material confined to work sites in a way to ensure that there is no obstruction to natural drainage pattern, efficient drainage is maintained • Stockpiles should be located at 500m away from settlements and water bodies (seasonal canal in the southern direction to the project site) • Stockpiles to be covered to reduce dust generation • Develop and implement the Materials Management Plan (including warehouses / storage) 	<ul style="list-style-type: none"> • Location of construction camp approved by Namakkal Division (Implementation Division) Approved materials management plan 	Contractor and Namakkal Division (Implementation Division)	PMU
3.6	Establishment of baseline environmental conditions prior to start of civil works	<ul style="list-style-type: none"> • Conduct documentation of location of components, areas for construction zone (camps, staging, storage, stockpiling, etc.) and surroundings (within direct impact zones), locations of environmental monitoring Include photos and GPS coordinates • The monitoring parameters and the frequency of the monitoring should comply with the Environmental Monitoring Plan. 	<ul style="list-style-type: none"> • Baseline environmental profile including ambient air, noise, water quality as per the standards indicated in the monitoring plan. 	Contractor and Namakkal Division (Implementation Division)	PMU
3.7	Drinking water availability and water arrangement	<ul style="list-style-type: none"> • The contractor will be responsible for arrangement of water in every workplace at suitable and easily accessible place for the whole construction period. • Sufficient supply of cold potable water (as per IS 10500) to be provided and maintained. 	<ul style="list-style-type: none"> • Records of drinking water supply to workers • Feedback from workers 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> If the drinking water is obtained from an intermittent public water supply then, storage tanks will be provided. 			
3.8	Identification of disposal sites	<ul style="list-style-type: none"> Location of disposal sites will be finalized by the Environmental Specialist of the Namakkal Division (Implementation Division) and he will confirm that disposal of the material does not impact natural drainage courses or surface water bodies or low-lying areas and that no endangered / rare flora is impacted by such materials The disposal sites shall be identified in consultation with Alapalayam Special Grade Town Panchayat Information on the disposal site should be included in the IEE (update/ revise it accordingly) Open dumping is strictly prohibited 	<ul style="list-style-type: none"> Disposal site selected and approved by Namakkal Division (Implementation Division) prior to works commencing Records of materials disposed at disposal site Log book maintained for debris disposal 	Contractor and Namakkal Division (Implementation Division)	PMU
3.9	Shifting of Utilities	<ul style="list-style-type: none"> Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase. Require contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. Obtain from the Namakkal Division (Implementation Division) the list of affected utilities and operators; If relocation is necessary, Contractor will coordinate with the providers to relocate the utility and communicate the dates and duration in advance to affected communities / persons / businesses. 	<ul style="list-style-type: none"> List showing utilities to be shifted Contingency plan for services disruption 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
3.10	Social and Cultural Resources	<ul style="list-style-type: none"> • No cultural properties or religious structures shall be removed or relocated without the knowledge and written consent of the concerned parties or communities and local administration as the case may be. Sites for the relocation of these religious structures shall be identified following the choice of the community • No major works will be done during the local festivals and other important festivals to avoid traffic congestion. All the construction works will be regulated during these days. • The contractor will be required to undertake consultation with affected stakeholders an any anticipated impacts to be undertaken prior to any works. • As far as possible, the architectural elements of the structure should be conserved / reflected / translated into the design of new structures following the wishes of the community • For any Chance find, consult Archaeological Survey of India (ASI) or Tamil Nadu Archaeology Department to obtain an expert assessment of the archaeological potential of the site. • Consider alternatives if the site is found to be of medium or high risk. • Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available. • Develop a protocol for use by the construction contractors in conducting any 	<ul style="list-style-type: none"> • Chance find protocol • Consultation records • Community feedback 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.			
3.11	Circulation plan during construction in the densely populated areas	<ul style="list-style-type: none"> • Prior to mobilization and commencement of site activities, contractor has to prepare site work plan approved by Engineer² so that no works or activities shall interrupt safe passage of local residents/ road users during construction stage, including development of alternative access routes, traffic regulations, signage etc., during construction. • The sensitive receptors like residential settlements, schools and hospitals in the close proximity of the resettlement site have to be consulted to discuss the site work plan for their suggestions and feedback, accordingly the plan shall be modified. • The Contractor with support of the Namakkal Division (Implementation Division) will carry out dissemination of these information 	<ul style="list-style-type: none"> • Site work plan prepared by contractor and approved by Namakkal Division (Implementation Division) • Traffic plan and records of road signage's • Contractor information dissemination records 	Contractor and Namakkal Division (Implementation Division)	PMU
3.12	Access	<ul style="list-style-type: none"> • Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided • Plan transportation routes (NH 381A & SH 79) so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. 	<ul style="list-style-type: none"> • Temporary Traffic management Plan 	Contractor and Namakkal Division (Implementation Division)	PMU

² Engineer refers to Concerned division

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> • Drive vehicles in a considerate manner. 			
3.13	Occupational health and safety	<ul style="list-style-type: none"> • Comply with IFC EHS Guidelines on Occupational Health and Safety • Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to Contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project. • Include in H&S plan measures such as: <ol style="list-style-type: none"> (i) type of hazards in the construction site; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel (including labours); (iv) procedures to be followed for all site activities; and (v) Documentation of work-related accidents. • Provide medical insurance coverage for workers. • Contractor to nominate an on-site environment, health and safety officer. • Contractor shall undertake a COVID risk assessment of project area and prepare a COVID Response and Management Plan (C-R&MP) and submit to Namakkal Division (Implementation Division) for approval 	<ul style="list-style-type: none"> • Approved Health and safety (H&S) plan 	Contractor and Namakkal Division (Implementation Division)	PMU
3.14	Site clearance activities including delineation of construction areas	<ul style="list-style-type: none"> • Commencements of site clearance activities shall be undertaken after permissions of Namakkal Division (Implementation Division) to minimize environmental impacts. 	Construction and workers camp sites should be restored as per the original situation	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> All areas used for construction and camp activities shall be restored to their former conditions after project completion and no impact to the baseline environment indicators have been confirmed. 			
3.15	Excessive disturbance to communities due to prolonged construction	<ul style="list-style-type: none"> Meaningful consultations with nearby residences / communities to keep them informed of anticipated activities, in particular those that may result in disruption with respect to area access, utilities, and noisy or dust-generating activities that are likely to result in significant disturbance Identify and adhere to strict construction schedule Liaise with schools that are in close proximity to construction sites, on school examination periods scale down construction activities and avoid noisy activities (including piling) during such periods Alert communities and residents if night time construction work shall occur nearby (no night time construction within 500 m of the nearest household) and ensure safe alternative access is provided Ensure communities are aware of Grievance Redress Mechanism (GRM) entry points Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor Develop and implement the Community Health and Safety Plan 	<p>Approved Community Health and Safety Plan</p> <p>Contractor consultation records</p>	Contractor and Namakkal Division (Implementation Division)	PMU
3.16	Vibration Impact	<ul style="list-style-type: none"> Precaution will be taken while using the machines and equipment, during construction. 	<ul style="list-style-type: none"> Maintenance record of construction vehicles and equipment 	Contractor and Namakkal Division	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> • Before any works commences, conduct situation analysis (including videos and photos) in the subproject area of influence to check the structural integrity of nearby buildings that may be affected by vibration during demolition works. • For the buildings having weak structure, temporary structural support shall be provided • Noise level measurements shall be taken once before the start of the demolition works to establish the baseline; and during the construction stage as per the Environmental monitoring plan. • Contractor will be responsible for creating awareness among the operators to ensure careful handling of machines and equipment and heavy vehicles like excavators and dump trucks during mechanical activities • The contractor will inform the surrounding settlements / residences and community in prior to operations that bear the risk of nuisance and accidents. • The contractor shall maintain the records of the consultations including dates, names and actions agreed to. • The contractor will be responsible for compensating if there are any damage to structures due to vibration resulting from construction. 	<ul style="list-style-type: none"> • Records of noise monitoring as per Environmental Monitoring Plan. • Contractor site and consultation records • Contractor's surrounding site survey and proposed actions submitted prior to any construction commencing 	(Implementation Division)	
4.	Construction Impacts				
4.1	Improper stockpiling of construction materials cause impacts starting from obstruction	<ul style="list-style-type: none"> • Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. 	<ul style="list-style-type: none"> • Proper stockpiling of construction materials • vehicles transporting construction materials 	Contractor and Namakkal Division	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
	of drainage, disturbance / safety hazard etc.	<ul style="list-style-type: none"> • Vehicles transporting material will be covered to prevent spillage. • Operations to be undertaken by the contractor as per the direction and satisfaction of Engineer. 	covered to prevent spillage	(Implementation Division)	
4.2	Impacts due to Batching Plant operation	<ul style="list-style-type: none"> • Batching plant shall comply with the requirements and specifications of the relevant current emission control legislation. • Batching plant shall be located within the project construction area and as far as possible from residential / settlements and commercial establishments, at least 300 m away and preferably 300 m in the downwind direction. • The Contractor shall submit a detailed layout plan for all such sites and seek prior approval of Namakkal Division (Implementation Division) before entering into a formal agreement with a landowner for setting-up such sites. • Actions by Namakkal Division (Implementation Division) against any non-compliance shall be borne by the Contractor at his own cost. • Arrangements to minimize dust pollution through the provision of windscreens, mist spray units, and dust encapsulation shall have to be provided at all such sites. • Specifications of batching plant shall comply with the requirements of the relevant current emission control legislation and Consent / NOC for such plant shall be submitted to the Namakkal Division (Implementation Division) 	Batching Plants should be kept/ stationed 300 m away from residential /settlements and other nearby sensitive receptors and at least 300m downwind.	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> No such installation by the Contractor shall be allowed till all the required legal clearances are obtained from the competent authority and the same is submitted to the Namakkal Division (Implementation Division). 			
4.3	Quarry, borrow areas operations	<ul style="list-style-type: none"> If quarry, borrow areas are exclusively opened for the project, contractor shall ensure that they qualify all the legal conditions to operate such areas. Consent to Operate (CtO) for quarry sites has to be taken from Tamil Nadu Pollution Control Board (TNPCB) and a copy of the same has to be kept in record and submitted in Namakkal Division (Implementation Division). Contractor has to comply with all the conditions stipulated in Consent to Operate document. If contractor purchases the materials from other party, he has to ensure that quarry has obtained the necessary clearance from Tamil Nadu Pollution Control Board (TNPCB) and should take a copy of it and submit in Namakkal Division (Implementation Division). 	<ul style="list-style-type: none"> List of approved quarry sites and sources of materials CtE and CtO certificated obtained by contractors for quarry sites, batching plant and DG sets and submitted to Namakkal Division (Implementation Division) 	Contractor and Namakkal Division (Implementation Division)	PMU
4.4	Stripping, stocking and preservation of top soil	<ul style="list-style-type: none"> The topsoil from areas of cutting and areas to be permanently covered (proposed site construction of building) will be stripped to a specified depth of 150 mm, trans located and stored in stockpiles. The stockpiles will be covered with gunny bags or tarpaulin. It will be ensured by the contractor that the topsoil will not be unnecessarily trafficked either before 	<ul style="list-style-type: none"> Top soil preservation plan prepared and approved by Namakkal Division (Implementation Division) Record of top soil excavated, preserved and reutilized 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		stripping or when in stockpiles. Such stockpiled topsoil will be returned to cover the disturbed area and cut slopes.			
4.5	Soil and water pollution due to storage of fuels, lubricants, construction vehicles and construction wastes	<ul style="list-style-type: none"> • Fuel and lubricant storage areas shall be designed in such a way that oil may not contaminate soil or water. • The floor of storage area shall be protected by impermeable membrane and covered by roof so that it is not affected by rain. • Oil pumps should be used to take out the oil from the container and no oil spillage shall take place. • All the construction waste should be disposed properly after end of the day so that it may not create nuisance at site. • Soil and water pollution parameters shall be monitored as per the monitoring plan. • Dispose waste oil and lubricants that have been generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989. • Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation • Strictly prohibit open defecation by workers in nearby areas 	<ul style="list-style-type: none"> • Proper storage of fuel and lubricants • Impermeable membrane used in flooring of storage yard to prevent soil and water pollution • Construction waste disposal records • Waste management plan 	Contractor and Namakkal Division (Implementation Division)	PMU
4.6	Siltation of drains / water bodies due to spillage of construction wastes	<ul style="list-style-type: none"> • Silt fencing to be provided at construction sites during rain period to prevent sediments from the construction site to enter into the watercourses/ nearby settlements. The number of units of silt fencing to be installed is to be decided by the Engineer. • Haul roads on the site and approaches to the watercourse (or drains leading to 	<ul style="list-style-type: none"> • Site fencing • Numbers of Silt traps constructed at site • Proper drainage system provided at site 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<p>watercourses) will be regularly cleaned to prevent the build-up of mud; areas of bare soil will be kept to a practical minimum to reduce silt runoff.</p> <ul style="list-style-type: none"> • Extraneous construction wastes will be transported to the pre-identified disposal site for safe disposal. 	<ul style="list-style-type: none"> • Regular cleaning of drains during rain period 		
4.7	Emission from Construction Vehicles, Equipment and Machinery	<ul style="list-style-type: none"> • The discharge standards promulgated under the Environmental Protection Act will be strictly adhered to. • All vehicles, equipment and machinery used for construction will conform to the relevant Standard. • All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements. • All the construction vehicles shall have Pollution Under Control (PUC) certificates to check air pollution. 	<ul style="list-style-type: none"> • PUC available for all vehicles • maintenance record of construction vehicles and equipment 	Contractor and Namakkal Division (Implementation Division)	PMU
4.8	Erosion Hazards	<p>The resettlement site has a gentle slope and hence the risk of erosion is anticipated. Hence the Contractor will be required to:</p> <ul style="list-style-type: none"> • Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so. • Use dust abatement such as water spraying to minimize windblown erosion. • Provide temporary stabilization of disturbed/excavated areas that are not active under construction. • Apply erosion controls (e.g., silt traps) along the drainage leading to the water drains. 	<ul style="list-style-type: none"> • Slope stability • Frequent monitoring during the piling operation • Monitoring noise and vibration 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> • Maintain vegetative cover within unused land to prevent erosion and periodically monitor the area to assess erosion. • Clean and maintain catch basins, drainage ditches and culverts regularly. • Conduct routine site inspection to assess the effectiveness and the maintenance requirements for erosion and sediment control systems 			
4.9	Piling Operation (Noise and Vibration Impacts)	<ul style="list-style-type: none"> • The Contractor should perform construction activities in a phased manner especially during drilling the piles, which may disturb the surrounding area due to vibration • The contractor and Namakkal Division (Implementation Division) shall inspect the nearby settlement site (including schools, hospitals and other sensitive location), to assess the likely impacts during the piling operation and based on the assessment, suitable mitigation measures like provision of temporary noise barrier and structural strengthening measures shall be provided • For the structures that are weak, appropriate evidence (including video/ photograph) shall be collected from the site, for which temporary structural support shall be provided till the completion of the piling works 	<ul style="list-style-type: none"> • Frequent monitoring during the piling operation • Monitoring noise and vibration • Contractor records of nearby settlements including video and photographs. 	Contractor and Namakkal Division (Implementation Division)	PMU
4.10	Generation of Dust	<p>The contractor will take every precaution to reduce the levels of dust at construction sites to the satisfaction of the Engineer.</p> <ul style="list-style-type: none"> • All earth works to be protected / covered in a manner acceptable to the satisfaction of the Engineer to minimize dust generation. • Clearance will be affected immediately by manual sweeping and removal of debris, or if 	<ul style="list-style-type: none"> • Records of housekeeping • Records of water sprinkling at site • Vehicles carrying excavated soil covered • AAQ parameters (Particulate matter 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<p>so directed by the Engineer, the road surfaces will be hosed or watered using necessary equipment.</p> <ul style="list-style-type: none"> • Construction site shall regularly be wetted by sprinkling of water during dusty conditions especially during summer seasons and winds. • Ambient Air Quality monitoring has to be performed as per the Environmental Monitoring Plan. 	<p>(PM₁₀ & PM_{2.5}), SO_x, NO_x, CO) to be monitored.</p>		
4.11	Noise from construction activities and equipment	<ul style="list-style-type: none"> • The Contractor will ensure appropriate noise monitoring carried out continuously during piling works. • Prior to piling works the contractor should inform surrounding areas as well and it will be prohibited at night. Specify the limit for noise for the piling works. • Maintenance of vehicles, equipment and machinery will be regular and to the satisfaction of the Engineer, to keep noise from these at a minimum. • All vehicles and equipment used for construction will be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers will be checked and if found to be defective will be replaced. • Noise limits for construction equipment used in this project (measured at one metre from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (movable), vibrators and saws will not exceed 75 dB (A). • Notwithstanding any other conditions of contract, noise level from any item of plant(s) 	<ul style="list-style-type: none"> • Maintenance record of construction vehicles and equipment • Exhaust silencers working properly • Use of proper PPEs as work sites • Records of noise monitoring as per EMP. • Contractor information dissemination and consultation records. 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<p>will comply with the noise standards specified by CPCB.</p> <ul style="list-style-type: none"> • If specific noise complaints are received during construction, the Contractor may be required to implement one or more of the following noise mitigation measures, as directed by the Engineer: <ul style="list-style-type: none"> • Shut off idling equipment. • Reschedule construction operations to avoid periods of noise annoyance identified in the complaint. • Notify nearby residents whenever extremely noisy work will be occurring. • The Contractor shall provide necessary PPEs as per the direction of the environmental specialist (Namakkal Division (Implementation Division)) • The Contractor shall adopt IS 5121-1969 (Indian standard Safety Code for Piling and Other Deep Foundations) to ensure safety is maintained during the piling operations • Ambient Noise levels has to be monitored as per the Environmental Monitoring Program 			
4.12	Impacts on flora and fauna	<ul style="list-style-type: none"> • Strictly instruct workers not to cut trees for fuel wood • Do not harm existing vegetation in the area except for those indicated in site plan • Limit activities within the work area. • Strictly prohibit poaching of birds and animals in the vicinity of work sites 	<ul style="list-style-type: none"> • Baseline information of the flora and fauna for the project area 	Contractor and Namakkal Division (Implementation Division)	PMU
4.13	Material Handling at Site	All workers employed on mixing asphaltic material, cement, concrete etc., will be provided with protective footwear and protective goggles. Workers, who are engaged in welding works, will be provided with welder's	<ul style="list-style-type: none"> • Use of proper PPEs as work sites • Records of PPEs procured and issued for use 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals.			
4.14	Disposal of Construction Waste / Debris / Cut Material	<ul style="list-style-type: none"> • The waste generated will be reused in the construction activities, either as a fill material or otherwise, based on its suitability of reuse to the maximum extent possible. • Safe disposal of the extraneous material will be ensured in the pre-identified disposal locations. In no case, any construction waste will be disposed around the project locations indiscriminately. • Burning of municipal solid waste or hazardous waste will be prohibited. 	<ul style="list-style-type: none"> • Records of excavated soil and • Records of reuse and disposal of excavated soil • Disposal site identified and approved • AAQ parameters (Particulate matter (PM₁₀& PM_{2.5}), SO_x, NO_x, CO) to be monitored 	Contractor and Namakkal Division (Implementation Division)	PMU
4.15	Safety Measures During Construction	<ul style="list-style-type: none"> • Personal Protective Equipment (PPE) for workers on the project and adequate safety measures for workers during handling of materials at site will be taken up. • The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • Night time works should be avoided unless in exceptional circumstances and will have to be pre-approved by the Namakkal Division (Implementation Division). • Appropriate safety measures (including hard barriers) have to be adopted for the construction during the night time (Lux level shall be equivalent to a minimum of two 500 watt flood lights) 	<ul style="list-style-type: none"> • Use of PPEs • Records of PPEs procured and issued for use • Compliance of all regulations regarding scaffolding, ladders and work at height 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
4.16	Risk caused by Force Majeure	<ul style="list-style-type: none"> All reasonable precaution will be taken to prevent danger of the workers and the public from fire, flood, drowning, etc. All necessary steps will be taken for prompt first aid treatment of all injuries likely to be sustained during the course of work. 	<ul style="list-style-type: none"> Records of first aid facilities at site Records of safety training to workers 	Contractor and Namakkal Division (Implementation Division)	PMU
4.17	Malaria Risk	<ul style="list-style-type: none"> The Contractor will, at his own expense, conform to all anti-malarial instructions given to him by the Engineer; mosquito prevention at site should be done The frequency of the testing for malaria should be increased during the monsoon season 	<ul style="list-style-type: none"> records of use of mosquito prevention measures at site and work camps anti-malaria instructions to workers 	Contractor and Namakkal Division (Implementation Division)	PMU
4.18	Clearing of Construction Camps & Restoration	<ul style="list-style-type: none"> Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish should be removed, all rubbish should be removed, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer. 	<ul style="list-style-type: none"> Restoration plan for site and work camps prepared Restoration of site and work camps as per plan 	Contractor and Namakkal Division (Implementation Division)	PMU
4.19	Influx of migrant workers	<ul style="list-style-type: none"> Local labourer's to be given preference for job opportunities and each contractor should be bound by this commitment The Contractor has to adopt a Code of Conduct for the migrant labour to resolve any issues with locals Ensure labour-related regulations are met In case of hiring outside labour, ensure that their working conditions as well as camps meet local regulations and the best practices 	<ul style="list-style-type: none"> Health and safety risks Chances of spread of sexually transmittable diseases like AIDS Water pollution Health & Safety Risks due to Transmittable diseases (HIV/AID and Covid-19) / awareness plan 	Contractor and Namakkal Division (Implementation Division)	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		of the industry (refer to IFC Workers' Accommodation: Processes and Standards)			

Table 2: Environmental Management Plan for Operation and Maintenance - Pallipalayam, Namakkal District

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
1.	Operation and Maintenance Impacts				
1.1	Solid waste (debris, excavated soils, etc.)	<ul style="list-style-type: none"> • Re-establish the original grade and drainage pattern to the extent practicable. • Restore access roads, staging areas, and temporary work areas. • Remove all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. Demolish buildings/structures not required for O&M. Dispose in designated disposal sites. • Request in writing from Namakkal Division (Implementation Division) that construction zones have been restored. 	<ul style="list-style-type: none"> • Pre-existing condition 	Contractor (till the DLP period) and Namakkal Division (Implementation Division)	PMU
1.2	Proposed Buildings/ Dwelling units may result congestion, increased pollution.	<ul style="list-style-type: none"> • Creating awareness through Consultation • The 3 Rs (Reduce, Reuse, and Recycle) approaches have to be explained to the settled communities in order to reduce the pollution level (waste minimisation, water minimisation etc.,) • The environmental monitoring action plan during the operation stage will result in monitoring of the environmental impacts after project implementation. 	<ul style="list-style-type: none"> • Conducting regular consultations • Monitoring plan during project operation 	Social Team Namakkal Division (Implementation Division)/ Alapalayam Special Grade Town Panchayat	PMU
1.3	Rain water Harvesting Pit management	<ul style="list-style-type: none"> • Regular inspection and cleaning of catchment, gutters, filters and tanks reduce the likelihood of contamination. • Water from other sources should not be mixed with that in the tank. • Storm water drains will be maintained periodically to maintain free flow of storm water without any obstacles 	<ul style="list-style-type: none"> • Monitoring plan during project operation 	TNUHDB/ Alapalayam Special Grade Town Panchayat	PMU
1.4	Management of the STP	<ul style="list-style-type: none"> • TNUHDB/ Alapalayam Special Grade Town Panchayat will carry out regular maintenance of the STP to prevent any impacts, including 	<ul style="list-style-type: none"> • Proper sanitation and solid waste management 	TNUHDB/ Alapalayam	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<p>pollution of ground water and nearby water courses.</p> <ul style="list-style-type: none"> • TNUHDB shall appoint an Environmental Engineer with necessary qualification for the operation and maintenance of the STP, All the necessary PPE's should be provided to the STP operator. • It is the sole responsibility of the TNUHDB that the treated sewage water disposed (as per PART A Schedule VI of the Environmental Protection Rules 1986)for green belt development/ avenue plantation should not pollute the soil/ ground water/ adjacent canals/ lakes/ ponds, etc • The excess treated water will be discharged into the Underground Drainage system • Any sludge after anaerobic treatment and drying will be disposed with the municipal solid waste (organic waste). The treated sludge shall be as per compost quality standard given in the Solid waste management rules 2006 (schedule II A, standards for composting). • Workers who interact with any sludge will be provided all appropriate PPE's including gloves, safety shoes, protective eyewear and masks. 	<ul style="list-style-type: none"> • Regular effluent testing and monitoring 	Special Grade Town Panchayat	
1.5	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection in the project site necessitate regular maintenance of constructed amenities.	<ul style="list-style-type: none"> • TNUHDB/ Alapalayam Special Grade Town Panchayat will carry out maintenance of the sewer system (including the pipeline, collection system etc.), and carry out the regular collection of wastes, and will also ensure that Sanitation improvements proposed do not result in pollution of groundwater. 	<ul style="list-style-type: none"> • Proper sanitation and solid waste management • Frequent regular visits to the MSW facility to check for the compliances 	TNUHDB/ Alapalayam Special Grade Town Panchayat	PMU

Sl.no	Environmental Issues	Mitigation Measures	Indicators and Targets	Responsibility for Implementation	Responsibility for Supervision
		<ul style="list-style-type: none"> • Sanitary facilities do not interfere with other utilities and block access to buildings, cause nuisance to neighbouring areas. • House hold hazardous waste such as batteries, small electronics, CFL bulbs, expired medicines and used cleaning solvent bottles should be segregated at source, collected once in a month from residences and disposed as per the SWM Rules 2016. • Municipal Solid Waste will be segregated as organic waste and inorganic waste. No open dumping is recommended. Both organic and Inorganic waste will be collected by the Alapalayam Special Grade Town Panchayat, Organic waste will be composted in the vermin composting / biodegradation process and will be used as a manure. The inorganic waste will be disposed off in the MSW dumping area. • The transfer of waste will also ensure no spillage and all wastes will be transported to a designated solid waste treatment site. 	with respect to MSW rules.		
1.6	Fire fighting / Emergency preparedness	<ul style="list-style-type: none"> • Fire fighting equipment's including the fire extinguisher and sand buckets have to be annually maintained. Fire extinguishers have to be checked regularly for the expiry date and have to be refilled or replaced accordingly. Wet sand (if any) in the bucket should be replaced with dry sand • Fire mock drills should be conducted as a part of emergency preparedness to create awareness among the residents 	<ul style="list-style-type: none"> • Fire extinguisher expiry date • Emergency preparedness plan • Training records 	Contractor (during the DLP) TNUHDB/ Alapalayam Special Grade Town Panchayat	PMU

Table 3: Pre-construction and Construction Stage Environmental Monitoring Plan

Monitoring Field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility
Construction disturbances, nuisances, public and worker safety	All work sites ((i) Resettlement Construction works in Pallipalayam, (ii) Building demolishing works in Pallipalayam and (iii) Regeneration of Cauvery River bank in Pallipalayam)	<ul style="list-style-type: none"> Implementation of construction stage EMP including dust control, noise control, traffic management, and safety measures. Site inspection checklist to review implementation to be adhered. 	Weekly during construction	Contractor under the supervision of Namakkal Division (Implementation Division) (sampling locations shall be identified by the Environment specialist of Namakkal Division (Implementation Division))
Ambient air quality	<p><u>Pre-Construction Stage</u>: one sample at each location</p> <p><u>Construction stage</u>: two samples at each location</p> <p>Sampling locations: (i) Resettlement Construction works in Pallipalayam, (ii) Building demolishing works in Pallipalayam and (iii) Regeneration of Cauvery River bank in Pallipalayam</p> <p>Sampling method: At the work sites during pre-construction stage and 50 m downwind direction near the work sites during the construction stage</p>	PM ₁₀ , PM _{2.5} NO ₂ , SO ₂ and CO	<p>(i) Once before start of construction (pre-construction)</p> <p>(ii) Monthly monitoring during peak construction activity, which will be followed by quarterly monitoring (till the project completion).</p>	Contractor under the supervision of Namakkal Division (Implementation Division) (sampling locations shall be identified by the Environment specialist of Namakkal Division (Implementation Division)). The environmental specialist (Namakkal Division (Implementation Division)), shall decide the frequency of the monitoring as per the construction schedule
Ambient noise	Similar to ambient air quality locations and sample size including methodology.	Day time and night time noise levels	(i) Once before start of construction (pre-construction)	Contractor under the supervision of Namakkal Division (Implementation Division) (sampling locations

Monitoring Field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility
			(ii) Monthly monitoring during peak construction activity, which is followed by quarterly monitoring (till the project completion).	shall be identified by the Environment specialist of Namakkal Division (Implementation Division)). The environmental specialist (Namakkal Division (Implementation Division)), shall decide the frequency of the monitoring as per the construction schedule
Surface water quality	<p><u>Pre-Construction Stage:</u> one sample at each location</p> <p><u>Construction stage:</u> One sample at each location</p> <p>Sampling locations:</p> <p>(i) for the seasonal canal, the sampling frequency shall be based on the Namakkal Division (Implementation Division) instruction (ii) Building demolishing works in Pallipalayam and (iii) the 6 encroachment sites on the Cauvery River bank in Pallipalayam</p>	pH, Oil and grease, Cl, F, NO ₃ , TC, FC, Hardness, Turbidity BOD, COD, DO, E-coli, Total Alkalinity, Heavy metals and Pesticides.	Every quarter during construction stage (till the project completion)	Contractor under the supervision of Namakkal Division (Implementation Division) (sampling locations shall be identified by the Environment specialist of Namakkal Division (Implementation Division))
Environmental statement for each financial year ending 31 March in Form V	TNUHDB official website	As per Environment (Protection) Rules, 1986	Annual (Financial Year)	Namakkal Division (Implementation Division)/ PMU

Table 4: Operation Stage Environmental Monitoring Plan

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility
Ambient air quality	Two samples at Pallipalayam resettlement site <u>Sampling method:</u> one sampling location should be located at 50m downwind direction from the Pallipalayam site and another sampling location should be located within the premises	PM ₁₀ , PM _{2.5} NO ₂ , SO ₂ and CO	Every quarter during operation (for 2 years)	Contractor under the supervision of Namakkal Division (Implementation Division) during the DLP
Ambient noise	Two samples at Pallipalayam resettlement site <u>Sampling method:</u> One sampling location within the premises and another sampling location should be at the closest sensitive receptor.	Day time and night time noise levels	Every quarter during operation (for 2 years)	Contractor under the supervision of Namakkal Division (Implementation Division) during the DLP
Surface water quality	Two random samples in the Cauvery river bank	pH, Oil and grease, Cl, F, NO ₃ , TC, FC, Hardness, Turbidity BOD, COD, DO, E-coli, Total Alkalinity, Heavy metals and Pesticides.	Every quarter during operation (for 2 years)	Contractor under the supervision of Namakkal Division (Implementation Division) during the DLP
Water quality (potable water supplied by TWAD)	<u>Operation Stage:</u> One sample at each water sump	pH, Oil and grease, Cl, F, NO ₃ , TC, FC, Hardness, Turbidity BOD, COD, DO, E-coli, Total Alkalinity, heavy metals and pesticides.	Monthly monitoring	TWAD under the supervision of Namakkal Division (Implementation Division)'s (Cost for monitoring should be borne by the TWAD)
STP (Treated Water)	<u>Operation Stage:</u> Two water samples to be collected at (i) Inlet and (ii) outlet from the STP. One sludge sample should be collected	<ul style="list-style-type: none"> Total suspended solids, pH, Oil and grease, Ammonical nitrogen, Biochemical Oxygen, Dissolved Oxygen, and Phenolic 	Monthly monitoring	STP service provider/ third party monitoring under the supervision of Namakkal Division (Implementation Division)'s (Cost

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility
		compounds (as C ₆ H ₅ OH) • Sludge sample should be tested for Fecal Coliforms/ pathogenic bacteria		for monitoring should be borne by the STP service provider)
Environmental statement for each financial year ending 31 March in Form V	TNUHDB official website	As per Environment (Protection) Rules, 1986	Annual (Financial Year)	Namakkal Division (Implementation Division)/ PMU

B. Implementation Arrangements

6. TNUHDB will be responsible for the management, coordination and execution of all subproject activities funded under IRSHUPSP. The Government of Tamil Nadu has approved the formation of the Project Management Unit (PMU) for the project vide G.O.(2D) No.27, H&UD(SC2(2)) Department, dated: 12.02.2019.

7. **Project Management Unit (PMU).** The PMU is headed by Joint Managing Director/ Project Director, who will be assisted by the Chief Engineer, Superintending Engineer and the Executive Engineer. The PMU will design the infrastructure, manage the tendering of contracts, supervise the construction / demolition process, assure the technical quality of design and construction, provide advice/ assistance on institutional capacity development and ensure subproject compliance to ADB 2009, EARF, RF and loan covenants. The PMU shall appoint the contractors to build the infrastructure elements and will manage the construction and commissioning activities. The PMU will seek government clearance for submission and disclosure of the environmental, social and resettlement monitoring reports to ADB. To ensure effective implementation of environmental safeguards procedures, an environmental consultant has been assigned to the environmental team of the PMU. The environmental consultant will be supported by an Assistance Executive Engineer and two (2) Assistant Engineers who will be full time employees of the TNUHDB. The PMU will be responsible for the following environmental safeguard activities:

- Ensure subproject compliance to Gol, GoTN statutory and legal environmental requirements, ADB SPS 2009, the project EARF, and loan covenants
- Ensure subprojects conform to exclusion criteria and subproject selection guidelines as stipulated in the EARF
- Review and approve subproject category for environment
- Review and approve subproject IEE studies and reports and EMPs; ensure that updated subproject IEEs and EMPs reflect final subproject detailed design and submit to ADB for approval
- Check whether all relevant permits / environmental clearances/approvals as per Gol and GoTN are obtained in a timely manner
- Ensure that full IEE studies and EMPs are included in bidding documents, contract clauses and civil works
- Ensure an efficient subproject implementation in line with IEE studies and reports and EMPs with adequate budget
- Review and approve quarterly environmental monitoring reports submitted by Namakkal Division (Implementation Division)(Environment / Social Cell) and submit to ADB
- Support the preparation of quarterly and annual monitoring reports and submit to ADB

- Ensure effective GRM set up and monitor grievances redress process and ensure timely redress
- Ensure adequate awareness campaigns, information disclosure and additional consultations are held within affected communities / host communities to minimize resistance and ensure hassle free transition for the project beneficiaries to new resettlement sites
- Periodical review of safeguards related loan covenants, and the compliance in project implementation
- Organize periodic capacity building and training programs for subproject staff in safeguards
- Ensure that subproject activities are synchronized between the RPs and EMP implementation
- Ensure that any damage to areas and infrastructure outside the agreed work sites (Corridor of Impact assessed in RP) will be restored to pre-construction conditions and will be subject to compensation at contractor cost and through written agreement with the land owner, as applicable
- Ensure availability of budget for safeguards activities
- Ensuring disclosure of EARF, IEEs and EMPs, and monitoring documents
- Ensure that IEE studies and Gol EIA studies for a subproject is prepared concurrently to avoid any inconsistencies and ensure robust environmental assessment is undertaken.

8. **Project Implementation Divisions (PIDs).** The PMU is supported by the Project Implementation Unit (PIU). The Superintending Engineer of the WestCircle will be in charge of the Namakkal Division with regard to this project. The Namakkal Division is headed by the Executive Engineer. The West Circle and Namakkal Division will be responsible for the implementation, management and monitoring of the subprojects and supervision of contractors and all day to day activities in the field. The Namakkal Division (Implementation Division) located in Namakkal will be responsible for Implementation, management and monitoring of the Pallipalayam Resettlement site.

9. To ensure effective implementation of environmental safeguards procedures, one (1) environmental specialist will be assigned to the Environment Cell Environment Cell of each Namakkal Division (Implementation Division). The environmental specialist will be supported by one (1) Assistant Engineer that will be full time employee of the TNUHDB. Namakkal Division (Implementation Division) (Environment Cell) will be responsible for the following environmental safeguard activities.

- Identify/select subprojects in compliance with the key exclusion criteria and subproject selection guidelines stipulated in EARF
- Conduct regular site visits for overseeing compliance with safeguards
- Prepare screening checklists and submit to PMU for categorization; update checklist and category as and when required to reflect subproject changes, and report to PMU
- Work closely with design teams to include environmental considerations in subproject location, design and technical specifications.
- Identify and obtain statutory environmental clearance/permissions/approvals required for subproject
- Include standards/conditions, if any, stipulated in regulatory clearances, consents in the subproject detailed design
- Conduct environmental baseline surveys
- Prepare subproject IEE studies and reports and EMPs and submit to PMU for approval
- Update subproject IEE studies and reports and EMPs to reflect any changes in subproject during detail design / implementation; IEE shall reflect the final subproject design; IEE shall also be updated in case of any unanticipated impacts
- Conduct adequate awareness campaigns are held with affected persons and within the host communities to minimize resistance and ensure hassle free transition for the affected persons / resettled households to new locations
- Conduct meaningful consultation in compliance with the EARF; disclose relevant information on safeguards to stakeholders, affected people etc. reflect inputs from public consultation in subproject IEE studies and reports and EMPs
- Integrate EMP into the bid and contract documents
- Review and approval of contractor's site specific EMP (e.g. C-EMP / D-EMP/ R-EMP), individual sub-plans and SOMP as indicated in Appendix 3 of EARF.

- Ensure implementation of subproject C-EMP / D-EMP / R-EMP, individual sub-plans and SOMPs as indicated in Appendix 3 of EARF by contractors
- Establish GRM at divisional level; coordinate grievance redress process, registration, records, information dissemination, etc., and ensure timely actions by all parties; report to PMU
- Conduct training and capacity building activities (workshops, hands-on trainings, visits etc.) to contractors and field level staff as well as participating ULBs or PWDs (as necessary) in C-EMP/D-EMP/R-EMP, individual sub-plans and SOMPs implementation
- Undertake internal monitoring and supervision and record observations throughout the subproject implementation period
- Review and approval of contractor's monthly report, consolidation into quarterly progress reports and submission to PMU
- Submit periodic monitoring reports³ to the PMU, who will then submit these to the ADB

10. **Contractors.** Contractors will appoint their own Contractor Environment, Health and Safety (C-EHS) and Contractor Grievance Redressal Mechanism (C-GRM) staff as well as Contractor Asbestos Containing Materials (C-ACM) staff for construction works at resettlement sites, demolition sites / removal of encroachments and regeneration works⁴. All the contractors will be required to prepare a site-specific EMP (C-EMP / D-EMP /R-EMP) and Standard Operation and Maintenance Plans (SOMP) manuals. The contractors will bear the costs of preparing these site-specific plans included in the EMP. The contracts will not be awarded until the SEIAA has approved all environmental clearances, other relevant permits and clearances have been obtained, ADB has approved the subproject IEEs and EMPs and corresponding subproject EMPs are included in the bid and contract documents. The following are the key safeguards tasks for contractors

- Submit site specific EMP for construction, demolition and regeneration works, individual sub-plans and SOMPs to Namakkal Division (Implementation Division)
- Attend training and capacity building sessions
- Conduct orientation and daily briefing sessions to workers on EHS
- Ensure that appropriate worker facilities (workers accommodation / camps) are provided at the work sites in line with this EARF
- Register and maintain records of all work-related accidents, and undertake remedial actions to mitigate/minimize recurrence
- Implement EMP measures and report to Namakkal Division (Implementation Division) if any new impacts are surfaced; seek guidance from Namakkal Division (Implementation Division) as required in EMP implementation
- Conduct environmental monitoring (air, noise, etc.) as per the monitoring plan
- Prepare monthly EMP monitoring reports and submit to Namakkal Division (Implementation Division)
- Address any grievances effectively and in timely manner

11. The PMU and Namakkal Division (Implementation Division) will ensure that the contractors are aware of their obligations including specific provisions requiring contractors to comply with: (i) all applicable labour laws and core labour standards on (a) prohibition of child labour as defined in national legislation for construction and maintenance activities; construction site should not hire any child below 18 years of age; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste including no discrimination against pregnant women and (c) prohibition of forced labour; and with (ii) the requirement to disseminate information on health & safety risks due to transmittable diseases, including HIV/AIDS and COVID-19⁵, to employees

³The periodic monitoring report will focus on the progress of implementation of the safeguard, issues encountered and measures adopted, follow-up actions required, if any, as well as the status of compliance with subprojects election criteria and relevant loan covenants.

⁴C-ACM staff appointment will be for demolition / removal of encroachment works only.

⁵The Ministry of Health and Family Welfare, Government of India has released the Environmental and Social Management Framework for India #COVID19 Emergency Response and Health Systems Preparedness Project; particularly Annex IV: India COVID-19 Project – Clauses for Inclusion in Civil Works Contracts; The document can be accessed here:

12. If the TNUHDB PMU fails to comply with the loan and legal agreements on safeguards requirements, ADB will seek corrective measures and work with the TNUHDB PMU to achieve compliance. If the TNUHDB PMU fails to re-establish compliance, then ADB may exercise remedies, including suspension, cancellation or acceleration of maturity that are available under ADB legal agreements. Before resorting to such measures, ADB will use other available means to rectify the situation satisfactory to all parties to the legal agreements, including initiating dialogue with the parties concerned to achieve compliance with legal agreements. Further details on institutional roles and responsibilities for safeguards implementation are presented in Table below.

Table 5: Institutional Roles and Responsibilities for Safeguards Implementation

Project Stage	Tasks	Responsible Agency	
		Implementation	Supervision
Subproject identification and finalization	<ul style="list-style-type: none"> Ensuring that the key exclusion criteria and environmental guidelines for subproject selection are adhered to Prepare REA and No Mitigation (Scoping) checklists Categorize the subproject 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
Preliminary design	<ul style="list-style-type: none"> Identify GoI and GoTN regulatory requirements (clearances/approvals/consents etc.) Check latest amendments to EIA Notification 2006 for environmental clearance requirement and subproject categorization (B1 / B2) Preparation of subproject IEE studies and reports and EMPs 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	<ul style="list-style-type: none"> Delineating and mapping of catchment areas of encroached water bodies and/or areas vulnerable to flooding hazards and mapping Delineating and mapping ROW for water canals / channels 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	Conduct survey and develop database for information management for: <ul style="list-style-type: none"> Number of project beneficiaries full demographic and socio-economic profiles of project beneficiaries complete inventory of livelihood and asset losses due to physical and economic displacement of the project beneficiary information on environmental impacts of the subproject at the beneficiary-level 	Namakkal Division (Implementation Division)/ PMU with support of other public / state agencies	PMU
Detailed design	<ul style="list-style-type: none"> Mitigation measures specified in subproject IEE studies and reports incorporated in subproject detailed design 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)

<https://www.mohfw.gov.in/pdf/EnvironmentalandSocialManagementFrameworkforindiaCOVID19EmergencyResponseandHealthSystemsPreparednessProjectP173836.pdf> The Ministry of Law and Justice, Government of India has released the Occupational Safety, Health, Working Conditions Code, No. 37, 28th September 2020; the document can be accessed here: http://dgms.gov.in/writereaddata/UploadFile/Occupational_Safety_Health_Code_Act_2020_as_assented_by_the_President_of_India637370849450871.pdf

Project Stage	Tasks	Responsible Agency	
		Implementation	Supervision
	<ul style="list-style-type: none"> Updating of subproject IEE studies and reports to integrate any changes in subproject after approval of studies and reports 		
	<ul style="list-style-type: none"> Conducting capacity development activities for staff, hired workers, contractors 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	<ul style="list-style-type: none"> For subprojects involving facilities and/or business activities that already exist or are under construction, undertake an environment and/or social compliance audit, including on-site assessment, to identify past or present concerns related to impacts on the environment. Where non-compliance is identified, a Corrective Action Plan shall be prepared, and agreed on by ADB and the TNUHDB PMU (Environment Team) and implemented, accordingly. 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	<ul style="list-style-type: none"> Obtain all necessary environmental clearances, consents, and no objection certificates (NOCs) as per the national and state legal framework prior to bid invitation and/or award of contract⁶ 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	<ul style="list-style-type: none"> Meaningful consultations carried out in a manner commensurate with the impacts on affected stakeholders. The consultation process and its results to be documented and reflected in the subproject IEE reports. 	Namakkal Division (Implementation Division)(Environment Cell / Social Cell) /	PMU (Environment Team / Social Impact Assessment Team)
	<p>Information Disclosure: For Category B</p> <ul style="list-style-type: none"> Disclosure on the TNUHDB website of the draft subproject IEEs and EMPs; updated IEEs and EMPs including corrective action plans; environmental monitoring reports. Disclosure of draft IEE (and EMP) in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. Any revised IEE (and EMP) should be disclosed to affected people and other stakeholders. 	Namakkal Division (Implementation Division)(Environment Cell) PMU (Environment Team)	PMU (Environment Team)
	<ul style="list-style-type: none"> Disclosure on ADB website of the final subproject IEE studies and reports and EMPs; updated subproject IEE studies and reports and EMPs and corrective action 	ADB	ADB

⁶ TNUHDB will take into cognizance that it is a best practice to obtain all necessary environmental clearances, consents, etc., prior to bid invitation; however, these must be clearly obtained prior to award of contract.

Project Stage	Tasks	Responsible Agency	
		Implementation	Supervision
	plans; environmental monitoring reports.		
	<ul style="list-style-type: none"> Incorporate final subproject EMP into bid/contract documents 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
Appraisal	<ul style="list-style-type: none"> EMP and other environmental covenants are incorporated into the sector loan agreement and project administration memorandum (PAM) Approval of subproject IEE studies and reports and EMPs prior to invitation of bids All clearances are in place prior to invitation of bid / award of contracts / start of work 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
	<ul style="list-style-type: none"> Effective GRM established prior to award of contracts 	Namakkal Division (Implementation Division)(Environment Cell)	PMU (Environment Team)
Approval	ADB will be responsible for regular review and timely approval of subproject IEE studies and reports and EMPs (draft and final)	ADB	-
Bid Invitation and Award of Contracts	<ul style="list-style-type: none"> Approval of subproject IEE studies and reports and EMPs a must prior to bid invitations Subproject EMPs to be incorporated into contracts. Ensure all statutory national and state clearances prior to award of contracts 	Namakkal Division (Implementation Division)(Environment Cell)	PMU
Subproject Implementation	<ul style="list-style-type: none"> Development and approval of site-specific Construction-EMP and Demolition-EMP by contractors and individual sub-plans Implementation of above EMP including monitoring and reporting plans by contractors and submission of monthly reports to Namakkal Division (Implementation Division)(Environment Cell), Submission of Quarterly progress reports (Environment Cell) to PMU (Environment Team) including corrective action plan where a non-compliance is Identified Conduct public consultation and awareness programs as per EARF Overall compliance monitoring and submission of quarterly monitoring report during construction stage and annual reporting during operation stage by PMU (Environment Team) to ADB ADB will be responsible for reviewing regular monitoring reports 	Contractors Namakkal Division (Implementation Division)(Environment Cell) PMU (Environment Team)	PMU

13. **Training Needs.** The following Table presents the outline of capacity building program to ensure EMP implementation. These capacity building and trainings will be conducted at the offices of PMU and Namakkal Division (Implementation Division) by the environmental safeguards specialist of Namakkal Division (Implementation Division), which are part of project implementation set-up, and therefore no separate or additional costs are envisaged. Adequate costs are already considered in project's capacity building program. The detailed program and specific modules will be customized for the available skill set after assessing the capabilities of the target participants and the requirements of the project by the PMU.

Table 6: Outline Capacity Building Program on EMP Implementation

Sl.no	Description	Target Participants and Venue	Cost and Source of Funds
1	<p>Introduction and Sensitization to Environmental Issues (1 day)</p> <ul style="list-style-type: none"> • ADB Safeguards Policy Statement • Government of India and Tamil Nadu applicable safeguard laws, regulations and policies including but not limited to core labor standards, OH and S, etc. • Incorporation of EMP into the project design and contracts • Monitoring, reporting and corrective action planning 	<p>All staff and consultants (if any) involved in the subproject</p> <p>PMU Office (combined program for all Namakkal Division (Implementation Division))</p>	<p>Included in the overall program cost</p>
2	<p>EMP implementation (1/2 day)</p> <ul style="list-style-type: none"> • EMP mitigation and monitoring measures • Roles and responsibilities • Public relations, - Consultations • Grievance redress • Monitoring and corrective action planning • Reporting and disclosure • Construction site standard operating procedures (SOP) • Chance find (archeological) protocol • Asbestos materials protocol • Traffic management plan • Waste management plan • Site clean-up and restoration 	<p>All Namakkal Division (Implementation Division) staff, contractor staff and consultants (if any) involved in the subproject</p> <p>Namakkal Division (Implementation Division) Office</p>	<p>To be conducted by Namakkal Division (Implementation Division) (Environmental Specialist) at the Namakkal Division (Implementation Division) office; part of project implementation cost</p>
3	<p>Contractors Orientation to Workers (1/2 day)</p> <ul style="list-style-type: none"> • Environment, health and safety in project construction 	<ul style="list-style-type: none"> • Once before start of work, and thereafter regular briefing every month once. • Daily briefing on safety prior to start of work • All workers (including unskilled laborers) • Awareness & on-site training for workers and staff on sludge handling and disposal in existing STP repair work 	<p>Contractors' EHS officer to conduct program, with guidance of Namakkal Division (Implementation Division)</p>

C. Monitoring and Reporting

14. The prepared IEE is based on the final draft design for the resettlement site and likely construction activities in the demolishing sites and water body regeneration works. Hence upon finalising the detailed design for the resettlement site and preparation of the work plan for the demolishing sites and water body regeneration sites, this IEE has to be reviewed based on the updated information for the subproject. This includes, as soon as further information on the water supply works are made available, this IEE needs to be updated and a separate EMP has to be prepared by the environment specialist Namakkal Division (Implementation Division), submitted to the environmental consultant PMU for review. Further consultations (that have been prevented due to COVID-19) at various places (including at encroachment sites and around the resettlement site) have to be conducted and the outcomes/ feedback and suggestions shared by the communities have to be incorporated in the project design, if not appropriate response have to be shared with the communities to their satisfaction. The revised draft IEE will then need to be submitted to ADB for concurrence. The EMP will need to be adopted by the water work construction contractor (appointed by TWAD) which has to be updated.

15. All subproject EMPs will have internal monitoring. The Namakkal Division (Implementation Division)(Environment Cell) with support of the PMU (Environment Team) will conduct internal environmental monitoring for each subproject and provide the environment input based on site inspections, compliance checks and prepare the subproject Quarterly Progress Reports (QPRs) for submission to the PMU for final submission to ADB till the subproject completion report is issued. Monitoring will also encompass tracking progress on regeneration works undertaken by the PMU of previously encroached water bodies / channels and surrounding areas.

16. The environmental monitoring report⁷ for submission to ADB shall be on quarterly basis during construction and on an annual basis during operation. Environmental monitoring reports will be required to be submitted to ADB within 30 days from the end of the relevant period. The environmental monitoring reports will be publicly disclosed on ADB public website. Reporting to ADB will continue until a project completion report is completed.

17. Types of subproject monitoring that may be conducted under subproject specific EMP will include:

- **Project readiness monitoring.** To be conducted by the Namakkal Division (Implementation Division)(Environment Cell)
- **Environmental monitoring.** To be conducted by Namakkal Division (Implementation Division) (Environment Cell) and contractors across all stages of project implementation as described in the subproject specific EMP and assessing compliance with applicable Gol environmental quality standards and/or International standards and best practices
- **Compliance monitoring.** To be conducted by the PMU / Namakkal Division (Implementation Division)to verify EMP compliance across all stages of subproject implementation

18. ADB will oversee subproject compliance on the basis of quarterly (during construction) and annual(during operation) environmental monitoring reports provided by the PMU (Environment Team) and site visits (generally one to two times per year). For any non-compliance, ADB will make suitable recommendations for undertaking remedial measures for mid-term correction and improvement, if required. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report is completed.

19. The contractor(s) will submit monthly progress reports to the Namakkal Division (Implementation Division)(Environment Cell) on C-EMP/ D-EMP / R-EMP implementation, and SOMPs/ O&M EMP,

⁷The environmental reporting will cover EMP implementation, focusing on compliance and any needed corrective actions.

which will inform the quarterly safeguards monitoring reports as part of the project QPR. The contractor monthly progress reports will include compilation of daily monitoring sheets that is duly signed by C-EHS. The template for daily monitoring sheet for contractors during construction stage is provided.

20. During operations of the new housing development and regeneration works, the contractors will also submit monthly progress reports to Namakkal Division (Implementation Division)(Environment Cell) on New Housing Development SOMP/ O&M EMP and Regeneration Works for the first year of operation and quarterly progress reports thereafter. These will inform the annual safeguard monitoring reports. The Contractor's monthly (and quarterly) progress reports will include compilation of daily monitoring sheets corresponding to the operation of assets created. The subproject specific IEE will include a template for daily monitoring sheets during operation stage.

D. EMP Monitoring Requirements

21. The cost of water sprinkling for dust suppression and providing personal protective equipment to construction workers shall be borne by contractor as part of conditions of contract. In addition, the sources of funds for mitigation measures including monitoring (air, water and noise) during the construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The costs of components for monitoring in operation stage and the capacity building costs are to be funded by the PMU. The Environmental Monitoring requirements are furnished in the Table below.

Table 7: Environmental Monitoring requirements

Sl. No.	Particulars	Stages	Unit	Total Number	Source of fund
A. Monitoring Measures (Pallipalayam Resettlement Site)					
1	Air quality monitoring	Pre-construction	Per sample	2	Namakkal Division (Implementation Division)
2	Noise Levels	Pre-construction	Per location	2	Namakkal Division (Implementation Division)
3	Water Quality	Pre-construction	Per Sample	2	Namakkal Division (Implementation Division)
4	Ambient Air Quality	Construction	Per Sample	24	Contractor budget
5	Ambient Noise Quality	Construction	Per Sample	24	Contractor budget
6	Water Quality	Construction	Per Sample	24	Contractor budget
7	Ambient Air Quality	Post Construction	Per Sample	20	Contractor budget (DLP)
8	Ambient Noise Quality	Post Construction	Per Sample	20	Contractor budget (DLP)
9	Water Quality	Post Construction	Per Sample	20	Contractor budget (DLP)

Outline of Daily Monitoring Sheet for Contractors

Contractor Monitoring Sheet

Name of Subproject:
 Location of Subproject:
 Supervising Namakkal Division (Implementation Division):
 Contractor:
 Contractor EHS Supervisor (or equivalent):
 Date of monitoring:

Summary of Findings

	Monitoring Item	Status	Remarks
	1. Compliance with Local Permit Requirements	(Secured / Application Submitted / Not Applicable)	
	<i>Location/zoning permits</i>		
	<i>Permit to construct</i>		
	<i>Building permit</i>		
	<i>Transport / hauling permits</i>		
	2. Compliance with IEE Requirements	(Approved / Under Preparation / Submitted to Namakkal Division (Implementation Division) for Approval)	
	<i>Construction EMP (C-EMP)</i>		
	<i>Corrective Action Plan, if any</i>		
	3. Compliance with C-EMP		
	Construction Site	(Satisfactory / Needs Improvement / Not Implemented)	
	- Conduct of toolbox talk		
	- Use of PPE		
	- Rest areas for male and female workers		
	- Toilets for male and female workers		
	- Medical kits		
	- Drinking water supply		
	- Dust control		
	- Noise control		
	- Solid waste management		
	- Wastewater management		
	- Chemicals storage (fuel, oil, etc.)		
	- Siltation or erosion control		
	- Heavy equipment staging / parking area		
	- Barricades around excavation sites		

-	Access to residential houses/shops/businesses		
-	Traffic routing signages		
-	Lightings at night		
-	Trench shoring / landslide protection		
Construction Workers' Camp Site		(Available / Needs	
		Improvement / Not	
		Available)	

Quarters for male and female workers

Monitoring Item	Status	Remarks
- Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.)		
- Power/Electricity supply		
- Drinking water supply		
- Toilets for male and female workers		
- General purpose water supply (cooking, washing, bathing)		
- Cooking facilities and areas		
- Solid waste management		
- Wastewater management		
- Pest control		
4. Implementation of GRM	(Yes / No or None / Under Resolution)	
<i>Complaints</i>		
<i>Complaints resolution</i>		
5. Environmental Quality Measurement	(Passed / Failed / Not Applicable)	
<i>Ambient air quality sampling</i>		
<i>Noise level measurement</i>		
<i>Receiving water quality sampling</i>		

Other Issues:

Attachments:

1. Copies of permits secured, if any.
2. Photos taken at worksites, if any.

(Photos attached in previous monitoring sheets should not be used again).

3. Laboratory results of environmental quality measurements, if any.

Prepared by:

Name, Designation and Signature

Resettlement Plan

Document Stage: Updated draft for Consultation
Project Number: 53067-004
January 2024

**IND: Inclusive, Resilient and Sustainable Housing
for Urban Poor Sector Project in Tamil Nadu**

**Subproject: Construction of 520 Nos of housing units
adopting Type Design No. 09/2020 (G+3) with associated
infrastructure works at Pallipalayam Village,
Kumarapalayam Taluk in Namakkal District
(IRSHUPSP/PAL/04)**

Prepared by the Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 05 April 2022)

Currency Unit	–	Indian rupee (₹)
₹1.00	=	\$0.0133
\$1.00	=	₹75.3596

ABBREVIATIONS

ADB	-Asian Development Bank
BPL	- Below Poverty Line
CCDO	- Chief Community Development Officer
CBO	- Community Based Organization
CDO	- Community Development Officer
EMA	- External Monitoring Agency
GOTN	- Government of Tamil Nadu
GRC	- Grievance Redressal Committee
IRSHUPSP Project	- Inclusive, Resilient and Sustainable Housing for the Urban Poor Sector
NGO	- Non-Governmental Organization
PID	- Project Implementation Division
PMU	- Project Management Unit
SPS	- Safeguard Policy Statement
TNSCB	- Tamil Nadu Slum Clearance Board
TNUHDB	- Tamil Nadu Urban Habitat Development Board
TNPTEEA	- Tamil Nadu Protection of Tanks and Eviction of Encroachment Act
TWAD	- Tamil Nadu Water Supply and Drainage Board
WBM	- Water Bound Macadam

NOTE

In this report, "\$" refers to United States dollars.

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DEFINITIONS

Assistance refers to the support provided to affected persons in the form of ex-gratia payments, loans, asset services, training and skills development, etc. in order to improve their standard of living and reduce the negative impacts of the investment program.

Below poverty line (BPL) families are families whose monthly income is less than a designated sum as determined by the Planning Commission of India's revised methodology for measurement of poverty (2011-2012). The state specific poverty line for urban Tamil Nadu for the year 2011-2012, as per Dr. C. Rangarajan committee's (constituted by Planning Commission of India) revised methodology for measurement of poverty, is ₹1380.36 per capita per month. The same has been updated to August 2020 (survey period) based on Consumer Price Index for Industrial Workers (CPIIW)¹ and accordingly BPL families have been identified. The BPL cut-off income is ₹2191.93 per capita per month for August 2020. Those persons earning less than ₹2191.93 per capita per month in the urban areas will be considered as below poverty line.²

Cut-off date. The date of identification and marking of the structures (Topo Numbers) by Tamil Nadu Urban Habitat Development Board will be considered as the cut-off date for entitlements under the project.

Displaced families means a family whose primary place of residence or source of livelihood is adversely affected due to the project. This includes any tenant, lessee or owner occupier of the property, who on account of project, has been involuntary displaced from such land or property.

Displaced persons are those who face physical (relocation, loss of residence, or loss of shelter) and/or economic displacement (loss of shops, income sources, or means of livelihoods) as a result of the project.

Replacement value of the affected assets and property is the amount required for the affected person to replace/reconstruct the lost assets through purchase in the open market.

Squatters are non-titleholders who have illegally occupied lands for residential, business and/or other purposes.

Tenants are those persons having bonafide written or unwritten tenancy agreements, with a private structure owner, to occupy a structure for, residence and/or business.

Vulnerable families are those families with physical/mentally disabled members, women headed families, below the poverty line families, including elderly,³ women and children,⁴ transgender, the Indigenous Peoples, the landless and those without legal title to land,⁵ Scheduled Caste and Scheduled Tribe families.

¹ The base year (June 2012) Consumer Price Index for Industrial Workers (CPIIW) was 199 (CPIIW base 2001) and for August 2020, when the surveys were undertaken, CPIIW was 316.

² BPL threshold and all entitlements and costs presented in the entitlement matrix will be increased annually on the 1st of April in accordance with appropriate price indices.

³ The Maintenance and Welfare of Parents and Senior Citizens Act, 2007, GoI, defines elderly/ senior citizen as any person being a citizen of India, who has attained the age of sixty years or above.

⁴ Destitute and orphans

⁵ ADB SPS, 2009.

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EXECUTIVE SUMMARY

Background: Recent weather events such as severe flooding in Tamil Nadu, has highlighted the extreme vulnerability of low-income households and their livelihood. The state's high risk for climate-related disasters makes the slums extremely vulnerable to intense rainfall and recurrent flooding given their encroachment on natural drains, which are prone to overflow during heavy rainfall. Tamil Nadu's population living in slums amounts to 5.8 million, representing 16.6 percent of the state's urban population. The state faces a housing shortage in urban areas of around 1.25 million units.⁶ Based on a recent demand survey, there are 1.39 million registered applications requesting affordable housing units in Tamil Nadu under Pradhan Mantri Awas Yojana-Urban, of which about 625,368 have been approved. The Government of Tamil Nadu (GOTN) is committed to addressing the state's urban housing deficit, especially for the economically weaker section (EWS) population. The Tamil Nadu's "Vision 2023"⁷ sets out the provision of housing with infrastructure for all urban slum families in Tamil Nadu and the creation of a slum free state by 2023.

Project Description: Given the flooding risks and the GOTN's Vision 2023, the government has requested support from Asian Development Bank ADB for: (i) relocation and rehabilitation of households living in extremely vulnerable and high-risk areas in cities in Tamil Nadu; (ii) development and implementation of a housing model for industrial workforce; (iii) piloting new models of affordable housing; and (iv) regional planning. The proposed Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project (IRSHUPSP) in Tamil Nadu will promote access to inclusive, resilient and sustainable housing and urban development by supporting the state in (i) relocating slum households vulnerable to natural hazards to safer locations, (ii) providing affordable, proper housing for households and migrant workers from the EWS and lower-income group (LIG), and (iii) strengthening the state's capacity to design and implement integrated development plans for its regions.

Subproject description: This subproject proposed under IRSHUPSP by the Tamil Nadu Urban Habitat Development Board (TNUHDB), the implementing agency, aims at '*Construction of 520 Nos of housing units adopting Type Design No. 09/2020 - (G+3) with associated infrastructure works at Pallipalayam Village, Kumarapalayam Taluk in Namakkal District*'. TNUHDB has proposed to construct 520 multistorey housing units in Pallipalayam to accommodate the families proposed to be relocated from six water bodies that have been identified by the District administration as encroachments on the river bank requiring to be relocated as these families are living in high-risk areas.

Resettlement Plan: This resettlement plan, prepared based on the results of the inventory of loss and census and socioeconomic survey of affected families in all six settlements identified for relocation, addresses social impacts arising out of relocation of non-titleholders / squatters in six settlements on river banks identified by the District administration and impact to private assets resulting in physical and/or economic displacement to families/individuals, either direct or indirect, and is in compliance with ADB's Safeguard Policy Statement, 2009 and the Resettlement Framework for the project.

Land Acquisition and Involuntary Resettlement Impacts: The sub project involves construction of 520 housing units in government land measuring 1.62 hectares that has been

⁶Report of the Technical Group on Urban Housing Shortage, 2012-2017.

⁷ "Vision Tamil Nadu 2023: Strategic Plan for Infrastructure Development in Tamil Nadu." Government of Tamil Nadu.

transferred by the District Collector in favour of the TNUHDB. The land for the receiving site is free from encumbrance and there is no non-titled occupation. The six settlements from where affected families are to be relocated from have 520 residential structures identified by TNUHDB, few of which are unoccupied. The census and socioeconomic survey was carried out in all the six settlements and the survey identified 577 affected families comprising 450 residential owner occupiers, 68 residential tenants, 2 residence cum commercial owner occupiers and 57 absentee owners living elsewhere. Socio economic surveys were conducted for 564 of the 577 families in the six settlements, facing permanent and significant impacts.

Categorization: This sub project involves significant involuntary resettlement impacts and is classified as category “A” for involuntary resettlement.

Legal Framework: The policy framework and entitlements for IRSHUPSP are based on a combination of The Tamil Nadu Protection of Tanks and Eviction of Encroachment Act 2007, and ADB’s SPS. The project will extend compensation, assistance, and benefits to all families identified by TNUHDB in the settlements that are identified by the District administration as encroachments of water bodies and facing high risk of flooding. These will include all persons occupying land over which they neither have legal title, nor have claims recognized or recognizable under national law.

Entitlements, Assurances and Benefits: IRSHUPSP is likely to have six types of impacts that will require compensation and/or mitigation measures: (i) physical displacement / relocation impact; (ii) loss of assets and structures (residential/commercial); (iii) permanent loss of income or livelihood; (iv) collective impacts on groups, such as loss of common property resources; and (v) loss of trees. Affected persons (structure owners, occupiers, tenants, etc.) are entitled to receive compensation and resettlement benefits as specified in the entitlement matrix.

Graduation Program: The Graduation approach is a holistic, time-bound, and carefully sequenced set of interventions designed to restore such ruptures for vulnerable households by providing assistance through four core pillars: (1) social protection to support basic income security and immediate needs, such as food consumption support and access to health and education; (2) livelihoods promotion consisting of an asset transfer, to procure a market-viable asset along with technical skills training to manage the asset or access employment opportunities; (3) financial inclusion to ensure direct access to convenient, formal or informal financial services, accompanied with financial literacy training; and (4) social empowerment through regular check-ins with Graduation Animators and life-skills support that build confidence and resilience. As part of the subproject in Pallipalayam, the Graduation Program, will supplement existing resettlement activities for eligible urban poor households to restore livelihoods and rehabilitate social welfare post resettlement.

Consultation and Disclosure: Consultations were limited during the project preparation period due to coronavirus disease (COVID-19) restrictions that allowed surveys of individual households. Consultations with the affected families were undertaken in March 2022, after obtaining necessary clearance from the District administration and confirming to the Covid-19 safety protocols. Printed brochures were distributed to all participants and the brochure contained information about the project design, assistances available, grievance redressal mechanism and livelihood support through the graduation program. Consultations were also held with civil society organisations to explain the project details. Further consultations will be conducted by the project implementation division (PID) prior to, during implementation and post-relocation, in line with the consultation and participation plan (CAPP) prepared for the project. The resettlement plan will be disclosed to the affected community, detailing information

including entitlements and special provisions, grievance procedures, timing of payments, and relocation schedule by the PID. This will be done through public consultation and brochures and leaflets in Tamil. Copies of the summary resettlement plan in Tamil will also be made available at: (i) office of the PID; (ii) Commissioner of Municipality; and (iii) local level offices. The resettlement plan will also be disclosed on the official websites of TNUHDB and ADB. A report of disclosure, giving details of the date and location will be shared with the ADB.

Grievance Redress Mechanism (GRM): A common GRM will be in place for social, environmental, or any other grievances related to the investment program. The GRM will receive, evaluate, and facilitate the resolution of social, environmental or any other project related grievances. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The GRM described in this report has been developed in consultation with stakeholders. The CAPP will ensure that awareness on grievance redress procedures is generated. The CAPP will ensure that affected persons are made aware of and part of the project GRM. TNUHDB also has various methods for grievance redress for slum dwellers or the general public affected by TNUHDB activities and the same can also be used. Any IRSHUPSP specific grievance which comes in through TNUHDBs existing systems will be routed back to the project specific GRM to level 1.

Implementation Arrangements: TNUHDB is the IA and will be responsible for the management, coordination, and execution of all the activities funded under IRSHUPSP. The project management unit (PMU) will be headed by Joint Managing Director/ Project Director and will be assisted by the Chief Engineer and the Superintending Engineer. The PMU will design the infrastructure, manage the tendering of contracts, supervise the construction process, assure the technical quality of design and construction, and provide advice/ assistance on institutional capacity development. The PMU will be supported by the PID. The PIDs will be responsible for the implementation, management and monitoring of the project. TNUHDB has set up three PIDs (Sivagangai (PID-1), Namakkal (PID-2) and Villupuram (PID-3)) for implementation of IRSHUPS Project.

Monitoring and reporting: The monitoring mechanism for the resettlement plan shall comprise both internal and external monitoring. This sub project involving significant resettlement impacts is classified as category "A" and hence will have to be monitored by an experienced external monitor. The PMU will provide resettlement plan implementation updates in quarterly monitoring reports (QMR) to ADB, until a project completion report is issued. Additionally, the external monitor under ADB's technical assistance will monitor projects on an ongoing basis, guide the PMU and ensure compliance with SPS requirements and submit monitoring reports to PMU and ADB on a quarterly basis.

Resettlement Cost: The estimated budget for the proposed subproject resettlement plan is estimated at ₹85.25million.

I. INTRODUCTION

A. Overview of the Project

1. Recent weather events such as severe flooding in Tamil Nadu, has highlighted the extreme vulnerability of low-income households and their livelihood. The state's high risk for climate-related disasters makes the slums extremely vulnerable to intense rainfall and recurrent flooding given their encroachment on natural drains, which are prone to overflow during heavy rainfall.

2. Tamil Nadu's population living in slums amounts to 5.8 million, representing 16.6 percent of the state's urban population. The state faces a housing shortage in urban areas of around 1.25 million units.¹ Based on a recent demand survey, there are 1.39 million registered applications requesting affordable housing units in Tamil Nadu under Pradhan Mantri Awaas Yojana-Urban, of which about 625,368 have been approved. The Government of Tamil Nadu (GOTN) is committed to addressing the state's urban housing deficit, especially for the economically weaker section population. The Tamil Nadu's "Vision 2023"² sets out the provision of housing with infrastructure for all urban slum families in Tamil Nadu and the creation of a slum free state by 2023.

3. Given the flooding risks and the GOTN's vision 2023, the government has requested support from Asian Development Bank (ADB) for: (i) relocation and rehabilitation of households living in extremely vulnerable and high-risk areas in cities in Tamil Nadu; (ii) development and implementation of a housing model for industrial workforce; (iii) piloting new models of affordable housing; and (iv) regional planning. The proposed Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project (IRSHUPSP) in Tamil Nadu will promote access to inclusive, resilient and sustainable housing and urban development by supporting the state in (i) relocating slum households vulnerable to natural hazards to safer locations, (ii) providing affordable, proper housing for households and migrant workers from the economically weaker section (EWS) and lower-income group (LIG), and (iii) strengthening the state's capacity to design and implement integrated development plans for its regions.

4. Tamil Nadu Urban Habitat Development Board (TNUHDB), the implementing agency, has prepared this resettlement plan for '*Construction of 520 Nos of housing units adopting Type Design No. 09/2020 - (G+3) with associated infrastructure works at Pallipalayam Village, Kumarapalayam Taluk in Namakkal District*', one of the subprojects proposed under IRSHUPSP, based on the results of the inventory of loss and census and socioeconomic survey of affected families in all six settlements identified for relocation. This resettlement plan addresses social issues arising out of relocation of squatters in six settlements on the river bank, identified by the District administration, and impact to private assets resulting in physical and/or economic displacement to families/individuals, either direct or indirect and is in compliance with ADB's Safeguard Policy Statement, 2009 and the Resettlement Framework for the project.

B. Subproject Description

5. Tamil Nadu Urban Habitat Development Board has proposed to construct 520 multi-storey housing units in Pallipalayam, Kumarapalayam Taluk, Namakkal District to accommodate

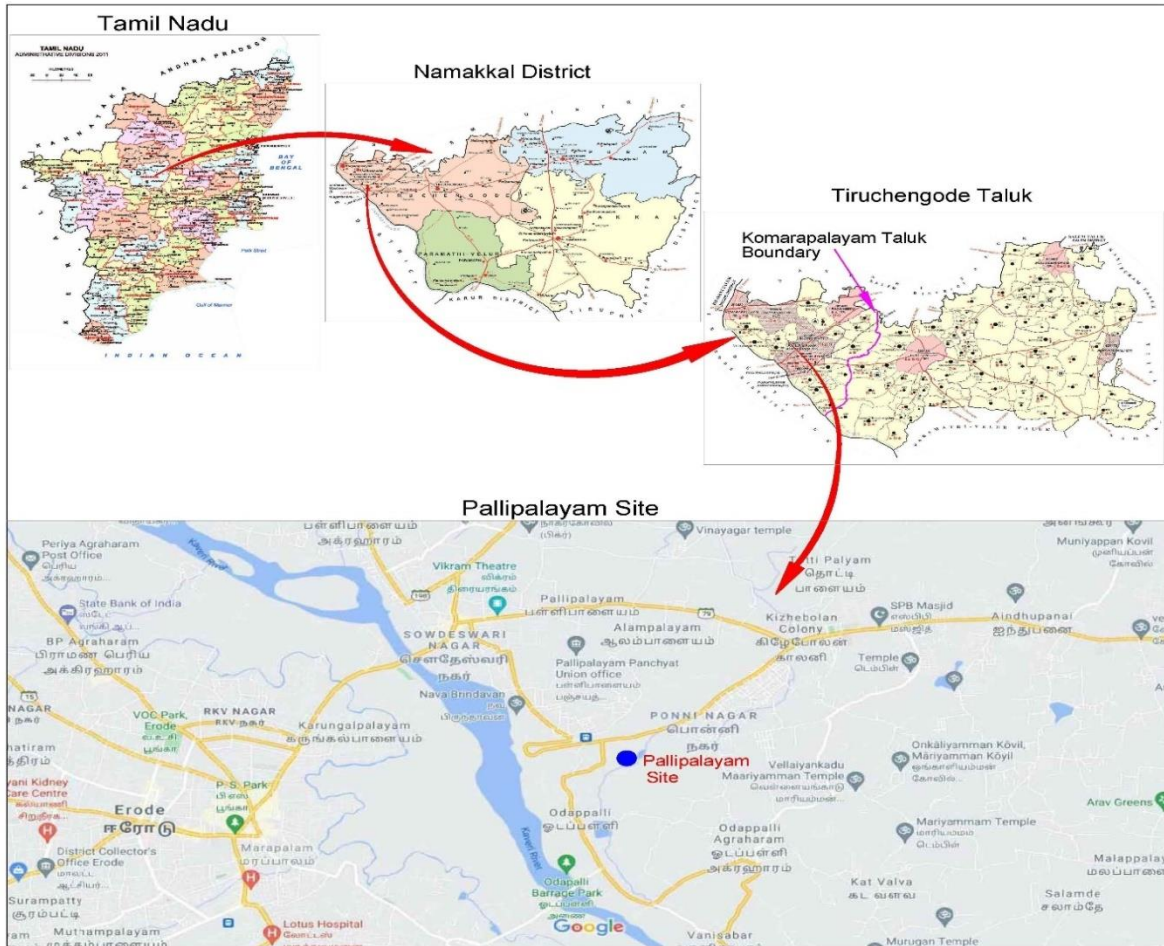
¹Report of the Technical Group on Urban Housing Shortage, 2012-2017.

² "Vision Tamil Nadu 2023: Strategic Plan for Infrastructure Development in Tamil Nadu." Government of Tamil Nadu.

the families proposed to be relocated from six settlements on the river bank that have been identified by the District administration as encroachments on the river bank requiring to be relocated as these families are living in high-risk areas. The Pallipalayam resettlement site is 2.9 kilometers from the central bus terminus, 2 kilometers from the PHC, 4.8 kilometers to Erode town (the major textile market in the region), 2 kilometers to the fair price shop and the weekly market, primary school is at 1 kilometer distance and higher secondary school is at 2 kilometers, and the Pallipalayam town, a textile manufacturing town is at 2 kilometers. This meets the selection criteria of subproject sites (resettlement sites) viz. (i) should be within one hour travel time on public transport from existing settlements so that relocated community members can opt to continue accessing their livelihoods; (ii) should conform to land use classification and relevant development control regulations; planned areas to guide future growth and efficiently provide basic services; (iii) should have sufficient land for the accommodation of all relocated community members in line with housing space and design ratio considerations; (iv) should be within a 2.5 km radius of public amenities or be within prescribed social infrastructure access norms;³ (v) should have access to supporting services; and (vi) connected to existing neighbourhoods. The location map of the resettlement site is given below and the google image as Appendix 1. The location of various social infrastructure facilities plotted alongside the resettlement site is given in Appendix 2.

Figure 1: Location Map of the Resettlement Site

³ Including but not limited to: hospital/primary health care center, groceries, schools/kindergarten (creche), ration shops for subsidized food collection, transport with a dedicated bus stop, libraries/reading rooms. In addition to distance, access needs to be considered for the resettlement sites.



6. This subproject has the following components: (i) construction of 8 blocks (G+3 totalling 520 housing units (residential houses) with the plinth area of each house ranging from 35.44 m² to 37.29 m²; (ii) formation of 9-3 m wide WMM road for an area of [m²; (iii) construction of 3 numbers of sump and pump room; (iv) provision of 0.4MLD sewage treatment plant; (v) provision of paver block pavement as plinth protection; (vi) provision of 9 numbers of rain water harvesting recharge wells; (vii) construction of storm water drain along the sides of the roads; (viii) provision of 160 x 200 millimeter diameter foam core pipes for sewer lines connecting the housing blocks with the sewage treatment plant; (ix) provision of external water supply arrangements; (x) filling the site for a depth of 0.75 meters; and (xi) social infrastructure such as, anganwadi, , convenience shops, livelihood centre and library, has been proposed. These meet the selection criteria of providing comprehensive infrastructure and services, optimally sited open spaces of adequate size, and community spaces including space for training and community enterprises.

C. Profile of the Subproject Area

7. The subproject lies entirely in Pallipalayam Village Panchayat, adjoining Pallipalayam Municipality, the six settlements proposed for relocation under the subproject are within the Pallipalayam Municipality limits. Pallipalayam Municipality is one of the five Municipalities in

Namakkal District and is spread over an area of 7.10 km². The municipality divided into 21 administrative wards has a population⁴ of about 40,140 persons with male accounting for 20,200 persons (50.3%) and female 19,940 persons (49.7%), which is almost the same as the State average of male (50.1%) and female population (49.9%). The sex ratio is 987, lower than the State average (996) for 2011. The scheduled caste constitutes 3.4 percent and the scheduled tribe are 0.07 percent.

8. The literacy rate in the Municipality is 73.2 percent with male literacy level at 81.1 percent and female literacy level is 65.3 percent. Amongst the main workers, 0.2 percent are into cultivation, 0.4 percent are agricultural labourers, 2.5 percent are into household activities and 96.9 percent are other workers (trade, service, etc.). The average rainfall is 793.4 mm. The Municipality is a hub for textile manufacturing and is a twin city of Erode, one of the major textile market in South India.

D. Subproject Impact

1. Involuntary Resettlement

9. The construction of housing units (houses) will provide secured tenure to the affected families of the six settlements proposed for relocation. These affected families were identified by the District administration as those who have encroached the river bank and who face the risk of flooding. This conforms to the primary subproject selection criteria that the settlements of targeted non-titled beneficiaries without tenure security should be vulnerable to flooding or other hazards. The multistoried housing proposed in Pallipalayam resettlement site will have access to all required social infrastructure and amenities such as health care, education, market, etc., in close proximity. The affected families will have access to safe drinking water, proper sewerage system, and electricity. However, the affected families will have to relocate to Pallipalayam resettlement site from the settlement where they have been living in the past, leaving everything familiar and this can be overwhelming. The Project Implementation Division (PID), Namakkal, TNUHDB will assist the families to adapt to the new environment.

10. The subproject involves construction of 520 housing units in government dry land measuring 1.62 hectares that has been transferred by the District Collector in favour of the Tamil Nadu Urban Habitat Development Board and possession taken over by the Assistant Engineer for and on behalf of TNUHDB. The land is free from encumbrance and there is no non-titled occupation. Land documents (copy of Field Measurement Book and *Adangal*, land ownership statement) to establish that the said land is government dry land and land transfer statement along with the proceedings of the District Collector is given as Appendix 3.

11. The six settlements from where affected families are to be relocated involve 520 residential structures identified by TNUHDB. The census and socioeconomic survey was carried out in the six settlements proposed for relocation and the survey identified 577 affected families (1712 affected persons) comprising 448 residential owner occupiers, 68 residential tenants, 2 residence cum commercial owner occupiers, 2 residential owners with dilapidated structure and 57 absentee owners⁵ living elsewhere. The involuntary resettlement impacts are

⁴ Source: Census of India, 2011, Office of the Registrar General and Census Commissioner of India.

⁵ The affected families (of absentee owners) live outside the sending settlements and own structures in the sending settlement that have either been rented-out or are dilapidated or not in use.

summarized in Table 1. This subproject involves significant involuntary resettlement impacts and is classified as category “A” for involuntary resettlement.

Table 1: Summary of Involuntary Resettlement Impacts

S. No	Impact	Extent/Numbers	
1	Private Land Acquisition	Nil	
2	Government Land Transferred	1.620 ha	
3	Temporary Land Acquisition	Nil	
4	Significant Impact	577	
4a	Physically Displaced Families (Loss of Residence)	518	
4b	Affected persons facing physical displacement	1531	
4c	Economically Displaced Families (Loss of Shop)	Nil	
4d	Members of economically displaced families	-	
4e	Physically and Economically Displaced Families (Loss of Residence cum Shop)	2	
4f	Members of physically and economically displaced families	7	
4g	Loss of Structure and Rental Income (absentee owners losing the structure and rental income)	57 ⁶	
4h	Members of families facing loss of structure and rental income	174	
4i	Titled affected persons	Nil	
4j	Non-titled affected persons	1712	
4k	Affected employees	Nil	
4l	Vulnerable families with Multiple Vulnerability facing significant impacts	390 ⁷	
5	Indigenous Peoples	Nil	
6	Number of Trees ⁸	48	

Source: Census and Socio economic Survey, January 2021

2. Indigenous Peoples

12. There are no scheduled areas in Tamil Nadu and the State has Tribal Advisory Councils to advise on such matters pertaining to the welfare and advancement of the Scheduled Tribes in the State, as may be referred to them by the Governor. No indigenous peoples impact involving direct or indirect impacts to the dignity, human rights, livelihood systems or territories or natural or cultural resources that are used, owned, occupied or claimed by indigenous peoples as their ancestral domain or asset, is anticipated. The surveys have not revealed presence of scheduled tribes or particularly vulnerable tribal groups and no presence of such groups is reported in project areas. Hence, the need for an Indigenous Peoples Plan is not assessed for this subproject.

⁶(Footnote 12)

⁷ Families with multiple vulnerabilities is out of the 564 families who provided all socio-economic details, the remaining 13 families include families not available and who refused to share information.

⁸ The 48 trees were planted by 32 affected families.

E. Minimizing Impacts

13. The involuntary resettlement safeguards objectives governing resettlement planning and implementation under the project are to: (i) avoid involuntary resettlement wherever possible; (ii) minimize involuntary resettlement by identifying non-displacing or least displacing subproject and design alternatives; (iii) improve, or at least restore, the livelihoods of all displaced persons; (iv) improve the standards of living of the displaced persons including vulnerable groups; and (v) ensure all compensation and assistance is paid prior to displacement.

14. Adequate measures were taken to avoid involuntary resettlement impacts by identifying suitable vacant government land for resettlement site and the site is free from encumbrance and with no non-titled users. Thereby TNUHDB ensured that land acquisition and other involuntary resettlement impacts are avoided.

F. Scope and Objective of the Resettlement Plan

15. This Resettlement Plan has been prepared based on the results of the inventory of loss and census and socioeconomic survey of affected families in all six settlements identified for relocation, and from information drawn from the baseline census and socioeconomic survey. It includes the results and findings of the survey of displaced persons and their entitlements to restore losses, institutional mechanisms and schedules, budgets, assessment of feasible income restoration mechanisms, grievance redress mechanisms, and results monitoring mechanisms. This resettlement plan complies with the principles outlined in the resettlement framework. The resettlement framework outlines the objectives, policy principles, compensation and other assistance measures for displaced persons under IRSHUPSP.

16. This resettlement plan has been prepared based on the ADB's SPS and the Tamil Nadu Protection of Tanks and Eviction of Encroachment Act (TNPTEEA), the following resettlement principles have been adopted for IRSHUPSP:

- (i) Screening to identify involuntary resettlement impacts and risks. Minimizing and avoiding resettlement impacts of each subproject by exploring all viable alternative designs;
- (ii) Carrying out consultations with displaced persons, host communities and NGOs, informing all displaced persons of their entitlements, ensuring their participation in planning, implementation, and monitoring and evaluation of resettlement programs;
- (iii) Where the resettlement impacts are unavoidable, the displaced persons will be assisted in improving or at least regaining their standard of living;
- (iv) Vulnerable persons /groups, including households headed by women, the elderly, the disabled, and indigenous groups and those living below poverty line will be given special livelihood support to improve their socioeconomic status; and all vulnerable households will be prioritized for project construction work.
- (v) Compensation for all assets affected will be based on the principle of replacement cost;
- (vi) Restoration of livelihoods of the displaced persons will be facilitated with adequate resources according to the resettlement plan;
- (vii) Where physical displacement takes place, displaced persons are to be assisted in integrating economically and socially into host communities in such a way that any adverse impacts on the host communities are minimized and social harmony is promoted;

- (viii) All payments, will be made prior to physical or economic displacement;
- (ix) Disclosure of the resettlement plan, including documentation of the consultation process will be done in a timely manner to displaced persons and other stakeholders. Disclosure of the final resettlement plan and other documents such as the monitoring reports to displaced persons and other stakeholders will be undertaken.

II. SCOPE OF LAND ACQUISITION AND RESETTLEMENT

A. Introduction

17. The subproject involves construction of 520 multi storied (G+3) housing units in Pallipalayam resettlement site to accommodate the affected families in six settlements that have been identified by the District administration as being encroachments on the river bank and under high risk of flooding.

B. Scope of Land Acquisition

18. The subproject does not involve any private land acquisition and the construction of 520 housing units and all associated facilities are proposed within 1.62 ha of government land transferred in favour of TNUHDB by the District administration. The land is barren, not used for any livelihood activities and as per revenue classification is government land⁹ and land records and site visits confirm that the land is free from encumbrance and does not have any non-titled use. The settlements proposed for relocation are all government land classified as river paramboke.

Figure 2: Pallipalayam Resettlement Site



C. Physical Displacement

19. Out of the 577 identified families, 520 families will face physical displacement, comprising 518 families who will lose their residence and 2 families who will lose their residence cum commercial shop. The remaining 57 are those losing the structure that they have rented out. The physically displaced 520-families will be relocated to the housing units proposed in Pallipalayam. The remaining 57-families, being structure owners (absentee owners¹⁰) losing their rental income and the structure rented-out will not be relocated as they live outside the

⁹ The land is classified as 'agraharam inam' vested with government.

¹⁰(Footnote 12)

sending settlements. The 57-absentee owners will be provided compensation and assistances in accordance with the provisions contained in the entitlement matrix.

D. Impact to Structures

20. In this subproject, the structures belonging to the affected families in the six settlements proposed for relocation will be affected. The 520 residential structures in the six settlements were identified by TNUHDB as likely to be affected requiring relocation. Census and socio-economic survey was conducted in all settlements after obtaining the required permissions for surveys from the District Administration and adhering to COVID-19 safety protocols. The six surveyed settlements have 520 structures that will be affected. The socio-economic survey was carried out in all six settlements and the survey identified 577 affected families, comprising 518 families living in the structures affected, 2 families living and carrying out business in the structures affected and 57 families being absentee owners (*footnote 17*) living outside the sending settlement and owning structures affected. Out of the 577-families identified, the socio-economic surveys were carried out amongst 564 families and the remaining 13 families comprise families who refused to share information and those who could not be contacted. Those who refused to be surveyed were not forced to participate in the surveys. Further consultations are planned to understand their concerns.

E. Ownership of the Affected Structures

21. Eighty seven percent of the affected families own the structure that they are using, followed by 13 percent affected families who are tenants. The tenure details of the structures of affected families is presented in the following table.

Table 2: Ownership of the Structures

Tenure	Number	Percentage
Owner occupied	452	86.9
Tenant occupied	68	13.1
Total	520	100

Source: Census and Socioeconomic Survey, January 2021

22. Ninety nine percent of the affected families use the structure for residential purpose, followed by a little less than 1 percent who use the structure as both residence and commercial. The settlement wise affected families by the use of structure and the type of ownership (tenure) is given below. The settlement photographs are given in Appendix 4.

Table 3: Settlement Wise Type of Loss Vs Tenure

Settlement	Residence			Commercial			Residence cum Commercial			Total Affected Families
	Owner	Tenant	Total	Owner	Tenant	Total	Owner	Tenant	Total	
<i>Natta gounda pudhur</i>	13	5	18	-	-	-	-	-	-	18
<i>Cauveri Nathi ora street</i>	133	21	154	-	-	-	1	-	1	155

Settlement	Residence			Commercial			Residence cum Commercial			Total Affected Families
	Owner	Tenant	Total	Owner	Tenant	Total	Owner	Tenant	Total	
<i>Janatha nagar</i>	160	32	192	-	-	-	-	-	-	192
<i>Meenavar street</i>	87	5	92	-	-	-	-	-	-	92
<i>Periyar Nagar</i>	17	2	19	-	-	-	-	-	-	19
<i>Venkatesapuram</i>	40	3	43	-	-	-	1	-	1	44
Total	450	68	518	-	-	-	2	-	2	520

Source: Census and Socioeconomic Survey, January 2021

23. Seventy five percent of the affected families are using structures that are semi-permanent in nature, followed by 14 percent who use structures that are temporary in nature and 10 percent are using structures that are permanent in nature.

Table 4: Type of Construction of the Affected Structures

Type	Total Structures Affected		Total Area affected (in sq.ft)	
	Number	Percentage	Area	Percentage
Permanent	53	10.2	15,310	11.8
Semi-Permanent	390	75.0	96,849	74.6
Temporary	77	14.8	17,688	13.6
Total	520	100	129,847	100

Source: Census and Socioeconomic Survey, January 2021

24. Eighty seven percent of the residences are owner occupied and 13 percent are tenant occupied. Among the residence cum commercial category, both the affected families are owner occupied. The use of the affected structure by tenure is presented in the following table.

Table 5: Tenure Vs. Use

Type	Residential		Commercial		Residence cum Commercial	
	Number	Percentage	Number	Percentage	Number	Percentage
Owner	450	86.9	-	-	2	100
Tenant	68	13.1	-	-	-	-
Total	518	100	-	-	2	100

Source: Census and Socioeconomic Survey, January 2021

F. Loss of Livelihood

25. The subproject is anticipated to cause significant impact to 2 residence cum commercial shops and 57 absentee owners, resulting in loss of livelihood to 10percent affected families (59 out of 577 affected families). The 57 absentee owners losing their rented-out structure will face loss of rental income and will be provided compensation and assistance for livelihood restoration. In order to prevent loss of livelihoods to relocated households, the Graduation Program will provide support for livelihood restoration in the form of a market-viable asset along with technical skills training to manage the asset or access employment opportunities, while also supporting rehabilitation of social welfare to the 518 families losing their residence and 2 families losing their residence cum commercial shop. Further, post-relocation, a livelihood

assessment survey will be undertaken by the Graduation Program team and based on the assessment and extensive consultations with the affected persons, suitable livelihood support measures will be developed for each affected person

G. Loss of Trees

26. The subproject will involve loss of 48 private trees belonging to 32 affected families. Trees belonging to the affected families will be compensated in accordance with the provisions contained in the entitlement matrix.

H. Loss of Common Property Resources

27. The project will affect 20 common property resources, comprising 12 places of worship, 1 community hall of the Municipality, 3 washing place and 4 public toilets. The Municipality, in consultation with the user community, will retain the common property resources such as places of worship, community hall, public toilets and the washing place in the same place without removing or relocating them, considering that these are also used by other non-affected families living around the sending settlements. The summary of common property resources is given in Appendix 5.

Table6: List of Affected Common Property Resources (CPR's)

Type of CPR	Number
Place of worship	12
Community Hall	1
Washing place	3
Public toilets	4
Total	20

Source: Census and Socioeconomic Survey, January 2021

III. SOCIO-ECONOMIC INFORMATION AND PROFILE

A. Involuntary Resettlement Impacts

28. The resettlement plan is based on the inventory of loss and census and socio-economic survey carried out in January 2021 amongst the affected families identified by TNUHDB. The survey was carried out in all six settlements identified by the District administration as being encroachments on the river bank and facing the risk of flooding. The survey identified 577 affected families (1,712 affected persons), comprising 452 owner occupiers, 68 tenants and 57 absentee owners.

B. Methodology

29. The survey enumerated all structures identified by TNUHDB that were provided with a unique identification number (topo number). In addition, common property resources were also enumerated. All private structures and common property resources within the identified settlements were enumerated and socio-economic survey was carried out amongst those who were available and shared the information. Handout explaining the purpose of the survey and details of contact person, being the concerned Executive Engineer, was given to affected families before commencing the data collection. Photograph of the affected structure and documents to establish address and identity proof of the affected family members was also gathered.

30. The survey of the affected families is undertaken to determine the magnitude of displacement and prospective losses, better identification of vulnerable groups, ascertain costs of resettlement, and prepare a rehabilitation and resettlement plan for implementation. The socio-economic survey helps in assessing the investment program's socio-economic impacts on the affected community and people. For the methodology for conducting socioeconomic surveys and database management used in the preparation of this resettlement plan, refer to Appendix 6.

31. The socio-economic census survey was conducted for 564 affected families and the remaining 13 affected families (577 total affected families identified less 564 affected families provided socio-economic information) are absentees and families who refused to share details. The summary of affected families and the summary of affected common property resources are available in the project file. The salient findings of the socio economic survey is presented in the following section.

C. Demographic Profile of Project Affected Families

32. **Affected Family by Sex:** Twenty seven percent of the affected families are headed by women, and the remaining families are headed by men. Males account for 48.7 percent and female account for 51.3 percent amongst affected persons.

Table 7: Head of Affected Family by Sex

Sex	Number	Percentage
Male	414	73.4
Female	150	26.6
Total	564	100

Source: Census and Socioeconomic Survey, January 2021

33. **Affected Family by Religion:** Hindus account for 99 percent of the affected families, followed by 1 percent Christians.

Table 8: Affected Family by Religion

Religion	Number	Percentage
Hindu	560	99.3
Muslim	-	-
Christian	4	0.7
Total	564	100

Source: Census and Socioeconomic Survey, January 2021

34. **Affected Family by Social Group:** Fifty percent of the affected families belong to the most backward caste, followed by 30percent other backward caste, 20 percent scheduled caste and less than a percent of general category.

Table 9: Affected Family by Social Category

Social Category	Number	Percentage
General	2	0.3
Other Backward caste	168	29.8
Most Backward caste	283	50.2
Scheduled Caste	111	19.7

Scheduled Tribe	-	-
Total	564	100

Source: Census and Socioeconomic Survey, January 2021

35. **Affected Family by Size of Family:** Family of size up to 3 members account for 62 percent, followed by 36 percent with a family of size 4 to 5 members and 2 percent with a family of size 6 and above. The average size of the affected family is 2.2966 or say 3 members.

Table 10: Size of the Affected Family

Size of the Family	Number	Percentage
≤ 3	350	62.1
> 4 and ≤ 5	202	35.8
> 6 and above	12	2.1
Total	564	100
Average size of the family is 2.966 or say 3		

Source: Census and Socioeconomic Survey, January 2021

36. **Age Group of Affected Persons:** The proportion of women aged above 60 years is higher compared to men in the same age group. However, in the 21 and below age group there are more men (34%) than the women (30%). Overall, 32 percent of the affected persons are in the age group of 21 and below, followed by 23 percent in the age group of 22 and 35, 22 percent in the age group of 36 and 50, 13 percent in the age group of 51 and 60 and 11 percent in the above 60 age group.

Table 11: Age Group of Affected Persons

Age Group	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
≤ 21	274	33.7	256	29.8	530	31.7
> 21 and ≤ 35	208	25.5	177	20.6	385	23.0
> 35 and ≤ 50	167	20.5	192	22.4	359	21.5
> 50 and ≤ 60	90	11.1	125	14.6	215	12.8
> 60	75	9.2	109	12.6	184	11.0
Total	814	100	859	100	1673	100

Source: Census and Socioeconomic Survey, January 2021

37. **Educational level of Affected Persons:** Forty eight percent amongst females and 31 percent amongst males are uneducated. Beyond high school level there are fewer male who continue their studies compared to females. Overall, 18 percent have completed primary level of education, followed by 14 percent each who have completed upper primary, 12 percent have completed high school, 8 percent have completed higher secondary school level, 6 percent are graduates, 2 percent have done technical education, 1 percent have a professional degree and 39 percent are uneducated.

Table 12: Educational level of Affected Persons

Educational level	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Primary (5th)	178	21.9	130	15.1	308	18.4
Upper primary (8th)	133	16.3	95	11.1	228	13.6
High School (10th)	104	12.8	91	10.6	195	11.7
Higher Secondary (12th)	51	6.3	81	9.4	132	7.8
Technical Education	21	2.5	9	1.0	30	1.8
Graduate	66	8.1	31	3.6	97	5.8
Professional degree	13	1.6	10	1.2	23	1.4

Educational level	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Uneducated	248	30.5	412	48.0	660	39.5
Total	814	100	859	100	1673	100

Source: Census and Socioeconomic Survey, January 2021

38. **Occupation of affected Persons:** Seventy three percent amongst females and 39percent amongst males are not in workforce or unemployed. The not in workforce comprises largely of children, students, elderly, housewives and women who do not go for work. Overall, 26 percent are casual labourers, 12 percent are salaried, 3 percent are into fishing, 2 percent are in domestic services and less than 1 percent are in business services and into other activities.

Table 13: Occupation of affected Persons

Occupation	Male		Female		Total	
	Number	Percent age	Number	Percent age	Number	Percent age
Salaried	138	17.0	57	6.6	195	11.7
Daily/casual labourers	284	34.9	153	17.8	437	26.1
Self-employed-Domestic service	26	3.2	14	1.7	40	2.4
Self-employed- Business service	3	0.4	1	0.1	4	0.2
Fishing / fish trading	43	5.2	5	0.6	48	2.9
Others	5	0.6	2	0.2	7	0.4
Not in workforce / Unemployed	315	38.7	627	73.0	942	56.3
Total	814	100	859	100	1673	100

Source: Census and Socioeconomic Survey, January 2021

39. **Income of Affected Family:** Sixty two percent of the affected families earn above ₹6,000 per month, followed by 8 percent who earn between ₹4,001 and ₹5,000 per month, 7 percent each earn between ₹5,001 and ₹6,000 and between ₹1,001 and ₹2,000, 6 percent earn between ₹3,001 and ₹4,000, 5 percent earn ₹1,000 and less, 4 percent earn between ₹2,001 and ₹3,000 and a few of the affected families did not disclose their income details. The average monthly family income reported is ₹8,563. Considering the household size of each household surveyed and using the state-specific per capita income criteria for BPL in urban areas, there are 226 affected families (40.1%) who fall below the poverty line.¹¹

Table 14: Monthly Family Income

Monthly Income Range	Number	Percentage	Average Income (in INR)
> 0 and ≤ 1000	30	5.3	987
> 1000 and ≤ 2000	39	6.9	1,915
> 2000 and ≤ 3000	25	4.4	2,936
> 3000 and ≤ 4000	34	6.0	3,958
> 4000 and ≤ 5000	43	7.6	4,965
> 5000 and ≤ 6000	37	6.7	5,973

¹¹ Families whose monthly income is less than the BPL cut-off income is ₹2191.93 per capita per month are considered as below poverty line Families. The state specific poverty line for urban Tamil Nadu for the year 2011-2012, as per Dr. C. Rangarajan committee's (constituted by Planning Commission of India) revised methodology for measurement of poverty, is ₹1380.36 per capita per month. The same has been updated to August 2020 (survey period) based on CPIIW and accordingly BPL families have been identified.

Monthly Income Range	Number	Percentage	Average Income (in INR)
> 6000	349	61.9	11,527
Not disclosed	7	1.2	
Total	564	100	8,563

Source: Census and Socioeconomic Survey, January 2021

40. **Indebtedness of Families:** Twenty nine percent of the affected families (165 out of 564 affected families) are indebted at different levels and the rest (71%) have not borrowed from anyone. Amongst those who had borrowed (29%), 56percent had borrowed from money lenders, followed by 23 percent who had borrowed from banking institutions, 9 percent each had borrowed from their groups (SHGs) and private financiers and 2 percent had borrowed from pawn brokers.

Table 15: Indebtedness of Affected Family

Source of Loan	Frequency	Percentage
Bank	38	23.0
Money lenders	93	56.4
Pawn broker	4	2.4
Financier	15	9.1
SHG	15	9.1
Micro Finance	-	-
Total	165	100

Source: Census and Socioeconomic Survey, January 2021

41. **Impact to Vulnerable Families:** All the 564 affected families being non-titled are vulnerable. Of these, 390 families have multiple vulnerabilities.

Table 16: Vulnerable Families (N=564)

Vulnerability Type	Number of Affected Vulnerable Families
Disabled Headed Families	14
Women Headed Families	150
Households headed by elderly	150
Transgender	-
Scheduled Tribe Families	-
Scheduled Caste Families	111
BPL Families ¹²	226
Non-titled families	564
Families with multiple vulnerability	390

Source: Census and Socioeconomic Survey, January 2021

Note: The above categories of vulnerability are overlapping and not exclusive.

42. All affected persons are assessed to be vulnerable persons, as all are non-titleholders. For all affected persons facing physical displacement, the relocation turns them from non-titled to property owners with secure tenure. Another key vulnerability is poverty and conditions that

¹²The state specific poverty line for urban Tamil Nadu for the year 2011-2012, as per Dr. C. Rangarajan committee's (constituted by Planning Commission of India) revised methodology for measurement of poverty, is ₹1380.36 per capita per month. The same has been updated to August 2020(survey period) based on CPIIW and accordingly BPL families have been identified. The BPL cut-off income is ₹2191.93 per capita per month for August 2020.

may cause them not to thrive post-relocation. These vulnerabilities include a lack of assets, or being disadvantaged by age, being female or transgender, being a person with disabilities, or belonging to scheduled castes. A graduation program, which will identify the specific support (including livelihood restoration support) required by such families will be implemented for 2 years to improve their chances to thrive. Vulnerable persons will be given priority for potential employment in the project construction activities, persons with disabilities will be given preference for housing units on the ground floor and all vulnerable persons identified for the Graduation program will be eligible for support as indicated under the program, including the benefits mentioned under this category. For the very vulnerable with multiple vulnerabilities, an additional one-time assistance of ₹5000 is provided and this will be over and above the other assistance based on type of loss as given in the entitlement matrix.

43. **Key Socio-economic Indicators:** The key socio-economic indicators of the affected families as captured during the survey is given below.

Table 17: Socioeconomic Profile and Assets Owned

S. No	Indicator	Unit	Value/Figure
a)	Income (N = 564 affected families)		
1	Monthly family income	Average	Rs.8,563
2	Number of earners	Average	1.30
3	Level of Indebtedness	%	29.2
b)	Occupation [N =564affected families - amongst workforce (43.7%)]		
4	Salaried	%	26.7
5	Daily wage earners	%	59.8
c)	Housing (N = 520affected families)		
6	Permanent	%	10.2
7	Semi-permanent	%	75.0
8	Temporary houses	%	14.8
9	Owned	%	86.9
10	Rented	%	13.1
d)	Facilities and Amenities(N = 564affected families)		
11	Having separate kitchen	%	86.4
12	Having separate toilet	%	9.4
13	Having separate bath	%	90.4
14	Houses electrified	%	96.3
15	Access to piped water supply (HSC/PT)	%	95.2
16	LPG as fuel for cooking	%	89.7
e)	Structure Affected (N = 520 affected families)		
17	Average area of House (Permanent)	Sq.ft	288.87
18	Average area of House (Semi Permanent)	Sq.ft	248.33
19	Average area of House (Temporary)	Sq.ft	229.71
f)	Demographic Details (N = 564affected families)		
20	Family size	Average	2.966
21	Women headed household	%	26.6

S. No	Indicator	Unit	Value/Figure
g)	Standard of Living (N = 564affected families)		
22	Mobile phone	%	90.8
23	Having Television	%	83.7
24	Having Cycle	%	11.2
25	Having Motorcycle	%	43.8
26	Having Car	%	0.2
27	Having Refrigerator	%	22.5
28	Having Washing Machine	%	4.4
29	Having Livestock	%	4.3
30	Having Ration card	%	90.1
31	Having Bank Account	%	65.4

Source: Census and Socioeconomic Survey, January 2021

D. Gender

44. Female-headed households are considered a vulnerable group as per the resettlement framework. Any negative impacts on female-headed households will be given priority. The resettlement plan has formulated measures to ensure that socioeconomic conditions, needs, and priorities of women are identified, and that the process of resettlement does not disadvantage women. It will ensure that gender impacts are adequately addressed and mitigated. Women's focus groups discussions and consultations with the community involving women will be conducted to address specific women's issues. During disbursement of compensation and provision of assistance, priority will be given to female-headed households. Joint ownership in the name of wife and husband will be provided for all affected families provided with housing units.

45. The women account for 51.3 percent of the affected persons and the worker participation rate is 27 percent (232 women out of 859 women). Amongst the women involved in economic activity, 66 percent are casual labourers, followed by 25 percent salaried, 6 percent are self-employed domestic services, 2 percent are into fish trading and 1 percent are self-employed business services and are in other activities such as coconut broom making, selling fish, etc.¹³The six settlements proposed for relocation are at a distance of about 3 km from the resettlement site. The women from these settlements will be able to continue their economic activity from the resettlement site, which is well connected with public transport system. There are residential colonies and market nearby the resettlement site that provide opportunity to the women to take up new economic activity. The graduation program will supplement the livelihoods of the women through the interventions proposed.

IV. CONSULTATION, PARTICIPATION AND DISCLOSURE

A. Consultation and Participation Process

46. Consultations with individual affected households were conducted during socioeconomic surveys due to COVID-19 restrictions, that allowed only one to one interaction. The one to one

¹³ In Pallipalayam, the type of home-based economic activity undertaken by few women is coconut broom making and selling fish (when there is water in the river).

consultations started early in the project preparation stage, and will be carried out on an ongoing basis throughout the project cycle by the TNUHDB CDOs; relevant and adequate information were provided in Tamil, it was undertaken in an atmosphere free of intimidation or coercion, it was gender inclusive and everyone including vulnerable persons participated and suggestions on safety aspects, amenities and facilities required were incorporated. The key concerns expressed by affected persons were: whether their livelihoods would be restored post relocation; whether relocation would affect their existing access to facilities and amenities; how the addresses on their identity cards (ration cards, voter identity cards and Aadhar cards) would be changed, and also expressed preference for their housing at the present location to be regularized. During ADB consultation mission before COVID-19, concerns voiced by the community on safe and well-lit common spaces, social cohesion, play areas with high visibility so that mothers can keep an eye on their children, need for *anganwadi*, ration shop, and other facilities at the relocation site were taken note of and incorporated into the design.

47. TNUHDB staff and survey team members explained that livelihood restoration would be undertaken and support for the same provided under the Graduation Program, key features of which were explained to the affected persons; relocation could not be avoided due to the High Court order on protection of water bodies and removal of encroachments, but the relocation sites would provide secure tenure and all required infrastructures; TNUHDB will support in ensuring access to the public distribution system, benefits under government programs and will facilitate address change on national identity cards of affected persons.

48. Consultations with the affected families were undertaken in March 2022, after obtaining necessary clearance from the District administration and confirming to the Covid-19 safety protocols. Three meetings were organized by the Social Development and Resettlement Cell (SDRC) of the Namakkal Project Implementation Division, with the support of the Chief Community Development Officer (CCDO) and the Consultations were held covering all six settlements proposed for relocation. The Superintending Engineer, Executive Engineer, CCDO, CDO and Communication Specialist carried out the consultations.

49. The CDO welcomed the participants and explained the purpose of the meeting. The CCDO provided an overview of the resettlement plan including the number of families proposed for relocation and details of the entitlements under the project, including the graduation program for livelihood support. The technical aspects of the project were explained by the superintending engineer and the executive engineer. The communication specialist provided an overview about the facilities available and how the TNUHDB's community development wing will work closely with them during the transition period and support them even after their relocation in helping them to secure school admissions, in getting the address changed in all their records, in supporting them in their livelihoods and in supporting and guiding them in any other issues that they may face. There were about 398 participants, including about 268 women. In addition, elected representatives of the local self-government representing the affected families participated in the consultations. Signed attendance sheets were not taken to avoid contact/touch in view of the prevailing Covid-19 situation. Photographs taken during the consultations and the minutes of meeting are presented as Appendix 8.

50. Consultations were held with civil society organizations to explain the project details. These civil society organizations are associated in development activities in the project town. The summary of the outcome of the three consultations conducted in Pallipalayam is presented in the following table.

Table 18: Summary of Settlement Level Consultation Outcome

SNo	Concerns and Issues	Response Provided
1	We have been living here over 40 years and we want to stay here for the rest of our time.	The place where you are living is the right-of-way of the river, adjoining the river and prone to flooding. Hence, you will not be able to continue here permanently and the Courts have insisted that people in occupation of water bodies be relocated.
2	Give us patta for this place. This was promised 10 years ago.	Patta cannot be given on river poramboke as these are non-assignable lands.
3	Patta is given to people living in far more remote places than where do we live. Why cannot we be given Patta.	The people who have got patta in other places are living in land than can be given patta. As explained, patta cannot be given on the river right-of-way.
4	Give us Individual houses instead of Apartments – we are not used to living in such houses.	Since it is difficult to find land suitable for housing in close proximity to the town and the available land has to be used to the maximum, multistoried tenements are proposed.
5	We are comfortable in the current location with all facilities such as water, electricity, transportation connectivity.	The resettlement site houses will have all facilities as explained and all this will be in place before you relocate.
6	Will you remove people who live only on the edges of the bank or everyone	Only those living within the river right-of-way and prone for flooding will be relocated
7	Will there be any provision to keep the livestock in the new place	Presently there is no provision and the project will look into this requirement.
8	Now you give lot of promises of the new place but who will follow it up and ensure that they are actually given.	The project will have all features as explained and as detailed in the brochure. The Social Development and Resettlement Cell of this project will work closely with families.
9	What are the facilities you are planning to provide us in the new place.	Besides the house, that will be free of cost, the facilities to be provided include piped water supply within the house, electricity, drainage facility, sewer system, primary health centre, playground, garden, walkway, ration shop (public distribution shop), multi-purpose open air market place, library, street lights with solar power, parking place etc. In addition you will have access to primary school, bus shelter and bus connectivity.
10	Explain the plan of the 400 sq ft house that you are planning for us.	The house will include a living room, bed room, kitchen, bathroom and a washroom.
11	We have no problem here. Give us Patta instead of spending money on building a house in a new place.	Patta cannot be given on river poramboke as these are non-assignable lands.
12	We are living here for more than 32 years on a rented house and the owners do not treat us with respect therefore give us the new houses at the earliest.	The project will be completed within 2 years and once it is ready for occupation, you can relocate.

SNo	Concerns and Issues	Response Provided
13	I live on a rented house in the current location. Will you give me also a new house or it is only for the owner of the house?	Tenants, being the occupier of a house and identified by TNUHDB will also be eligible for a house in the resettlement site.
14	I am a fisherman and I need to live here closer to the river. Build a wall if you think we need to be protected instead of shifting me to a new place.	The new location is not far from the current and it is just about 4 km away. One can always come to the riverfront is accessible to you. Further, one can opt to take assistance from the project team which would help them in linking people with opportunities through skill development

B. Plan for Further Consultation in the Project

51. Further consultations with various stakeholders will be carried out throughout the project cycle. The consultations will be conducted by the PID and the PMU taking into account COVID-19 related restrictions, and following the guidance and protocols of Government and ADB. ¹⁴Stakeholders will include primary stakeholders who are project displaced persons and the PID/PMU. Additionally, the concerned District Collector of the district, commissioner of the municipality and revenue department officials are also considered to be the primary stakeholders. Other stakeholders in the project include ward level members, local councilors, resident welfare associations (RWAs), local community groups, women's groups and people of the project area. A consultation and participation plan is prepared for various stages of the project cycle.

52. Consultation is a continuous process and will be conducted at several levels that include: (i) heads of households/ members likely to be impacted; (ii) ward level members; (iii) community- based organizations (CBOs) and RWAs; and (iv) TNUHDB and line departments. Several rounds of consultations will be conducted during resettlement plan implementation. Separate consultations on common property resources (CPRs), covering availability and access to CPRs at the resettlement site and CPRs in sending sites being retained, will be held with affected communities. Limited consultations were held during the project preparation period due to COVID-19 restrictions, however, consultations will be conducted by the PID during implementation. Consultation will involve (i) dissemination of information on resettlement plan including entitlement policies and options; this will involve explaining the entitlement matrix and resettlement process to the displaced persons and soliciting their support and co-operation; (ii) dissemination of information on the relocation site and the facilities to be provided including a visit to the relocation site including feedback on the designs;(iii) dissemination of information on livelihood restoration program/ graduation program and how to participate in the program; and (iv) dissemination of information on the relocation process, including likely date of shifting, ensuring that children's academic calendar is not disturbed, no important holidays are during the relocation time etc.

¹⁴[https://www.adb.org/documents/series/covid-19-asia-pacific-guidance-notes;https://stopcorona.tn.gov.in/;https://stopcorona.tn.gov.in/wp-content/uploads/2020/03/G O Ms No 09 Updated Triage and Treatment Protocol Amendment-11-Pages-English-2189-KB.pdf](https://www.adb.org/documents/series/covid-19-asia-pacific-guidance-notes;https://stopcorona.tn.gov.in/;https://stopcorona.tn.gov.in/wp-content/uploads/2020/03/G_O_Ms_No_09_Updated_Triage_and_Treatment_Protocol_Amendment-11-Pages-English-2189-KB.pdf)

53. The methodology followed for public consultations will include: (i) informing all the likely displaced persons, ward committee members, local NGOs, RWAs and CBOs of upcoming meetings; (ii) conducting the meetings; and (iii) seeking feedback of the participants, documenting the minutes of the meetings including genuine concerns, suggestions and recommendation of the participants, noting the list of participants as recorded by signature and filing photographs taken of the consultations. The CAPP and consultants appointed by ADB along with CCDO, CDOs, TNUHDB will sensitize and train the project staff to address the concerns of the people and will engage the affected persons and CSO in the process, as specified in the CAPP.

54. Particular attention will be paid to the needs of the vulnerable groups, especially those groups that are BPL, elderly, female-headed households, women, scheduled caste and indigenous people/ scheduled tribes. The PID will ensure that any views of the displaced persons, particularly vulnerable people, related to the relocation process are looked into and addressed. The implementing organization will ensure that groups and individuals consulted are informed about the outcome of the decision-making process and confirm how their views were incorporated.

55. The resettlement plan will be finalized and implemented in close consultation with key stakeholders. Women's participation will be ensured by involving them in public consultation at various stages of project preparation. The venue and the time of meetings must be convenient for women.

C. Information Disclosure and Resettlement Plan Disclosure

56. The resettlement plan will be disclosed to the affected community, detailing information including entitlements and special provisions, grievance procedures, timing of payments, and relocation schedule by the PID. This will be done through public consultation and brochures and leaflets in Tamil. Copies of the summary and full resettlement plan in Tamil will also be made available at: (i) office of the PID; (ii) Commissioner of Municipality; and (iii) local level offices. A report of disclosure, giving details of the date and location will be shared with the ADB. The template for project information and disclosure of the resettlement plan and grievance procedures along with the copy of the brochure distributed amongst the affected families is given in Appendix 7.

57. The resettlement framework and the resettlement plan will be placed on the official website of TNUHDB and the official website of ADB after approval and endorsement of the resettlement framework and resettlement plan by the TNUHDB and ADB. Table 18 provides a summary of the consultation and disclosure activities to be undertaken.

D. Consultation and Participation Plan

58. A consultation and participation plan (CAPP) is prepared for the project.¹⁵ A program of continuous consultation is proposed. The primary purpose of the consultation and participation plan is to disseminate information and to open up the lines of communication between the TNUHDB and all stakeholders to facilitate the implementation of the IRSHUPSP and the early

¹⁵ The CAPP is included as a linked document to the RRP (SLD 26) and provides details of proposed consultations throughout the project cycle.

resolution of any conflict issues that may arise. The consultation and participation plan will include the communication processes and activities which will take place throughout the course of the project. CDOs of TNUHDB will be trained and will be responsible for consultations through the project period, during the design and construction of housing units, during relocation and post relocation.

Table 19: Summary of Consultation and Disclosure Activities

Subproject Phase	Activities	Details	Responsible Agency
Initiation	Mapping of the subproject area	Subproject area to be mapped, clearly showing survey numbers of affected persons to be shifted.	Completed. PID in coordination with district collector's office/ ULB have identified the settlements to be relocated and the persons to be shifted.
	Stakeholder identification	Cross-section of stakeholders to be identified in order to facilitate their participation in the subproject.	Completed. PID has identified all stakeholders.
	Subproject information dissemination; disclosure of subproject details	Leaflets containing information on a subproject to be prepared. The public notice will mention the names of locations to be cleared and name of relocation site and other subproject details.	Limited information was shared during the socio-economic survey and information dissemination will be done by the PID. Notice will be issued by the PID.
	Stakeholder meetings	Meetings at community/ household level with displaced persons and other stakeholders, such as RWAs, ward committees etc. to seek feedback	Have been proposed by PID
Resettlement plan preparation	Socio-economic impact assessment and census surveys	Surveys and individual consultations to be conducted. Summary of Resettlement Plan to be disclosed in Tamil in accessible locations to displaced persons, particularly vulnerable stakeholders.	Census and socioeconomic surveys are completed. PID has conducted one round of consultations in March 2022 and will conduct consultations throughout the resettlement plan implementation.
	Formulating compensation Measures and rehabilitation measures	Based on census surveys, the entitlements will be shared through discussions and sharing the resettlement plans with displaced persons.	PID will conduct all discussions, meetings and workshops and will invite all secondary stakeholders.
	Disclosure of final entitlements and rehabilitation packages	Web disclosure of the resettlement plan. Dissemination of translated summary resettlement plans to all stakeholders before final disclosure.	The PID will undertake all activities related to dissemination of the resettlement plan. All the comments and suggestions made by DPs will be documented.
Resettlement Plan implementation and monitoring	Relocation and rehabilitation, livelihood restoration	Addressing any issues which arise or concerns raised by affected persons during shifting, or relocation or deciding on the choices of training programs or availing eligible assistance	PID/ PMU
	Monitoring of	Monitoring and guidance to PIDs on	PMU/ EMA

Subproject Phase	Activities	Details	Responsible Agency
	resettlement plan implementation	resettlement plan implementation. Helping PIDs to set up systems for monitoring and reporting on resettlement plan implementation	

EMA= external monitoring agency; PID= project implementation division; PMU= project management unit; ULB= urban local body.

V. GRIEVANCE REDRESS MECHANISM

59. A project specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns associated with the project.

60. A common GRM will be in place for social, environmental, or any other grievances related to the investment program. The resettlement and initial environmental examinations will follow the GRM described below. The GRM will provide an accessible and trusted platform for receiving and facilitating the resolution of affected persons' grievances related to the investment program. The multi-tier GRM for the investment program is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

61. The project area-wide public awareness campaigns will ensure that knowledge of the grievance redress procedures is generated. The PID will conduct awareness campaigns to ensure that all affected persons and vulnerable households, including those who are not literate, are made aware of grievance redress procedures and entitlements.

62. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/ suggestion boxes to be installed by IRSHUPSP or by e-mail, or by registering complaints on the TNUHDB website or by post, or by writing in a complaints register in the PID office. Careful documentation of the name of the complainant, date of receipt of the complaint, address/ contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The PID social and environmental officers will have the overall responsibility for timely grievance redress on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party. A copy of a proposed outline of a grievance registration form is given in Appendix 8. All the documents made available to the public will include information on the contact number, address and contact person for registering grievances, and will be disseminated throughout the program area by the PID.

A. Existing TNUHDB Grievance Mechanism

63. TNUHDB has various methods for grievance redress for slum encroachers or the general public affected by TNUHDB activities; these are structured to facilitate ease in submitting a grievance by any affected person / aggrieved petitioner and redress the grievances in an expeditious, fair and sympathetic manner.

- (i) Submission of grievance petitions in Division Office: The residents of the TNUHDB housing units submit the grievance petitions related to maintenance of

housing units, allotment of housing units, etc. to the Executive Engineers¹⁶. The Executive Engineers through the Assistant Executive Engineers and the Assistant / Junior Engineers redress the grievances submitted by the residents of the housing units.

- (ii) Public Grievance Redressal Centre in Board Office, Chennai: The public submits the grievance petitions in the Public Redressal Centre located in the Board Office. The petitions are forwarded to the concerned Superintending Engineer, Executive Engineer or the Estate Officer for redressal. The reply to the petitioner is sent after the redressal of grievance.
- (iii) Submission of grievance petitions to the Managing Director, TNUHDB: The Managing Director, TNUHDB meets the public daily to receive the grievance petitions. The petitions are forwarded to the concerned Superintending Engineer, Executive Engineer or the Estate Officer for redressal. The reply to the petitioner is sent after the redressal of grievance.
- (iv) Online Grievance Redressal System of TNUHDB in Chennai City: This is functioning in Chennai City only as of now. The grievance petitions received in the Board office are forwarded online to the concerned Divisions and redressal of grievances is monitored.
- (v) Chief Minister's Special Cell¹⁷: The grievance petitions are filed online through Chief Minister's Special Cell portal by the affected person / aggrieved petitioner. The filed grievances related to TNUHDB are forwarded to the Public Relations Officer, TNUHDB. For the Divisions within Chennai, the copy of the petition is sent to the concerned Division Executive Engineer. For the divisions outside Chennai, the scanned copy of the grievance petition is forwarded through Division Office's email and a copy is dispatched through post for immediate redressal of the grievance to the Division Executive Engineer. After resolving the grievances, the Executive Engineer / Estate Officer sends the reply to the affected person / aggrieved petitioner and the copy of the same is communicated to the Public Relations Officer at TNUHDB. On the receipt of the same, the Public Relations Officer closes the grievances through the online portal of the Chief Minister's Special Cell.

64. Any IRSHUPSP specific grievance which comes in through TNUHDBs existing systems will be routed back to the project specific GRM to level 1.

B. Proposed IRSHUPSP Grievance Mechanism

65. Given the above options, the aggrieved person can choose any of the abovementioned processes or opt to go through the project specific grievance redress mechanism which will be established for IRSHUPSP. In case of grievances that are immediate and urgent in the perception of the complainant, the Animator/Community Officer/Assistant Engineer from PID will provide the most easily accessible or first level of contact for the quick resolution of grievances. Contact phone numbers and names of the concerned staff and contractors, will be posted at all

¹⁶There are 21 Divisions in TNUHDB each headed by an Executive Engineer; the Executive Engineer maintains the housing units of TNUHDB within the jurisdiction of the Division.

¹⁷Chief Minister's Special Cell functions as the Hon'ble Chief Minister's Grievance Redressal forum open to public from all walks of life. The petitions are sent to the respective Departments and replies are fed into the online monitoring system. The Departments have been sensitized on the necessity for prompt and effective disposal of the petitions. Review meetings are routinely convened with the nodal officers of each Department/ District so that offices that delay are made accountable. Web-link: <http://cmcell.tn.gov.in/>

construction sites in visible locations. A representative of affected persons from each settlement will be a special invitee when grievances of a particular settlement are being discussed by the GRC.¹⁸

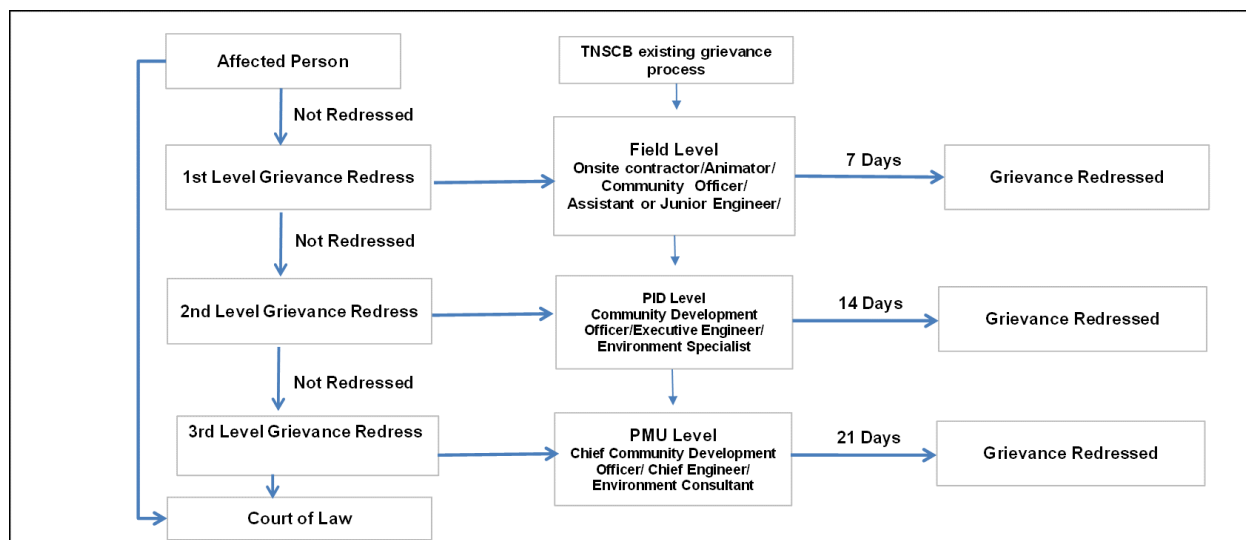
- (i) **1st level grievance.** The on-site Contractor / Animator/ Community Officer/Assistant or Junior Engineer of the PID(Environment/Social Cell) will receive and record the complaint at the subproject site. Alternatively, the complaint can be registered by phone call, message, email, or on the TNUHDB website and this will be reverted to the onsite personnel for 1st level resolution. The complaint will be reviewed and the on-site contractor/ animator / Community Officer / Assistant or Junior Engineer of the PID(Environment/Social Cell) will try to resolve the issue on-site in consultation with the aggrieved party. This will be done within 7 days of receipt of a complaint/grievance.
- (ii) **2nd level grievance.** All grievances that cannot be redressed within 7 days at the field/ level will be brought to the notice of the Community Development Officer of the PID/Environmental Specialist of the Environment Cell and the Executive Engineer in the PID. The PID Community Development Officer/ Environmental Specialist of the Environmental Cell and the PID Executive Engineer (PID Head) will resolve the grievance within 14 days of receipt of a complaint/grievance.
- (iii) **3rd level grievance.** If the grievance is not resolved at PID Community Development Officer level/ Environmental Specialist/ Executive Engineer (PID Head), the grievance will be referred internally to Chief Community Development Officer / Environmental Consultant of PMU / the Chief Engineer of IRSHUPSP. The grievance at this level will be resolved within 21 days of its receipt.

66. The project GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. The GRM will be set up prior to start of construction.

67. In the event that the established GRM is not in a position to resolve the issue, the affected persons can also use the ADB Accountability Mechanism by directly contacting (in writing) the complaint receiving officer at ADB headquarters or the ADB India Resident Mission. The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The ADB Accountability Mechanism information will be included in the project information document to be distributed to the affected communities, as part of the project GRM.

Figure 3: Grievance Redress Process

¹⁸ Any travel expenses incurred by affected persons and their representatives (special invitees) to attend the GRC meetings shall be covered under the budgetary provision made for GRC.



68. **Record-keeping:** The PID will keep records of grievances received, including contact details of the complainant, the date the complaint was received, the nature of the grievance, agreed corrective actions and the date these were effected and the final outcome. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PID office, as well as reported in monitoring reports submitted to ADB on a quarterly basis. All resolutions shall be communicated to the aggrieved party/complainant(s).

69. **Periodic review and documentation of lessons learned.** The PMU will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the program's ability to prevent and address grievances.

70. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/ information dissemination) will be borne by the PID.

VI. LEGAL FRAMEWORK

71. The policy framework and entitlements for IRSHUPSP are based on a combination of The Tamil Nadu Protection of Tanks and Eviction of Encroachment Act 2007, and ADB's SPS. The salient features of legal frameworks are summarized in the following sub-sections.¹⁹

A. Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007

72. The Government have enacted the 'Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007 with a view to provide measures for checking the encroachment, eviction of encroachments in tanks and protection of such tanks which are under the control and management of Public Works Department. The Government has also made the 'Tamil Nadu Protection of Tanks and Eviction of Encroachment Rules, 2007' to the said Act. The Act and

¹⁹ Review of the Tamil Nadu Slum Areas (Improvement and Clearance) Act, 1971, was also done. This Act will not be used for IRSHUPSP, as it is with reference to in situ development and this project deals with relocation. The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Bill, 2014 was also reviewed. The Act provides for protection of livelihoods rights, social security of street vendors, regulation of urban street vending in the country and for matters connected therewith or incidental thereto. The Act will hold good for those who have the Vending Certificate. However, IRSHUPSP will not impact street vendors.

Rules have been brought into force with effect from 1 October 2007. This Act provides the platform for removing of encroachments from water bodies, which are causing flooding and are a hazard to those living along the course. Due to climatic reasons such cyclones, droughts which affect the state of Tamil Nadu, the GOTN proposes to restore the water storage tanks, ponds and lakes, to its original status.

73. There have been various judgments of the High Court of Madras directing the State Government to protect all water bodies. The relevant sections of the High Court judgments are summarized below.

- (i) High Court of Madras in W.P.No.1294 of 2009 – TK Shanmugam vs GOTN – Judgement on 30 October 2015.
 - (a) To state the least, the Government Orders with particular reference to regularization of encroachment in water bodies is a clear breach of the public trust reposed on the Government which is enjoined upon a duty to protect the same.
 - (b) But unfortunately, the State, by passing the above said Government Orders, actively encourages encroachers of water bodies, to indulge in illegal and unlawful activities and also bent upon regularizing their possession which has to be deprecated.
 - (c) The tanks which do not fall within the purview of the Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007, also require protection from encroachment and any encroachment made in such tanks or water bodies have to be removed by following the provisions of the Tamil Nadu Land Encroachment Act, 1905.
- (ii) High Court of Madras in W.P.No.1295 of 2009 – TK Shanmugam vs GOTN – Judgement on 27 November 2015.
 - (a) Cases of encroachment on water bodies are really alarming. Water bodies are potential source for drinking water for human and cattle. Only with a view to protect the same and to help the environment and develop ecology, the Government has enacted the Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007 (Tamil Nadu Act 8 of 2007). The very object of the Act is to find the exact boundary of each Tank in Tamil Nadu and also to detect encroachments for eviction as per the procedure laid down in the said Act. However, there are instances where the public raised fingers against the Government also when it has forgotten the laws meant for preserving water bodies and attempted to fill up those natural streams under the guise of development. Occupation of the water bodies by way of encroachment will deprive water to the public in larger interest ignoring the Public Trust Doctrine.
 - (b) It has become inevitable for this Court to put on record that the authorities in power cannot destroy the water bodies or water courses formed naturally for the benefit of mankind forever and it is beyond the power of the State to alienate or re-classify the water bodies for some other purposes without compensating the effect of such water bodies.
 - (c) Having regard to the acute water scarcity recurring in the State of Tamil Nadu as a whole, we feel that a time has come where the State has to take some definite measures to restore the already ear marked water

storage tanks, ponds and lakes, to its original status as part of its rainwater harvesting scheme, which has already been initiated.

- (iii) High Court of Madras in W.P.No.26364 to 26376 of 2017 - Judgment on 10 October 2017.
 - (a) Kuttai Poramboke, Pond Poramboke and other Poramboke lands belongs to government are to be preserved for protecting the Environment and for usage of land for public at large.
- (iv) High Court of Madras in W.P.No.33883 of 2013 Judgment on 11 September 2018.
 - (a) District Collector, Kanchipuram is directed to issue suitable orders / instructions / circulars to all concerned officials to initiate immediate action to all concerned officials to initiate immediate action to evict all such encroachers in government poramboke lands, water bodies, water resources within his jurisdiction by following the procedures contemplated under the provisions of Tamil Nadu Land Encroachment Act, 1905 and Tamil Nadu Protection of Tank and Eviction of Encroachment Act, 2017 whichever is applicable.

B. ADB's Safeguard Policy Statement, 2009

74. The ADB's SPS, recognizes and addresses involuntary resettlement impacts and requires the preparation of a resettlement plan in every instance where involuntary resettlement occurs. The ADB policy requirements are:

- (i) Avoid or minimize impacts where possible;
- (ii) Consultation with the displaced persons in project planning and implementation;
- (iii) Payments of compensation for acquired assets at the replacement cost;
- (iv) Ensure that no one is worse off as a result of resettlement and would maintain at least their original standard of living;
- (v) Resettlement assistance to displaced persons, including non-titled persons; and
- (vi) Special attention to vulnerable people/ groups.

75. For any ADB operation requiring involuntary resettlement, resettlement planning is an integral part of project design, to be dealt with from the earliest stages of the project cycle. The main policy principles of the SPS are:

- (i) Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.
- (ii) Carry out meaningful consultations with displaced persons, host communities, and concerned NGOs. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and landless (those without legal title to land) and ensure their participation in consultations.

Establish a grievance redress mechanism to receive and facilitate resolution of the displaced persons' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.

- (iii) Improve, or at least restore, the livelihoods of all displaced persons through: (i) land-based resettlement strategies when affected livelihoods are land-based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods; (ii) prompt replacement of assets with access to assets of equal or higher value; (iii) prompt compensation at full replacement cost for assets that cannot be restored; and (iv) additional revenues and services through benefit sharing schemes where possible.
- (iv) Provide physically and economically displaced persons with needed assistance, including: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.
- (v) Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.
- (vi) Develop procedures in a transparent, consistent, and equitable manner if land acquisition is through negotiated settlement to ensure that those people who enter into negotiated settlements will maintain the same or better income and livelihood status.
- (vii) Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of non-land assets.
- (viii) Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.
- (ix) Disclose a draft resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to displaced persons and other stakeholders. Disclose the final resettlement plan and its updates to displaced persons and other stakeholders.
- (x) Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project's costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.
- (xi) Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.
- (xii) Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan

have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports.

C. Comparison of the ADB's SPS and the Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007(TNPTEEA)

76. A comparison of the provisions of ADB's SPS and the Tamil Nadu Protection of Tanks and Eviction of Encroachment Act, 2007, (TNPTEEA) and the issues which need to be addressed has been given in Table 19.²⁰ The TNPTEEA does not address any of the key ADBs SPS requirements. The Project will have to follow this Resettlement Framework and Entitlement Matrix to ensure that the gaps between the ADBs SPS requirements and the TNPTEEA are complied with. A comparison of the key requirements is made, and gap filling measures are indicated in the table below.

77. The Resettlement Framework addresses the following identified gaps:

- (i) screening past, present and future involuntary resettlement impacts and risks: The Project will undertake screening of all subprojects using the ADB involuntary resettlement checklist, to identify past, present and future involuntary resettlement impacts and risks;
- (ii) gap in carrying out meaningful consultations
- (iii) gap in establishing a project-level GRM. The Project will establish project-level GRM
- (iv) gaps in improvement /restoration of affected livelihoods
- (v) providing assistance for relocation
- (vi) define vulnerable group as per SPS, policy principle 2. The Entitlement Matrix outlines assistance for vulnerable groups, as defined by ADB policy;
- (vii) third party monitor of negotiated purchases. To ensure a fair and transparent process, a third party independent monitor will be hired to certify the process the negotiated purchase was undertaken in a transparent, consistent and equitable manner.;
- (viii) disclosure of resettlement plan and resettlement framework to affected persons; and
- (ix) frequency of resettlement plan monitoring: frequency of monitoring will be specified and will be quarterly.

Table 20: Comparative Analysis of SPS, 2009 and applicable State Government Policies

S.No	Policy Principles	ADB SPS, 2009	TNPTEEA,2007 and GO (Ms) No 281 of Revenue and Disaster Management Department on negotiated settlement	Measures to bridge the gaps in compliance with SPS requirements
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²⁰ No land acquisition is envisaged in this project, hence the Right to Fair Compensation and Transparency in Land Acquisition and Resettlement and Rehabilitation Act, 2013 will not apply. The gap analysis in this resettlement framework focuses on applicable policies of Government of Tamil Nadu.

S.No	Policy Principles	ADB SPS, 2009	TNPTEEA,2007 and GO (Ms) No 281 of Revenue and Disaster Management Department on negotiated settlement	Measures to bridge the gaps in compliance with SPS requirements
1	Project screening and categorization	Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.	No specific requirement for screening mentioned.	Screening will be conducted for each subproject, in accordance with the involuntary resettlement safeguards principles adopted in the resettlement framework
2	Meaningful consultation and grievance redress	Carry out meaningful consultations with affected persons, host communities, and concerned non-government organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the affected persons' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.	No requirement for consultation and grievance redress.	The identified gap related to the need for meaningful consultations will be addressed in accordance with the consultation, participation and disclosure requirements specified in the resettlement framework. In addition, the Consultation and Participation Plan developed for the project includes a social preparation phase and community engagement through the period of design and implementation. Project level GRM will be established.
3	Measures to restore or improve livelihood	Improve, or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with	No specific requirement related to restoration or improvement of livelihoods mentioned.	Will be addressed according to provisions of the resettlement framework and the agreed Entitlement Matrix for this project. Livelihood restoration measures will be

S.No	Policy Principles	ADB SPS, 2009	TNPTEEA,2007 and GO (Ms) No 281 of Revenue and Disaster Management Department on negotiated settlement	Measures to bridge the gaps in compliance with SPS requirements
		access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.		developed to improve or restore livelihood of affected persons at least to the pre-project level. The livelihoods promotion component of the Graduation Program will be a supporting measure to bridge the gap for eligible households, aimed to restore and improve their livelihoods post relocation. It will add to the existing provisions through an assessment-based viable livelihood plan, technical training, and close mentoring and monitoring to ensure sustainable livelihoods.
4	Relocation assistance	Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.	None specified.	This gap will be addressed and relocation assistance provided according to provisions in the resettlement framework and the agreed Entitlement Matrix.
5	Measures for vulnerable groups	Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least	No specific measures for vulnerable	Will be addressed according to the RF and Entitlement Matrix.

S.No	Policy Principles	ADB SPS, 2009	TNPTEEA,2007 and GO (Ms) No 281 of Revenue and Disaster Management Department on negotiated settlement	Measures to bridge the gaps in compliance with SPS requirements
		national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.	mentioned.	<p>Definition of vulnerable groups takes into account ADB SPS policy principle 2 (in addition to the government recognized categories).</p> <p>Livelihood restoration measures will be developed to improve or restore livelihood of the vulnerable persons to at least the national minimal level</p>
6	Negotiated settlement	Develop procedures in a transparent, consistent, and equitable manner if land acquisition is through negotiated settlement to ensure that those people who enter into negotiated settlements will maintain the same or better income and livelihood status.	The GOTN GO (Ms) No 281 of Revenue and Disaster Management Department dated 07.09.2017 which is applicable, does not specify the need for third party certification.	Will be addressed according to the resettlement framework. Third party certification of any negotiated settlement will be undertaken to meet the requirement of ADB SPS.
7	Compensation for informal settlers	Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of non - land assets.	No specific provisions.	Will be addressed according to the resettlement framework and Entitlement Matrix.
8	Resettlement plan	Prepare a resettlement plan elaborating on displaced persons' entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.	No specific rules mentioned.	Will be addressed according to provisions of the resettlement framework.
9	Information disclosure	Disclose a draft resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to affected persons and other	No specific rules mentioned.	Will be addressed according to disclosure procedures defined in the resettlement framework.

S.No	Policy Principles	ADB SPS, 2009	TNPTEEA,2007 and GO (Ms) No 281 of Revenue and Disaster Management Department on negotiated settlement	Measures to bridge the gaps in compliance with SPS requirements
		stakeholders. Disclose the final resettlement plan and its updates to affected persons and other stakeholders.		
10	Cost of involuntary resettlement	Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project's costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.	No specific rules mentioned.	Will be addressed according to the resettlement framework and Entitlement Matrix.
11	Timing of compensation	Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.	No specific rules mentioned.	Will be addressed according to the resettlement framework.
12	Loss of common property resources	Replacement or restoration of the affected community facilities.	No specific rules mentioned.	Will be addressed according to the resettlement framework and Entitlement Matrix
13	Monitoring and Reporting	Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports.	No specific rules mentioned.	Will be addressed according to the resettlement framework

ADB = Asian Development Bank, GRM = grievance redress mechanism, RF = resettlement framework, SPS= Safeguard Policy Statement

VII. ENTITLEMENTS, ASSISTANCE AND BENEFITS

78. **Type of Losses and Affected Person Category:** IRSHUPSP is likely to have five types of impacts that will require compensation and/or mitigation measures: (i) physical displacement / relocation impact; (ii) loss of assets and structures (residential/commercial); (iii) permanent loss of income or livelihood; (iv) collective impacts on groups, such as loss of common property resources; and (v) loss of trees. The affected persons who fall in the category of those who have no recognisable legal right or claim to the land they are occupying (*non-titleholders occupying*

government land) will be eligible for compensation and resettlement assistance including livelihood restoration support in accordance with the principles of the resettlement framework.

D. Eligibility Status of Displaced Persons

79. The project will extend compensation, assistance, and benefits to all families identified by TNUHDB in the settlements that are identified by the District administration as encroachments of water bodies and bunds of river, and facing high risk of flooding. These will include all persons occupying land over which they neither have legal title, nor have claims recognized or recognizable under national law.

E. Entitlements, Assistance and Benefits

80. The project Entitlement Policy addresses the direct and indirect impacts of the project on displaced persons, households and communities. The most direct and immediate impacts are those associated with loss of livelihood and loss of residences. Other losses include loss of other assets such as cattle sheds, water sources etc. and common property resources. Mitigation is provided through compensation and assistance to the displaced persons, households on the basis of this policy framework adopted by the IRSHUPSP. The policy provides mitigation for:

- (i) Loss of assets, including house or work place;
- (ii) Loss of livelihood or income opportunities;
- (iii) Collective impacts on groups, such as loss of community assets, common property resources, and others; and
- (iv) Temporary disruptions due to the loss of access.

81. Compensation eligibility is limited by a cut-off date. For this project, the cut-off date will be the date of identification and marking of structures (in the sending sites) of families to be relocated, by the TNUHDB.

82. The project Entitlement Matrix (see Table 21) identifies and lists the various types of losses resulting out of the project and specific compensation and resettlement packages for each category.

Table 21:Entitlement Matrix²⁸

Type of Loss	Identification of Displaced Persons	Details
A.	Assets Lost by Non-titleholders	
A.1 Loss of structure)	Residential - Occupier of the Structure (Owner or Tenant (with or without written tenancy/lease documents) ²⁹	<ol style="list-style-type: none"> 1. Alternate housing to be provided by TNUHDB. Alternate housing shall be provided only for the occupant of the structure. 2. Shifting assistance of ₹10,000 as one time shifting cost to be provided by TNUHDB 3. Subsistence allowance of ₹2500 per month will be provided for 12 months 4. Right to salvage material³⁰ from demolished structure, erected by occupants. 5. Will be given 7 days' notice to shift any assets from the sending site to the relocation site. 6. Notice period of 30 days to shift.
	Commercial - Occupier of the structure (Owner or Tenant (with or without written tenancy/lease documents) ³¹	<ol style="list-style-type: none"> 1. Shifting assistance of ₹10,000,as one-time shifting cost to be provided by TNUHDB 2. ₹2500/- as subsistence allowance for minimum 3 months for tenants and 6 months for owner occupier. 3. Replacement cost of structure to the owner of the structure on submission of evidence of ownership³² 4. Training would be provided for income generating vocational training and skill improvement options based on the choice of the displaced person up to ₹15,000 per household. This cost would be directly paid by the project to the training institute and purchase of income generating assets up to ₹50,000. There will be an age restriction on training based on the option of training selected. 5. Right to salvage material³³ 6. Will be given 7 days' time to remove any assets after shifting. 7. Notice period of 30 days will be given for shifting.
	Absentee Owner of the	1. Replacement cost of the structure on submission of evidence of ownership. ³⁵

²⁸All unit rates will be updated annually on the 1st of April in accordance with appropriate price indices.

²⁹In case owners and tenants (non-titleholders) are residing in the same structure, both will be eligible for an alternative house at the relocation site. In case the structure is occupied only by a tenant, the owner of the structure will be compensated for the structure at replacement cost.

³⁰ Asbestos cannot be salvaged.

³¹The business operator (owner or tenant) will be eligible for livelihood restoration assistance. The owner of the structure will be eligible for structure compensation at replacement cost and rental assistance.

³²Evidence of ownership will include any government document including electricity bill or the report of the officials of the Revenue Department on the ownership of the structure. The project will facilitate the absentee owners to get the report from the Revenue Department officials.

³³ Asbestos cannot be salvaged.

Type of Loss	Identification of Displaced Persons	Details
	structure ³⁴	2. Assistance for loss of rental income will be provided at ₹3000 per month for 3 months. A lump sum amount of ₹9000 will be paid.
A.2 Loss of crops	Non-titleholders	1. Displaced persons will be notified and given 60 days' advance notice to remove crops. 2. Compensation for one years' net harvest for seasonal crops at prevalent market rates, in consultation with the Department of Agriculture; Compensation will be provided only if the crops are planted by the displaced person.
A.3 Loss of trees		1. Compensation at market value of timber in case of timber-bearing trees, in consultation with Department of Forests; Compensation will be provided only if the timber bearing trees are planted by the displaced person. 2. For fruit bearing trees compensation to be calculated at market value of annual net product multiplied by the number of productive years remaining in consultation with Department of Horticulture. Compensation will be provided only if the fruit bearing trees are planted by the displaced person.
B.	Loss of Livelihood	
B.1. Loss of primary source of income	Occupier	1. Training would be provided for income generating vocational training and skill improvement options based on the choice of the displaced person at ₹15,000 per household. This cost would be directly paid by the project to the training institute and purchase of income generating assets up to ₹50,000. There will be an age restriction on training based on the option of training selected.) 2. Preference for employment opportunity for affected persons in the project construction work, if so desired by them.
	Wage-earning employees indirectly affected - those working in businesses such as petty shops, eateries	1. One time subsistence grant equivalent to 90 days of minimum wage as per notified GoTN rates. 2. Preference for employment opportunity for displaced persons in the project construction work, if so desired by them.
C.	Loss of Common Property Resources	

³⁵ Evidence of ownership will include any government document including electricity bill or the report of the officials of the Revenue Department on the ownership of the structure. The project will facilitate the absentee owners to get the report from the Revenue Department officials.

³⁴This pertains to absentee owners of both occupied and unoccupied structures.

Type of Loss	Identification of Displaced Persons	Details
C.1. Loss of common property resources		<ol style="list-style-type: none"> 1. TNUHDB will provide for public spaces, parks, playgrounds and community halls, rations shops (public distribution systems) at the relocation site. 2. Replacement or restoration of the affected host community facilities, in the relocation site, or which needs to be shifted due to design requirements in the vicinity of the relocation site, will be done in consultation with the community using the community facility, these will include religious structures, shrines etc.
D.	Additional support to Vulnerable ³⁶ Families/Persons	<ol style="list-style-type: none"> 1. Vulnerable families will be given priority for potential employment in the project construction activities. 2. Persons with disabilities will be given preference for housing units on the ground floor. 3. All vulnerable households identified for the Graduation program³⁷ will be eligible for support as indicated under the program, including the benefits mentioned under this category, with preference given to woman member of the household. 4. Additional one-time assistance of ₹5000 per family will be paid to families with multiple vulnerabilities.³⁸
E.	Temporary Impacts	
E.1. Temporary impacts during construction		<ol style="list-style-type: none"> 1. The contractor is liable to pay damages to assets/trees/crops in private/public land, caused due to civil works, in line with the provisions of this Entitlement Matrix. 2. The contractor should obtain prior written consent from the landowner and pay mutually agreed rental for use of private land for storage of material or movement of vehicles and machinery or diversion of traffic during civil works 3. Time bound restoration of land to its previous or better quality; and 4. The project will maintain access to all properties and businesses at all times.
E.2. Temporary disruption to residences and shops during laying of water/sewer mains		<p>Residential</p> <ol style="list-style-type: none"> 1. Temporary access to residences with adequate safety measures 2. 30 days advance notice regarding construction activities, including duration of and type of disruption <p>Commercial shops/vendors/kiosks</p>

³⁶Vulnerable families are those families with physical/mentally disabled members, women headed families, below the poverty line families, including elderly (above 60 years), women and children (destitute and orphans, the Indigenous Peoples, the landless and those without legal title to land, scheduled caste and scheduled tribe families and transgender.

³⁷The Graduation Program will assess all vulnerable persons/ families and cover persons/ families with multiple vulnerabilities and those losing their primary source of income.

³⁸Families with multiple vulnerabilities are families with more than one type of vulnerability. Types of vulnerability are defined in footnote 36.

Type of Loss	Identification of Displaced Persons	Details
		<ol style="list-style-type: none"> 1. 30 days advance notice regarding construction activities, including duration of and type of disruption 2. All temporarily disrupted commercial activities will be provided with temporary access for continuance of business or cash assistance for loss of income calculated for actual number of days of livelihood disruption or if income loss cannot be assessed, cash assistance based on minimum wages for the duration of actual number of days of livelihood disruption.³⁹
E.3. Impact to encroached structures such as ramps, steps and projection of buildings.		<ol style="list-style-type: none"> 1. 30 days advance notice regarding construction activities, including duration of and type of damage to structure 2. Compensation at replacement cost for the encroached structure without depreciation, or restoration of the affected structure during civil works
F.	Other Unanticipated Impacts	
F.1. Any unanticipated impacts due to project intervention		<ol style="list-style-type: none"> 1. Any unanticipated impacts of the project will be documented and mitigated based on the spirit of the principles agreed upon in this resettlement framework.

₹= Indian Rupee; TNUHDB= Tamil Nadu Urban Habitat Development Board.

³⁹The project will provide alternate space for kiosks and vendors who can relocate to an adjacent place for continuance of business.

VIII. RELOCATION OF HOUSING AND SETTLEMENTS

A. Provision for Relocation

83. TNUHDB will provide housing units to all affected families being physically displaced from the six settlements identified by the District administration as encroachments on river bank and prone for flooding. The affected families eligible for housing units in the multi storied (G+3) housing units proposed in Pallipalayam resettlement site will include both owner occupiers and tenant occupiers identified by TNUHDB. The settlements proposed for relocation are at a distance of about 3 km from the resettlement site.

84. Structures belonging to absentee owners, those who have rented out the structure owned by them and live outside the settlement or the structure is dilapidated or not in use and commercial structure owners will be entitled for compensation for structure at replacement cost and other rehabilitation assistance as per the eligibility and entitlement as in the resettlement framework.

B. Relocation Strategy

85. The physically displaced families will be consulted on the various amenities and facilities proposed in the resettlement site, including the type design and layout. The resettlement site has been identified adjacent to the Municipality limits, ensuring proximity to work place and access to social infrastructure facilities. Demolition of the existing settlements will take place only after the relocation of the affected families to the houses in the resettlement site that is developed with all amenities. Transitional arrangement will not be required as demolition of the existing settlements will take place only after all affected families relocate to the newly built houses.

C. Development of Resettlement Sites

86. The Pallipalayam resettlement site has been selected considering its suitability for housing purpose and the land belonging to the government is free from encumbrance and is already transferred to TNUHDB. The resettlement site is 2.9 kilometers from the central bus terminus, 2 kilometer from the primary health center, 4.8 kilometers to Erode town (the major textile market in the region), 2 kilometer to the fair price shop and the weekly market, primary school is at 1 km distance and higher secondary school is at 2 kilometers, of 500 meter to 1.5 kilometer, government higher secondary school at 3 kilometer distance and the Pallipalayam town, a textile manufacturing town is at 2 kilometers. The houses in the resettlement site will have piped water supply and each house will have a toilet and bath, with wastewater conveyed through a sewer system and well-ventilated kitchens. Ninety five percent of the affected families in the sending settlements presently have access to drinking water through public tap, 9percent have separate toilet and 90percent have separate bath. All amenities are accessible within a distance of 2 km.

87. Houses will be allotted to the affected families through public draw of lots and as far as possible ground floor will be assigned to families with disabled and elderly members. Further, appropriate measures will be taken to integrate the host population and enhance the various common facilities for smooth integration of host population with relocated population. Houses will be allotted in the joint name of the lady of the house and her spouse and allotment letters will be issued at the time of relocation. Proceedings for registration of housing unit will be issued by TNUHDB within 5 years from the date of allotment or relocation, whichever is earlier.

Registration will be in the name of the lady of the house and/or the spouse, who will bear the nominal registration charges, as per current practice in all TNUHDB projects. This will also serve as their contribution towards the housing unit provided by the project. The process of registration will be facilitated by the concerned Estate Officer, TNUHDB.

88. Further, to ensure that the 'host' and 'relocated' communities coexist amicably, the common spaces and amenities in the resettlement site will be extended for use of both the host and the relocated communities and suitable employment opportunities to the relocated community will be provided through the host communities. These will be discussed in detail with the host communities during the consultation and participation process. Mutual dependence is expected to foster co-existence.

89. TNUHDB will ensure that all persons who are to be relocated are not evicted and will be informed and consulted and their participation will be ensured. Only persons residing in hazard prone areas which incur flooding due to their close proximity to water body will be relocated. All compensation and assistance will be extended before relocation. The housing units will be ready with all services operational such as electricity and water supply and will have access to services such as schools and medical facilities within the prescribed social infrastructure access norms. School examination timings will be avoided and PID will facilitate school admissions near the resettlement site

IX. INCOME, RESTORATION AND REHABILITATION

A. Loss of Livelihood in this Subproject

90. The subproject will cause loss of livelihood to affected families losing their income derived from the petty shop attached to the house. The subproject causes significant impact to 2residence cum commercial shop owners, who will be supported through the graduation programme for livelihood restoration. In order to prevent loss of livelihoods to relocated vulnerable households, the Graduation Program will provide support for livelihood restoration in the form of a market-viable asset along with technical skills training to manage the asset or access employment opportunities, while also supporting rehabilitation of social welfare.⁴⁰

B. Entitlements for Loss of Livelihood

91. The affected persons losing livelihood will be assisted to improve or at least restore their income levels to pre-project level. The subproject entitlements for loss of livelihood include the following entitlements in accordance with the resettlement framework.

- 1. Loss of livelihood to Petty Shop of Residence cum Commercial Category**
 - (i) cash compensation at replacement cost for affected structure of the shop at scheduled rates without depreciation, on submission of evidence of ownership;
 - (ii) right to salvage affected materials,
 - (iii) Shifting assistance of ₹10,000

⁴⁰These slums are largely residential and there are two of petty shops attached to the house. There are no major commercial activities in these slums. Further, the families in the settlements proposed for relocation who are involved in fishing will continue to have access to the riverfront for fishing activities and will also be supported in alternate livelihoods which they can take up during lean seasons.

- (iv) ₹2,500/- as subsistence allowance for 12⁴¹ months
- (v) Training would be provided for income generating vocational training and skill improvement options based on the choice of the displaced person up to ₹15,000 per household. This cost would be directly paid by the project to the training institute and purchase of income generating assets up to ₹50,000. There will be an age restriction on training based on the option of training selected;
- (vi) Will be given 7 days' time to remove any assets after shifting; and
- (vii) Notice period of 30 days will be given for shifting.

2. Additional Support to Vulnerable Persons

- (i) Vulnerable families will be given priority for potential employment in the project construction activities;
- (ii) Persons with disabilities will be given preference for housing units on the ground floor;
- (iii) Vulnerable households identified for the Graduation program will be eligible for support as indicated under the program, including the benefits mentioned under this category, with preference given to woman member of the household; and
- (iv) Additional one-time assistance of ₹5000 per family will be paid to families with multiple vulnerabilities.

C. Income Restoration Measures

92. The entitlement proposed for this subproject has adequate provisions for restoration of livelihood of the affected families. Income restoration schemes will be identified and implemented by the PID for those who face loss of livelihood and are not covered under the Graduation Program. In this subproject, the affected families are covered under the Graduation Program as they are also losing the residence and will be relocating to the resettlement site. Efforts will be made to provide employment to the affected persons during the construction phase by facilitating their engagement by the civil works contractor.

D. Graduation Program (Livelihood)

93. The Graduation approach is a holistic, time-bound, and carefully sequenced set of interventions to place households on an upward trajectory from poverty. This includes four key components: (i) social assistance in the form of grants for food support and other immediate needs such as health and education during transition in the relocation site; (ii) livelihood promotion through localized market assessment and household-level enterprise/employment matching; (iii) financial inclusion through financial literacy and improving access to savings and financial services to promote economic resilience; and (iv) social empowerment by improving social dynamics (including gender relations) in the families and communities. The implementation of this approach will build on existing programs and services of government, non-government, and private organizations in project sites and will adapt to local needs and settings. It will also include support to capacity-building of government staff and collaboration to execute relevant intervention.

⁴¹ Since the affected person is losing the residence cum shop, will be eligible for alternate housing and 12 months subsistence allowance

94. The Graduation Program will be integrated with the slum relocation program and bring in livelihood and social welfare interventions which will assist the people relocated to access economic opportunities and restore household overall household wellbeing (health, community integration, social dynamics, etc.). Combined, this will have a powerful effect to reduce the negative impacts of the relocation. The beneficiaries of the program will be the affected persons relocated under the subproject.

95. Further under the Graduation Program, a livelihoods impact survey or assessment post-resettlement is proposed. Additionally, the program design and planning phase entails a localized market assessment, aimed to collect key information about existing and potential livelihoods, markets, risks for the urban poor, and factors such as demand, competition, market saturation, services, regulations and policies governing the market. A skills and readiness assessment alongside determines the alignment of existing skills and resources, where applicable, within relocated households with viable livelihoods based on assessment. Together this ensures a sustainable livelihood approach for the relocated and the support required to undertake it. The Graduation Program aims to sufficiently restore the affected persons' livelihood and improve the standard of living of vulnerable households. Regular monitoring of livelihood activities and coaching around asset management and growth is also included as part of the Graduation program and will allow the project to capture key trends, challenges and successes of various livelihood pathways in the receiving sites.

96. The Graduation approach is a holistic, time-bound, and carefully sequenced set of interventions to place households on an upward trajectory from poverty. This includes four core pillars. The first pillar of social protection ensures that the most basic needs of households are met by smoothing consumption and providing safety nets and are finalized after an assessment to identify the key vulnerabilities of resettled households and a mapping of stakeholders to identify potential linkages. The second pillar of livelihood promotion ensures sustainable livelihoods through a localized market assessment and segmenting livelihood based on household profile, household skills and readiness assessment; enterprise matching and selection, and core training in technical, business management and/or vocational skills. The third pillar of financial inclusion builds participants' financial awareness and management skills and their ability to manage shocks and access a range of available financial services, including primarily savings groups. Lastly, social empowerment mechanisms are used to elevate the needs and concerns of marginalized vulnerable groups through community mobilization and leadership, improvement in intra-household dynamics, and investment in social issues awareness and positive behavior change through regular life skills training by Animators. The interventions under these four pillars are sequenced to provide a comprehensive support, keeping the needs and growth of participant households at the center. The typical Graduation program timeline is between 18 and 24 months. TNUHDB will implement the program through its PID Social Development and Resettlement Cell. The budget for livelihood assets, allowances, and staffing is already covered in the Resettlement Plan. Additional budget details on training, workshops, market assessment, other surveys, and monitoring are given in the GP budget as part of the Graduation Restoration Plan. Planning and design activities have been financed by ADB NGOC⁴² TA facility and are being executed with external technical support from World Vision International and BRAC.

⁴² NGO and Civil Society Centre (NGOC). <https://www.adb.org/who-we-are/ngos/main>

X. RESETTLEMENT BUDGET AND FINANCING PLAN

A. Introduction

97. The detailed budget estimates for the resettlement plan was prepared by the PMU, which is part of the overall project budget. The budget includes: (i) livelihood and income restoration and improvement; (ii) details of all assistance and compensation; (iii) administrative and staff training; (iv) cost for GRM and consultation/disclosure; and (v) monitoring costs. All resettlement costs will be borne by the GOTN and to be provided in a timely manner to ensure payment of all entitlements prior to displacement.

98. All entitlements will be paid directly into the individual accounts of displaced persons. The PID will be involved in facilitating the disbursement process and rehabilitation program, and will facilitate opening bank accounts for the displaced persons who do not have them.

99. All entitlements and costs presented in the entitlement matrix will be increased annually on the 1st of April in accordance with appropriate price indices.

B. Compensation

100. **Structures:** The compensation for structures have been arrived at based on PWD Schedule of Rates, 2019-2020.⁴³ The replacement cost of structure without depreciation has been taken as ₹8,980 per m² for permanent structure, ₹6,530 per m² for semi-permanent structure and ₹2,905 per m² of temporary structure. Additional 7.5 percent for internal water supply and 7.5 percent for internal sanitation for permanent and semi-permanent structures and 7.5 percent for internal electrical wiring for all type of structures is added to the m² rate before including an additional 5 percent for building in Municipal limits. Thus, the rate per m² of permanent structure is ₹11,551, the rate per m² of semi-permanent structure is ₹8,399 and the rate per m² of temporary structure is ₹3,279. During implementation, the TNUHDB Engineer will value each and every structure required to be compensated and will arrive at the replacement cost and these estimates are only for budgetary purpose.

101. Compensation for structure has been provided for commercial structures and structures belonging to absentee owners.

102. **Trees:** Compensation for trees will be based on their market value/replacement cost. Loss of timber bearing trees and fruit bearing trees will be compensated at their replacement cost and will be decided by the PID in consultation with the Departments of Forest or Agriculture or Horticulture as the case may be. Prior to relocation of the affected families, the compensation will be fully paid, and affected persons will have the opportunity to harvest trees within 15-days from the date of payment of compensation. For budgeting purpose, a lumpsum of ₹15,000 has been estimated to be the replacement cost of each tree (timber and fruit bearing). For the valuation of the timber trees, the age of the tree and for fruit bearing trees, the age of the tree and annual net product multiplied by the number of productive years remaining will be taken into account

⁴³ PWD Common Schedule of Plinth Area Rates for for the Valuation of Buildings for Rental Calculation Purpose by Public Works Department and for the purpose of Collection of Stamp Duty by Registration Department, dated 13 August 2020.

C. Assistance

103. The minimum wages have been based on 'The Minimum Wages Act, 1948 (Central Act XI of 1948) - Revision of minimum rates of wages for the employment in Shops and Commercial Establishments', Tamil Nadu GO. (2D) No. 14 of Labor and Employment (J1) Department dated 05 March 2019. The rate prescribed for shop assistant/helper for Zone-A (special grade Municipality) is ₹5,396 per month (26 days) along with dearness allowance as per the said notification. Therefore, the minimum wages including dearness allowance computed up to 01 April 2020, as stipulated in the said notification, is equivalent to ₹9,366 per month or say ₹360.19 per day (monthly wages to be divided by 26 days to arrive at daily wages as per the notification).

104. Provisional allocation for affected families, residential occupiers who would be relocated, covered under graduation program⁴⁴ has been made for 520 affected families. All other unit rates are as per the provisions contained in the entitlement matrix. Affected families will be provided with all assistances in line with the provisions contained in the entitlement matrix. Shifting assistance, subsistence allowance and assistance towards training and livelihood support are not incremental. For example, if an affected household loses shelter and commercial business in one lot, the family will get each of these allowances only once.

D. Compensation for Common Property Resources

105. Replacement or relocation cost for the common property resources has not been budgeted as these will be maintained at the same place by the Municipality.

E. Administrative Expenses

106. This subproject is Category A for involuntary resettlement and is required to be monitored by an external monitoring and evaluation agency / expert. Budgetary provision for external monitoring has not been made as the cost is proposed to be covered through a separate technical assistance. A lump sum budgetary provision of ₹10,00,000 has been made to meet administrative expenses of GRC. Further, a lump sum provision of ₹5,00,000 to meet disclosure expenses and a lump sum provision of ₹10,00,000 for staff training, in particular for training of the social unit of the PID, has also been budgeted. To cover the cost of field office to house the subproject SDRC, a lumpsum provision of ₹50,000 per month for two years period to cover rental, office equipment, stationery and communication has also been provided. The administrative cost of graduation program is estimated at ₹46,26,600.

F. Source of Funding and Fund Flow

107. Government will provide adequate budget for all compensation, rehabilitation and resettlement assistances and resettlement plan implementation costs from the counterpart

⁴⁴The value of the stipend for training and livelihood assets as well as the number of households that will receive these stipends are provisional figures that will be updated based on baseline data analysis. The Graduation team will review this data to understand which indicators are crucial to determine household vulnerability, and may include food security, access to services, current housing structures, ownership of durable assets, among others. Households will be segmented into different degrees of vulnerability, based on which a certain number of households may not require these stipends. Furthermore, a household skills and readiness assessment as well as a localized market assessment will help determine the appropriate value of assets and training costs per household, which would be within the amounts mentioned in the budget.

funding. The funds as estimated in the budget for a financial year and additional fund required based on revised estimates, shall be available at the disposal of the Managing Director, TNUHDB at the beginning of the financial year and made available by PMU. The PMU will ensure timely availability of funds to PID for smooth implementation of the resettlement plan. PMU will be responsible for ensuring full and timely payment to affected persons.

G. Resettlement Budget Estimates

108. The budget for this subproject is based on data and information collected during socio-economic surveys conducted in January 2021 and the unit rates worked out from the latest SOR. The total budget for the proposed subproject resettlement plan is estimated at ₹85.25 million. A detailed budget estimate is given in the following table.

Table 22: Budget Estimate

Item No	Item	Input Unit	Rate	Quantity	Amount
1	Compensation				
1.1	Temporary Structures (Absentee Owners)	Sq.m	3,279	96	314,784
1.2	Semi-permanent Structures (Absentee Owners)	Sq.m	8,399	1123	9,432,077
1.3	Permanent Structures (Absentee Owners)	Sq.m	11,551	142	1,640,242
1.4	Compensation for Trees	Numbers	15,000	48	720,000
2	Assistances				
2.1	Shifting allowance for residential occupiers of structure	One time	10,000	520	5,200,000
2.2	Subsistence allowance for residential occupiers of structure	One Time	30,000	520	15,600,000
2.3	Vulnerable Household assistance (multiple vulnerability)	One Time	5,000	390	1,950,000
2.4	Loss of rental assistance to absentee owners	LS	9,000	57	513,000
3	Administrative Expenses				
3.1	Training for staff	LS	-		1,000,000
3.2	External Monitoring	LS	-		-
3.3	GRC Expenses	LS	-		1,000,000
3.4	IEC and Disclosure	LS	-		500,000
3.5	Field Office	Monthly	50,000	24	1,200,000
	Sub Total A				39,070,103
4	Graduation Programme				
4.1	Provisional allocation for affected families (residential occupiers who would be relocated) covered under Graduation programme for livelihood support - Training for skill improvement component	One time	15,000	520	7,800,000
4.2	Provisional allocation for affected families (residential occupiers who would be relocated) covered under Graduation programme for livelihood support - Income generating asset	One time	50,000	520	26,000,000

4.3	Administrative Cost for Graduation Programme	LS	-	-	4,626,600
	Sub Total B				38,426,600
	Total (Subtotal A +B)				77,496,703
	Contingency at 10%				7,749,670
	Grand Total				85,246,373
	Total in Million INR				85.25

GRC= grievance redress committee; IEC= Information Education Communication; ₹ = Indian rupee.

XI. INSTITUTIONAL ARRANGEMENTS AND IMPLEMENTATION SCHEDULE

A. Implementation Arrangement

109. TNUHDB is the Implementing Agency (IA) and will be responsible for the management, coordination and execution of all the activities funded under IRSHUPSP. The GOTN has approved the formation of the Project Management Unit and Project Implementation Divisions for the project vide G.O.(2D) No.27, H&UD(SC2(2)) Department, dated: 12 February 2019 and G.O.(2D) No.95, H & UD (SC2(2)) Department dated:20 May 2020.The IRSHUPSP implementation arrangements are summarized in Figure 4and the implementation arrangements for Social Safeguards and Gender in Figure 5.

110. The Joint Managing Director/ Project Director will head the PMU of IRSHUPSP and be supported by technical, financial, safeguards and administrative staff. The PMU/ PID staff will mostly be drawn from TNUHDB, and if required, will also be seconded from the other government departments on deputation or hired as independent Consultants. Details on agencies responsible for resettlement plan activities are in Table23.

B. Project Management Unit

111. The PMU will be headed by Joint Managing Director/ Project Director and will be assisted by the Chief Engineer, the Superintending Engineer and the Executive Engineer. The PMU will design the infrastructure, manage the tendering of contracts, supervise the construction process, assure the technical quality of design and construction, and provide advice/ assistance on institutional capacity development. The PMU will appoint the contractors to build the infrastructure elements and will manage the construction and commissioning activities. PMU will have 5 teams:

- (i) Procurement Team will include Procurement Consultant (1); Assistant Executive Engineer (1); Assistant Engineer (3) and Draughtsman Grade – III (1).
- (ii) Project Planning Team will include Project Planning Officer/ Urban Management Specialist (1);Assistant Executive Engineer (1); Assistant Engineer (3); MIS Specialist (1); Town Planning Specialist (1) and Planning Assistant (2).
- (iii) Environment Team: will have an Environmental Consultant (1); Assistant Executive Engineer (1); Assistant Engineer (2).
- (iv) Social Impact Assessment Team: headed by the Chief Community Development Officer. Other members include Community Development Officer (1); Social Development Specialist (Gender) (1).
- (v) Finance Cell: headed by Financial Advisor and CAO/ Joint Director. Other members include Accounts Officer (1); Assistant (1).

112. The Chief Community Development Officer in the PMU, heading the Social team will be responsible for the following social safeguard activities:

- (i) Implementation of the Resettlement Plans; the Graduation Program, GESI and CAPP;
- (ii) Ensuring CAPP is implemented in the design, implementation and post relocation phase; the social team will be trained on the different topics identified for consultation and dissemination before the start of the different phases of the project;
- (iii) Ensure compliance of documentation according to National, State laws and ADB policies;
- (iv) Ensuring the preparation of resettlement plans for new subproject according to the resettlement framework;
- (v) Ensuring adequate awareness campaigns are held within the community to minimize resistance and ensure hassle free transition for the displaced families to the new location;
- (vi) Ensuring availability of budget for resettlement and rehabilitation activities;
- (vii) Ensuring timely disbursement assistance to the displaced persons in close coordination with the concerned line department;
- (viii) Liaison with district administration for implementation of resettlement plans,
- (ix) Addressing grievances; and
- (x) Ensuring disclosure of resettlement framework, resettlement plan, and monitoring documents.

113. The PMU will be assisted by three consultants who will be from the Technical Assistance. One an External Monitor, a Social Development Expert and a Survey Specialist. The Consultants will primarily support the PMU and PID in ensuring social safeguard documentation, surveys and data management, and disclosure compliance with ADB requirements.

114. The PMU Chief Community Development Officer will be supported by a Community Development Officer and a Social Development Specialist (Gender). The Social Development Specialist (Gender) will be responsible for the implementation, monitoring and reporting of the Gender Equality and Social Inclusion Plan for the project and the consultation and participation plan at the PMU and at the PID and field level.

115. The Community Development Officer will assist: (i) preparing resettlement plans for new subprojects, where required to comply with national law and/or ADB procedures; (ii) update resettlement plans as required and conduct surveys; (iii) ensure all subprojects meet safeguard requirements as agreed in the loan covenant and in line with this resettlement framework; (iv) provide support to the PID for consultations; (v) assist the affected families in getting their address changed in their identity cards; and (vi) provide advice on policy changes. In addition, the Community Development Officer will assist the PID in all activities related to the implementation of social safeguards; play a central role in ensuring capacity building on resettlement management of the PIDs and line departments through capacity development support and training. The Community Development Officer will be supported by project specific Community Officer who will be further supported by the animators at the community level.

116. As primary coordinator of the graduation program, PMU will be responsible for the following activities: (i) ensuring all resettlement activities occur; (ii) finalizing households for Graduation sites; (iii) providing access to resettled households; (iv) ensuring all graduation

program activities take place by the PID in project sites; and (v) ensuring data-driven decision-making during project.

C. Project Implementation Division

117. The PMU will be supported by the Project Implementation Division (PID). The PIDs will be responsible for the implementation, management and monitoring of the project. TNUHDB has set up 3 Project Implementation Divisions (Sivagangai (PID-1), Namakkal (PID-2) and Villupuram (PID-3)) for implementation of IRSHUP Project.. Each of the PIDs will be headed by an Executive Engineer. Each of the PIDs will have the following Cells:

- (i) Project Cell: This cell will have a (i) Construction Management Specialist (i); Assistant Executive Engineer (3); Assistant Engineer/ Junior Engineer (11); Draughtsman Grade III (1) and Surveyor (1).
- (ii) Social Development and Resettlement Cell: will have Community Development Officer –(1) post per PID (3); Community Officer –(3) and Animators –(3)
- (iii) Environment Cell: will have an Environment Specialist - (1) and Assistant Engineer/ junior Engineer - (1).
- (iv) Finance Cell: will have (i) Divisional Accountant (1); Superintendent (1) and Accounts Assistant (1)

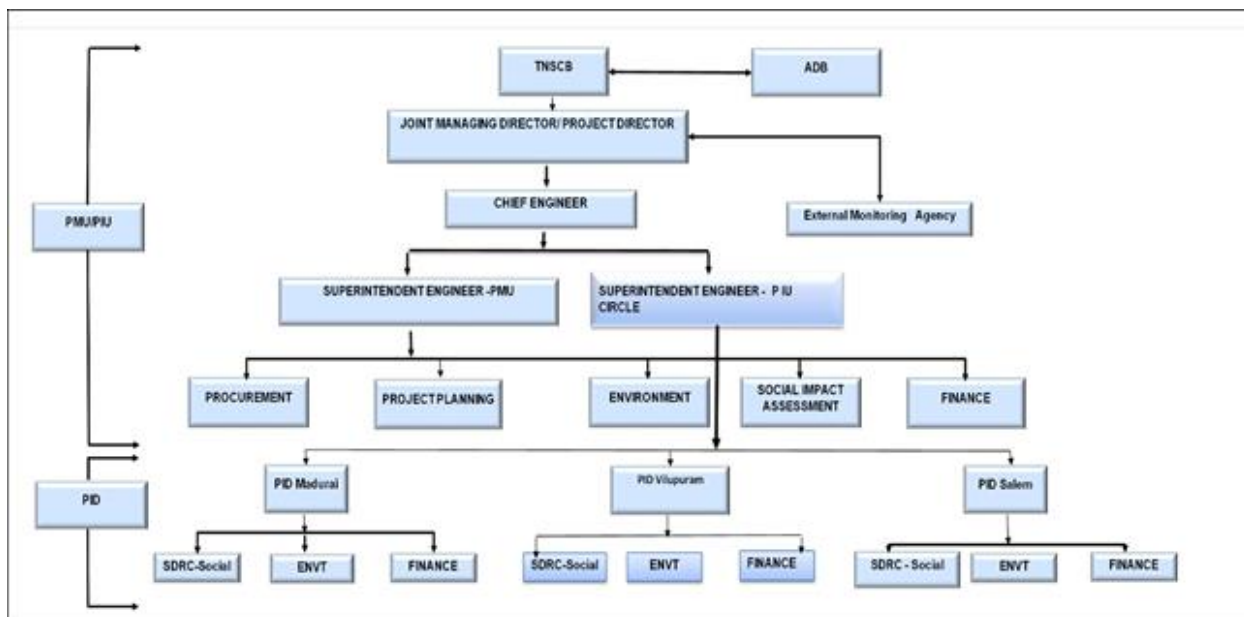
118. Each PID will have the following support staff: (i) Assistant/ Junior Assistant (1); (ii) Data Entry Operator (1) and (iii) Office Assistant (2).

119. The Community Development Officer will undertake internal monitoring and supervision and record observations throughout the project period to ensure that the safeguards and mitigation measures are provided as intended. He /she will have the following responsibilities: (i) addressing social safeguards issues; (ii) implementing the resettlement framework; (iii) ensuring adequate consultations are held with the affected persons; (iv) implementing and monitoring safeguards compliance activities, public relations activities, and (v) implementing Graduation Restoration Plan and undertake all field activities in project sites under the supervision of the PMU(vi) submitting periodic monitoring reports⁴⁵ to the PMU, who will then submit these to the ADB.

120. The PMU will seek government clearance for submission and disclosure of the social and resettlement monitoring reports to ADB.

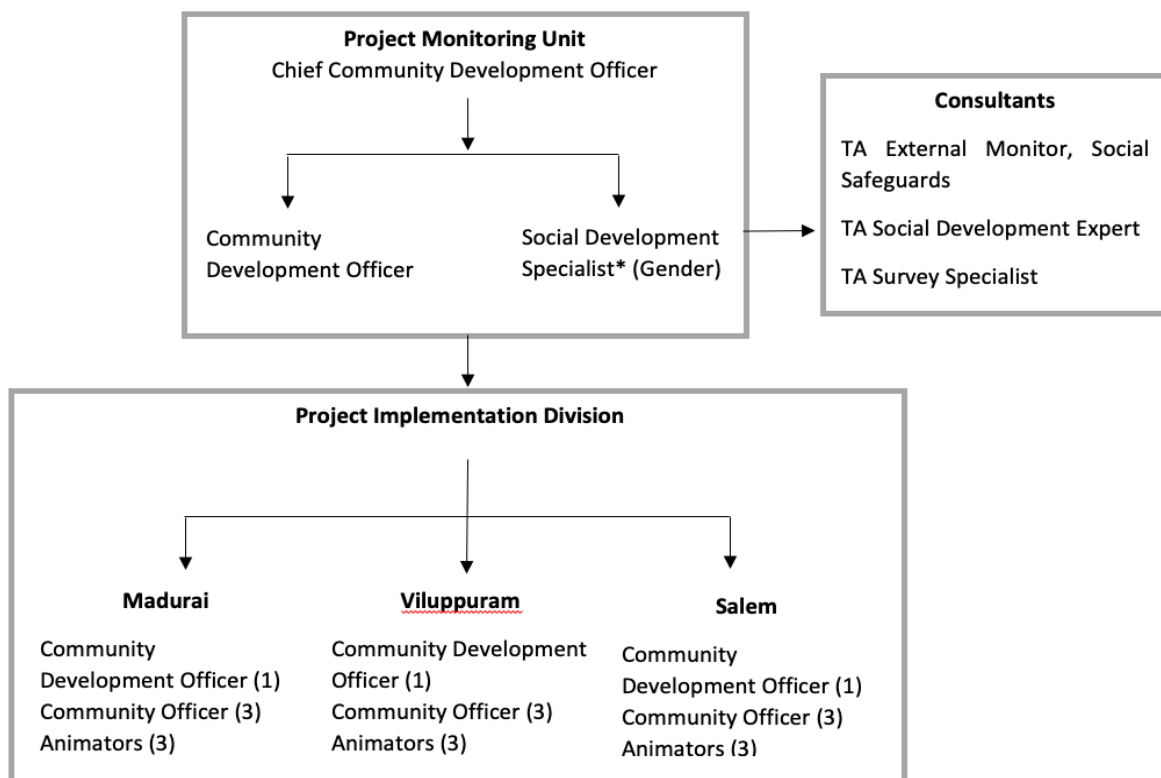
Figure 4: IRSHUPSP Implementation Arrangements

⁴⁵ The quarterly monitoring report will focus on the progress of implementation of the safeguard, issues encountered and measures adopted, follow-up actions required, if any, as well as the status of compliance with subprojects election criteria and relevant loan covenants.



ADB= Asian Development Bank; PID= project implementation division; PIU= project implementation unit; PMU= project management unit; SDRC= social development and resettlement cell; TNUHDB= Tamil Nadu Urban Habitat Development Board.

Figure 5: IRSHUPSP Implementation Arrangements for Social Safeguards and Gender



* Social Safeguard Specialist (Gender) will be responsible for all gender related activities in the PMU, PID and field level.

Table 23: Institutional Roles and Responsibilities

Activity	Responsible Agency
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Activity	Responsible Agency
Subproject Initiation Stage	
Finalization of sites for subprojects	PID/ PMU
Meetings at community/household level with affected persons	PID
Resettlement Plan Preparation and Updating Stage	
Conducting Census Survey of all affected persons	PID
Conducting FGDs/meetings/workshops	PID
Categorization of affected persons for finalizing entitlements	PID
Formulating rehabilitation measures	PID/
Conducting discussions/meetings/workshops with affected persons and other stakeholders	PID/
Finalizing entitlements and rehabilitation packages	PID
Disclosure of resettlement plan	PID/ PMU
Approval of resettlement plan	TNUHDB/ ADB
Resettlement Plan Implementation Stage	
Implementation of proposed rehabilitation measures	PID
Sale deed execution and payment of all assistances and compensation	PID
Consultations with affected persons during rehabilitation activities	PID
Implementation of the Graduation Program	PID/ BRAC
Grievances redressal	PID/ PMU
Preparation for relocation/awareness meeting/ issuing notices	PID
Internal monitoring	PMU / PID

D. Graduation Restoration Plan: Institutional Management Structure

121. For the Graduation Program, an NGO implementing partner will need to be selected based on criteria including expertise in case management, livelihoods, and health and social issues facing the extreme poor, as well as experience with resettled populations. The NGO will serve as a local technical support partner for the preparation phase of the Graduation Program and help build TNUHDB's capacity. Thereafter, the Graduation Restoration Plan will be implemented by the Social Team of PID, with discrete technical support where needed.

E. Institutional Capacity Development Program

122. As stated above, the safeguard officers will be drawn from TNUHDBs staff. It is necessary that all the social safeguards officers are provided with the necessary training to deal with social safeguard tasks following ADB SPS 2009. The safeguard officers will be trained through a series of programs periodically conducted by ADB for executing agencies and implementing agencies on safeguards. The Social Development Expert (consultant appointed under the TRTA) will be responsible for training the PMU's social safeguards officers, PID's engineers and social safeguards team.

123. The Chief Community Development Officer of the PMU will conduct a training and capacity building program on resettlement management for the PID staff on issues concerning: (i) public consultation and participation; implementation of the CAPP (ii) entitlements disbursement mechanisms; (iii) grievance redress; (iv) monitoring of resettlement operation; and (v) disclosure methods. Specific modules customized for the available skill set shall be devised after assessing the capabilities of the target participants and the requirements of the investment program. Institutional capacity building programs will involve training on environmental and social safeguards for the PID staff. Table 24 provides the indicative training needs assessment.

Table 24: Indicative Training Needs Assessment

S.No	Description	Target group / Venue
1.	Introduction and Sensitization to Social/Involuntary Resettlement - ADB Safeguards Policy Statement - Government of India and Tamil Nadu applicable social safeguard policies/Acts - Incorporation of social/resettlement components into the project design and contracts - Monitoring, reporting and corrective action planning. - Details of the Graduation Program and its implementation - Details of the CAPP and the need of continued consultations throughout the project cycle	All staff and consultants involved in the project. Will be done at PMU office- all the PIDs need to attend.
2.	Resettlement plan implementation (every 6 month) during implementation. - Roles and responsibilities - resettlement plan components and stages in implementation - ensuring livelihood restoration - specific requirement of relocation to resettlement site - Construction schedules and timelines - Consultations - social preparedness and interaction with host communities - Grievance redress - Monitoring and corrective action planning - Reporting and disclosure - Timely documentation	All staff and consultants involved in the subproject. Will be done at each PID.
3.	Learnings and best practices sharing - Experiences on resettlement plan implementation - Issues and challenges - Best practices followed	All staff / consultants/ Officers. At PMU.

F. Implementation Schedule

124. The project will be implemented, from June 2021 to May 2028. The resettlement plan implementation schedule will vary from subproject to subproject. In general, the project implementation will consist of the three major phases, namely relocation site preparation, relocation, and monitoring and evaluation. In line with the principles laid down in this resettlement framework, the implementation agency will ensure that project activities are synchronized between the resettlement plan implementation activities and the subproject civil works. The implementation agency will ensure that no physical or economic displacement of affected persons takes place until: (i) the housing units are complete in all respects which includes availability of water, electricity, access to livelihood etc.; (ii) compensation and assistance has been paid to each displaced; and (iii) a comprehensive income and livelihood rehabilitation program, supported by an adequate budget, is in place to help displaced persons improve, or at least restore, their incomes and livelihoods (Either through the graduation program or the general provisions of the entitlement matrix.) It is estimated that construction activities will take 24 months. Table 25 provides the overall implementation schedule.

Table 25: Social Safeguards Implementation Schedule

R&R Activities	2020				2021				2022				2023		2024		
	Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1 st half	2 nd half	1 st half	2 nd half
A. Project preparation phase																	
Preparation of Resettlement Framework																	
Census and Socioeconomic Survey of the subproject																	
Preparation of resettlement plan/ due diligence reports																	
Establishment of PID																	
Final detailed design of subprojects																	
Updating of displaced person list based on final detailed design																	
Submission of resettlement plan based on final detailed design																	
Review and Approval of resettlement plan																	
Resettlement Plan disclosure																	
Information campaign and community consultation																	
Localized market assessment and Income Restoration Plan ⁴⁶																	
B. RP implementation																	
Grievance redress																	
Final list of DPs and distribution of ID cards																	
Payment of all other eligible assistance																	
Shifting of Affected Persons																	
Household skills and readiness assessment																	
Training for Livelihood restoration/ graduation program																	
C. Monitoring and evaluation																	
Monitoring and report preparation																	

XII. MONITORING AND REPORTING

A. Internal Monitoring

125. Internal monitoring will be undertaken by the PID with assistance from PMU. Internal monitoring will ensure all resettlement activities are implemented according to the approved resettlement plans in accordance with this resettlement framework.

126. The PID will prepare monthly progress reports and submit to the PMU. The PMU will consolidate and submit quarterly monitoring reports to ADB. The PID will inform the PMU of the resettlement plan implementation activities. These reports will describe the progress of the implementation of resettlement activities and any compliance issues and corrective actions. These reports will closely follow the involuntary resettlement monitoring indicators agreed at the time of resettlement plan approval. Sample monitoring indicators are presented in Appendix 10.

⁴⁶The localized market assessment conducted during the planning phase of the Graduation Program will provide a list of viable livelihoods activities, asset packages, risk assessments and household characteristics, skills and readiness criteria to match with specific livelihoods. The household skills and readiness assessment will be conducted post-relocation by TNUHDB staff to guide households towards selecting a livelihood option. Animators will monitor livelihood development through regular household visits during the course of the Graduation program. The action plan will be included in the Operations Manual for the graduation program after the market assessment is conducted.

B. External Monitoring

127. This being a category A project, an independent external monitor, with prior experience in resettlement and rehabilitation of development induced displacement will be engaged to carry out external monitoring and reporting of the implementation of the resettlement plan. The external monitor will prepare semi-annual, annual monitoring reports and mid-term and final evaluation reports. The external monitor will flag and recommend necessary corrective actions to be taken if any to ensure time-bound resettlement plan implementation. The scope of external monitoring will cover compliance monitoring and social impact evaluation of resettlement plan implementation.

C. Approach and Methodology

128. The monitoring and evaluation (M&E) approach will be to identify and select a set of appropriate indicators and gathering information on them. The M&E process will ensure the participation of stakeholders, especially the affected persons, women, and vulnerable groups. The process will also use different formal and informal surveys for impact analysis. M&E processes will assess the resettlement efficiency, effectiveness, impact, and sustainability. The M&E consultants will identify lessons learned from the project for developing future policies. Monitoring tools would include both quantitative and qualitative methods as follows:

- (i) **Sample household survey:** a baseline household survey of a representative sample (20% of affected households requiring relocation), disaggregated by sex and vulnerability to obtain information on the key indicators of entitlement delivery, efficiency, effectiveness, impact, and sustainability.
- (ii) **Focus Group Discussions (FGDs):** Consult with a range of stakeholder groups (local government, resettlement field staff, NGOs, community leaders and affected households including women and vulnerable groups).
- (iii) **Key Informant Interviews:** Consult individuals like local leaders, persons with special knowledge or experience about resettlement activities and implementation.
- (iv) **Community Public Meetings:** Open public meetings at resettlement sites to elicit information about the performance of various resettlement activities.
- (v) **Structured Direct Observations:** Field observations on the status of resettlement implementation, plus individual or group interviews for cross-checking purposes.
- (vi) **Informal surveys/interviews:** Informal surveys of affected households, host village, workers, and resettlement staff.
- (vii) **In the case of special issues:** In-depth case studies of affected households and host populations from various social classes will be undertaken to assess the impact of resettlement.

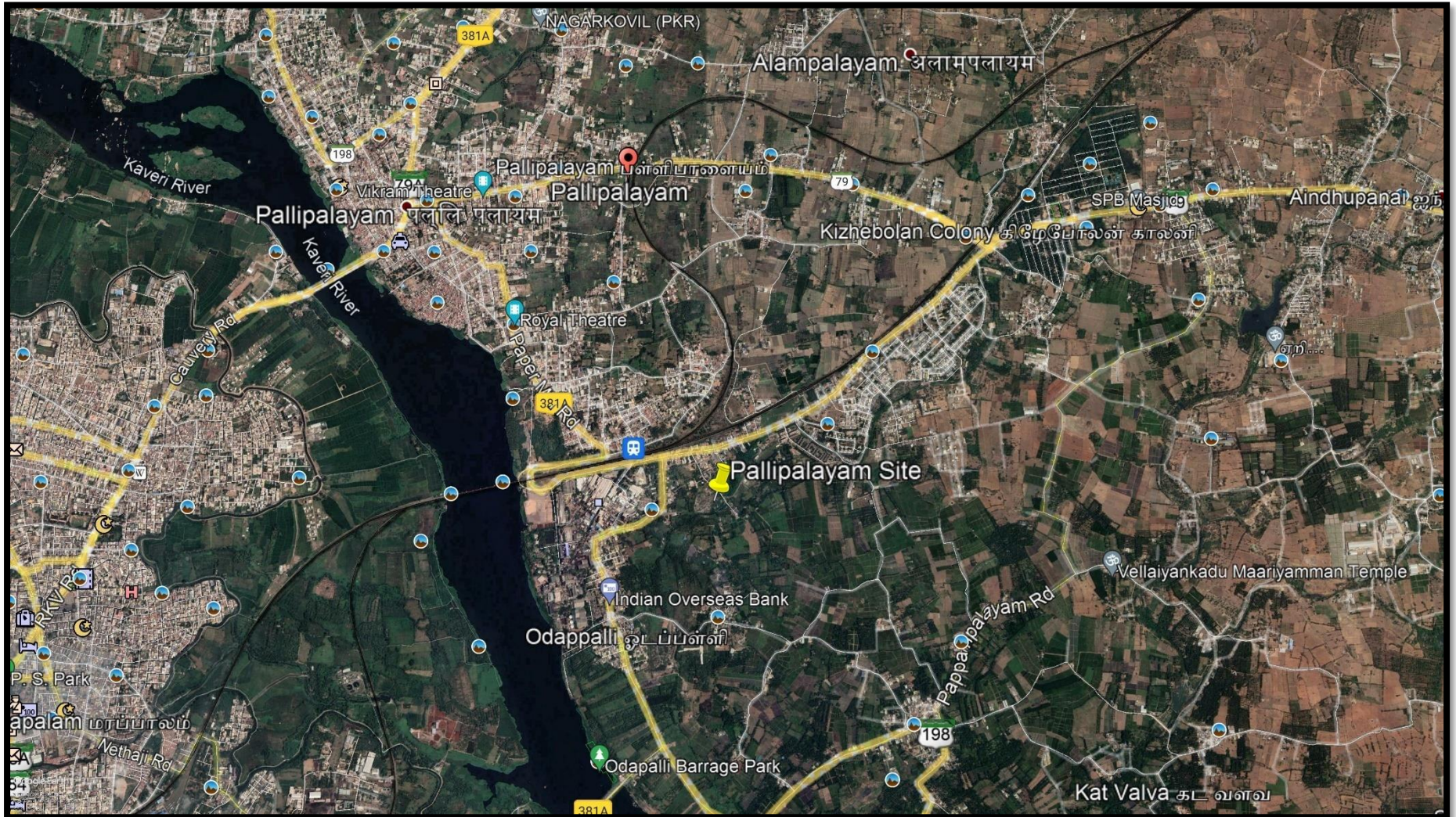
129. Indicative monitoring activities in the preparatory and the implementation stages have been identified. Table 26 lists some of the key activities.

Table 26: Indicative monitoring activities

Stage	Activities
Preparatory Stage	<ul style="list-style-type: none"> - Conduct additional baseline survey, if required; - Consultations with different stakeholders; - Identify affected households and their numbers;

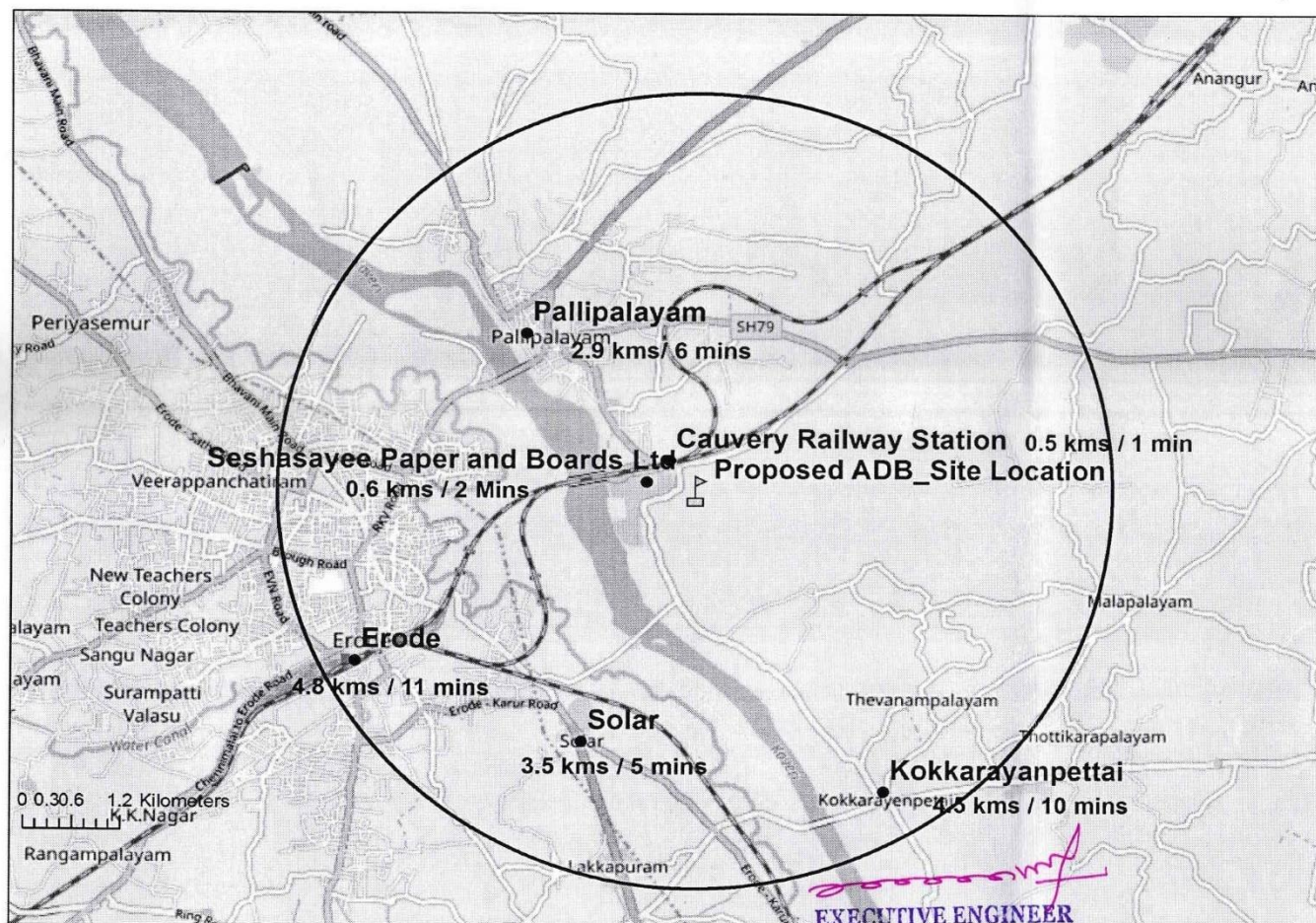
Stage	Activities
	<ul style="list-style-type: none"> - Identification of different categories of affected households and entitlements of individuals; - Collection of sex-disaggregated data and preferences of women; - Establish inventory of losses; - Ascertain entitlements; - Assistance delivery; - Information dissemination among the affected persons; - Institutional capacity assessment;
Rehabilitation Stage	<ul style="list-style-type: none"> - Economic indicators: Program related and - Independent means but assisted by the Program, such as what skill improvements have taken place, what are the changes in occupation, changes in income levels to monitor whether livelihood is restored to pre project levels or higher; new assets acquired - Housing: Changes in quality of life, such as less illness, better available infrastructure: potable water, living space, sanitation, proper road and drainage facilities, etc. - Representation in community groups, - Assistance to enhance the quality of life; such as better attendance at school
Post Implementation	<ul style="list-style-type: none"> - Changes in income levels to monitor whether livelihood is restored to pre project levels or higher - Quality of life, whether it is sustained, such as regular maintenance of the housing complex

Google Image of the Pallipalayam Resettlement Site



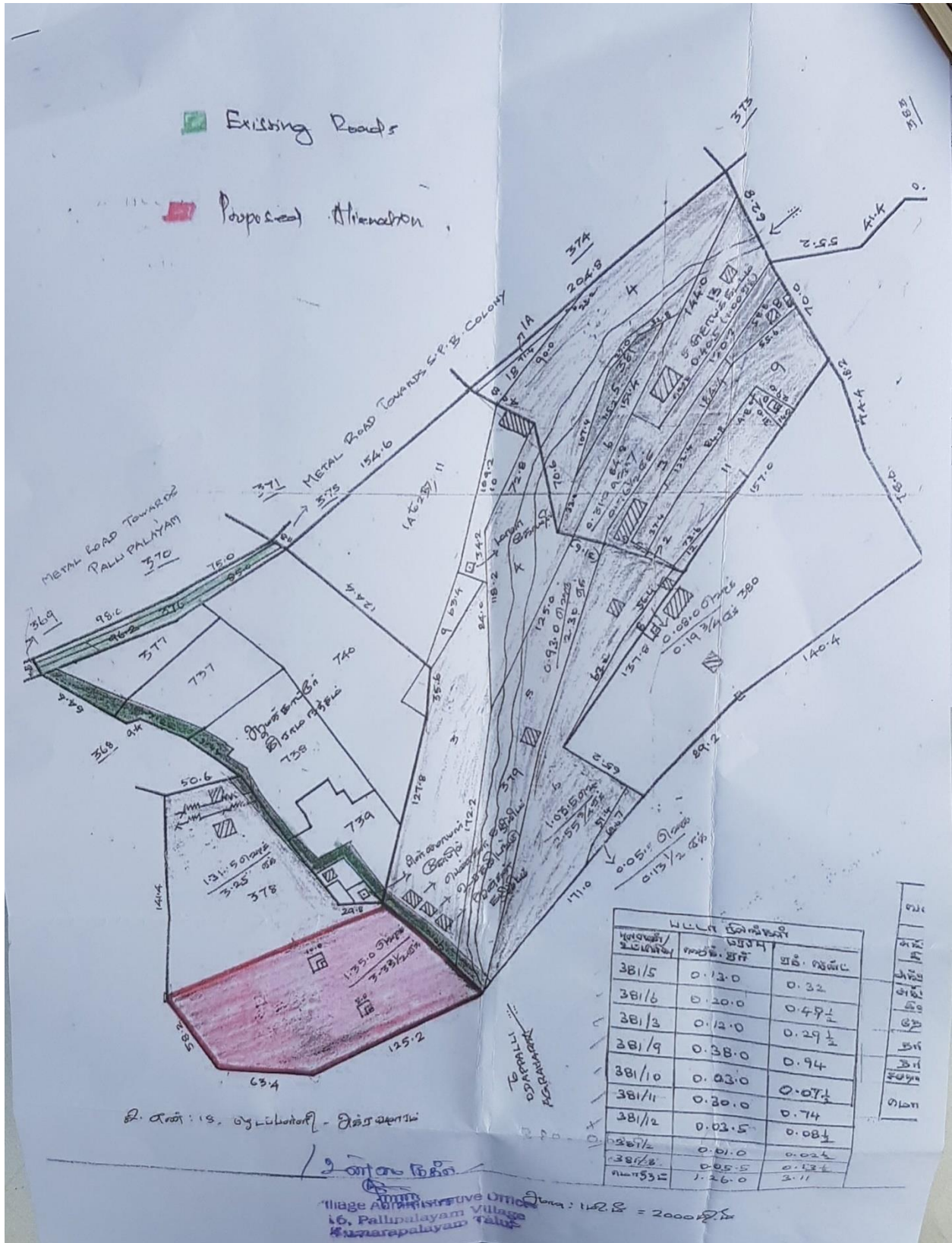
Social Infrastructure vis-à-vis Resettlement Site

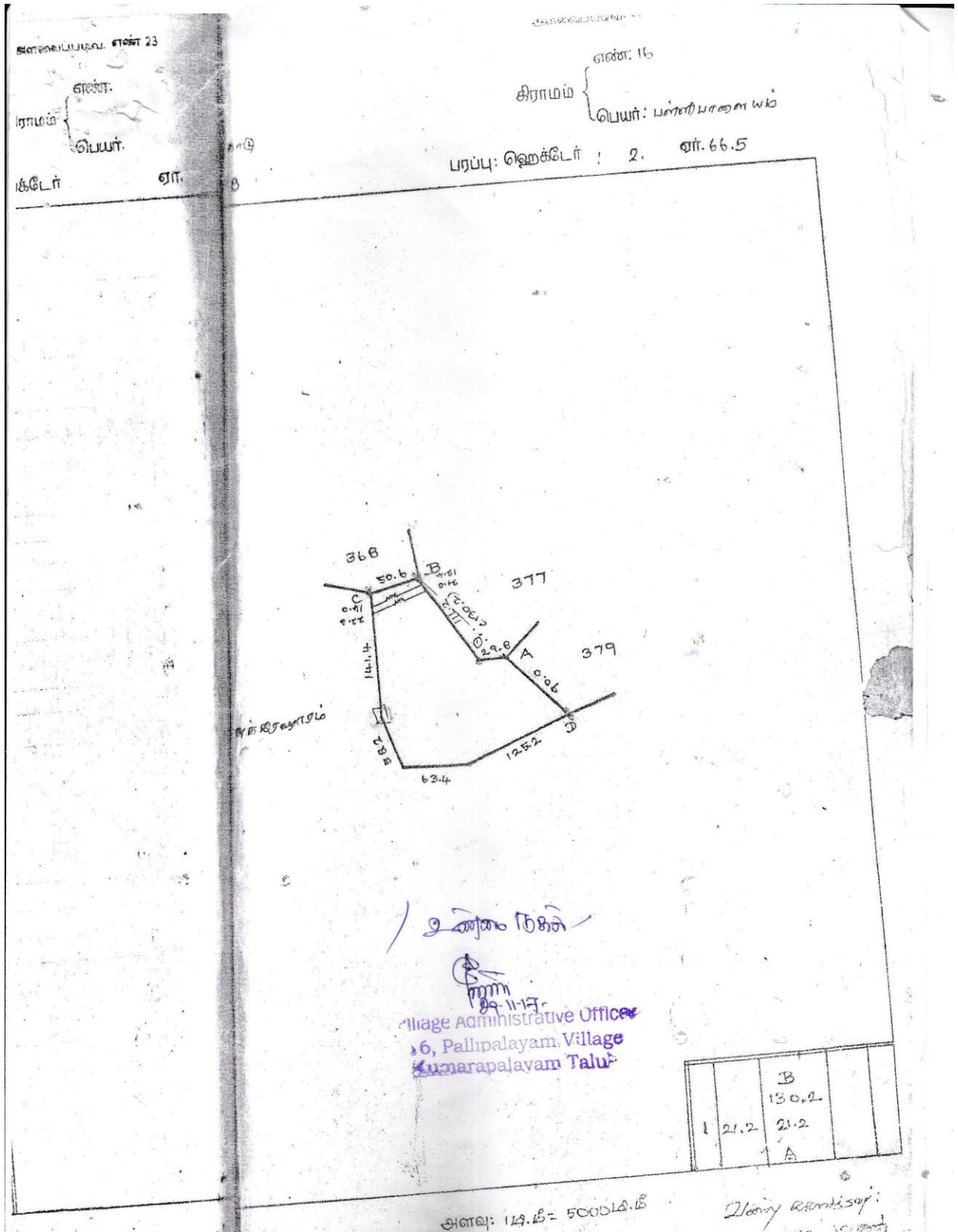
Map Showing Social infrastructure facilities around- Pallipalayam - Namakkal District



[Signature]
EXECUTIVE ENGINEER
Tamilnadu Slum-Clearance Board
Salem Division, Salem-7.

Land Ownership Documents and Land Transfer Statement





கி. எண். 16. பள்ளிபாளையம்.

195

1	2	3	4	5	6	7	8	9	10	11	12
							சூ. பை.	ஹெ. ஏர்ஸ்.	சூ. பை.		
377	16	377-16	ர	4	...	8-1	6	3 85	0 03.0	0 12	889 மு. அர்த்தநாரி மற்றும் மூன்று பேர்களும். *
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	18	-18	ர	4	...	8-1	6	3 85	0 45.5	1 76	207 நல்லப்ப கவுண்டர்.
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	19B	-19பா	ர	4	...	8-1	6	3 85	0 02.0	0 08	57 மு. காளியண்ண கவுண்டர்.
	20A	-20பா	அ	4	1 37.5	...	நெடுஞ் சாலை.
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	21	-21	அ	4	...	8-2	7	3 09	0 03.5	0 15	தரிக.
	22	-22	அ	4	...	8-2	7	3 09	0 05.5	0 25	தரிக.
									3 54.0	7 89	
378	...	378	அ	4	2 66.5	...	அக்ரஹாரி இளாம்.
379	1A	379-1A	அ	4	...	...	...	...	0 06.5	...	நெடுஞ் சாலை.
	1B1	-1Bபா	ர	4	...	8-1	6	3 85	0 07.5	0 28	355 அ. முத்துசாமி.
	1B2	-1Bபா	ர	4	...	8-1	6	3 85	0 03.5	0 13	57 மு. காளியண்ணன்.
	1B3	-1Bபா	ர	4	...	8-1	6	3 85	0 01.0	0 06	355 அ. முத்துசாமி.
	1B4	-1Bபா	ர	4	...	8-1	6	3 85	0 01.0	0 06	791 மு. காளியண்ணன் மற்றும் இரண்டு பேர்களும். *
	1B5	-1Bபா	ர	4	...	8-1	6	3 85	0 05.0	0 18	355 அ. முத்துசாமி.
	1B6	-1Bபா	ர	4	...	8-1	6	3 85	0 02.0	0 08	57 மு. காளியண்ண கவுண்டர்.
	1B7	-1Bபா	ர	4	...	8-1	6	3 85	0 07.5	0 28	96 அ. கொமரசாமி
	1B8	-1Bபா	ர	4	...	8-1	6	3 85	0 02.0	0 08	408 செ. வள்ளியம் மான்.

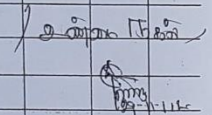
* விவரப்பட்டியலைப் பார்க்கவும்.

Administrative Office

கிராமக் கணக்கு

427 ஆம் பசலியில் **நொக்கிடு** மாவட்டம் **காரையாண்டி** கிராமம் **ப. ப. நி. நி. அ. அ. அ.**

நில வரித் திட்டத்தின்படி புலன்களின் விபரம்.					கைப்பற்று தாரகடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரகடைய பெயர்.	சார்பு யாளரின் பெயர்.	முதல் போகம்.					
(1)	(2)	(3)	(4)	(5)		(7)	(8)	(9)	(10)	(11)	(12)	
378	பி. ப. ப.				சி. காமசுந்தரி							


 Village Administrative Officer
 16, Pallipalayam Village
 Kallaruppalayam Taluk

எண் 2 கிராமத்தில் வருடவாரி புலவாரி கைப்பற்று சார்பு அடங்கல் கணக்கு

இரண்டாம் போகம்.						
(13)	(14)	(15)	(16)	(17)	(18)	(18,அ)
எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது.	பயிரின் பெயர்.	பயிரான / அறுவடையான பரப்பு.	உண்மையான பரப்பீசல் ஆதாரம்.	விளைச்சல் அளவு விழுக்காடு.	கிராம அலுவலரின் குறிப்புரை :- (1) பயிர் செய்த பகுதிகளில் மட்டும் விள்குகள் ஆரவல். (2) கைப்பற்றில் இல்லாத பயிர் சார்பு தன்மையும் மாதத்தில் பரப்பீசல் தரவில்லை. (3) முந்தைய மாதத்தில் பரப்பீசல் தரவில்லை.	கிராம அலுவலர் தலைமையில் மட்டும் இளைக்கோல் கைப்பற்றில் இல்லாத பயிர் சார்பு தன்மையும் மாதத்தில் பரப்பீசல் தரவில்லை.
						பயிர் சார்பு தன்மையும் மாதத்தில் பரப்பீசல் தரவில்லை.

நாமக்கல் மாவட்ட ஆட்சித்தலைவரின் செயல்முறைகள்
முன்னிலை: திரு.கா.மெகராஜ், இ.ஆ.ப.,

ந.க 38393/2017/எல்2

நாள்: 08.01.2020

பொருள்: நில உரிமை மாற்றம் - நாமக்கல் மாவட்டம் - குமாரபாளையம் வட்டம் - பள்ளிபாளையம் கிராமம் புல எண்: 378, மொத்த விள் 2.66.5 எக்டேர்- அரசு புறம்போக்கு அக்ரஹாரம் இனாம்- பரப்பு 1.62.0 எக்டேர் நிலம் அனைவருக்கும் வீடு கட்டும் திட்டத்திற்கு தமிழ்நாடு குடிசை மாற்று வாரியத்தின் பெயரில் நில உரிமை மாற்றம் செய்ய கோரியது - முன்நுழைவு அனுமதி வழங்கி உத்திரவு பிறப்பித்தல் - தொடர்பாக.

பார்வை: 1.நிர்வாகப்பொறியாளர், தமிழ்நாடு குடிசை மாற்றும் வாரியத்தின் கடித எண்:3115/அளவை/2017, நாள்: 11.12.2017
 2.திருச்செங்கோடு வருவாய் கோட்டாட்சியர் அறிக்கை ந.க 1926/2019/ஆ நாள்:05.11.2019
 3. மேலாண்மை இயக்குநர், தமிழ்நாடு குடிசை மாற்றும் வாரியம் க.ந.க எண் நி.ஆ 1(2)/9449/2019 நாள்:01.11.2019

நாமக்கல் மாவட்டம், குமாரபாளையம் வட்டம், பள்ளிபாளையம் கிராமம், சர்வே எண். 378 விள் 2.66.5 எக்டேர் அரசு புறம்போக்கு அக்ரஹாரம் இனாம் நிலத்தில் விள். 1.62.0 எக்டேர் நிலத்தினை அனைவருக்கும் வீடு வழங்கும் திட்டத்தின் கீழ் அடுக்குமாடி குடியிருப்புக்கட்டிடம் அமைக்க தமிழ்நாடு குடிசை மாற்று வாரியத்திற்கு முன்நுழைவு அனுமதி வழங்குகோரி பார்வை ஒன்றில் காணும் தமிழ்நாடு குடிசை மாற்றும் வாரிய நிர்வாகப்பொறியாளரின் 11.12.2017 நாள்ிட்ட கடிதத்தில் கோரப்பட்டுள்ளது. பார்வை இரண்டில் காணும் திருச்செங்கோடு வருவாய் கோட்டாட்சியரின் 05.11.2019 நாள்ிட்ட கடிதத்தில் மேற்படி பலத்திற்கான முன்மொழிவு கீழ்க்கண்டுவாறு வரப்பெற்றுள்ளது.

1. நிலவகைபாடு

குமாரபாளையம் வட்டம், பள்ளிபாளையம் கிராமம், சர்வே எண். 378 மொத்த விள் 2.66.5 ஹெக் நிலம் அரசு புறம்போக்கு அக்ரஹாரம் இனாம் என கிராம கணக்குகளில் தாக்கல் செய்யப்பட்டுள்ளது.

2.உட்பிரிவு:

தமிழ்நாடு குடிசை மாற்று வாரியத்திற்கு நில மாறுதல் செய்ய உத்தேசிக்கப்பட்ட நிலம் பின்வருமாறு உட்பிரிவு செய்யப்பட்டுள்ளன.

உட்பிவுக்கு முன்			உட்பிரிவுக்கு பின்		
ச.எண்	வகைபாடு	விஸ்	ச.எண்	விஸ்	வகைபாடு
378	அக்ரஹாரம் இனாம்	2.66.5	378/1	1.04.5	அக்ரஹாரம் இனாம்
			378/2	1.62.0	தமிழ்நாடு குடிசை மாற்று வாரியம்
	மொத்தம்	2.66.5		2.66.5	

உட்பிரிவு ஆவணங்கள் 22.07.2019 அன்று குமாரபாளையம் வட்ட துணை ஆய்வாளரால் முன்னுணுக்க பரிசீலனை செய்யப்பட்டுள்ளது.

3.ஆட்சேபணை:

பள்ளிபாளையம் கிராமம், ச.எண். 378 மொத்த விஸ். 2.66.5 ஹெக் அக்ரஹாரம் இனாம் புறம்போக்கு நிலத்தில் 1.62.0 ஹெக் பாகத்தை தமிழ்நாடு குடிசை மாற்று வாரியத்திற்கு நிலமாறுதல் செய்வது தொடர்பாக பள்ளிபாளையம் கிராமத்தில் 10.07.2019 அன்று ஏ1 நோட்டீஸ் சார்வு பெறப்பட்டது. மேற்படி நிலமாறுதலுக்கு ஆட்சேபணை ஏதும் இல்லை என செயல் அலுவலர், ஆலாம்பாளையம் பேருராட்சி ந.க. எண். 285/2019 நாள்: 03.09.2019—ன்படி பேருராட்சி மன்றத்தில் 28.08.2019 அன்று நடைபெற்ற கூட்டத்தில் தீர்மானம் நிறைவேற்றப்பட்டுள்ளது. மேலும், மேற்படி நிலமாறுதலுக்கு பொதுமக்களிடமிருந்தோ, இதர வகைகளிலிருந்தோ ஆட்சேபணை ஏதும் வரப்பெறவில்லை.

4.ஆக்கிரமிப்புகள்:

நில மாறுதல் செய்ய உத்தேசிக்கப்பட்டுள்ள புலங்களில் ஆக்கிரமிப்புகள் ஏதுமில்லை. மேலும், மேற்படி புலங்களில் 2-சி எஸ்.டி.டி மரங்கள் ஏதுமில்லை. உயர்மின் மற்றும் தாழ்வழுத்த மின் கம்பிகள் ஏதும் செல்லவில்லை. புராதானச் சின்னங்கள்

ஏதுமில்லை. மேற்படி புலங்கள் தடையாணைப் புத்தகத்தில் பதியப்படவில்லை. இப்புலங்களில் கனிம வளங்கள் ஏதுமில்லை.

5.நில மதிப்பு:

நில உரிமை மாறுதல் செய்ய உத்தேசித்துள்ள பள்ளிபாளையம் கிராம சர்வே எண் 378 விஸ் 1.62.0 எக்டேர் புறம்போக்கு நிலத்தின் நிலமதிப்பினை நிர்ணயம் செய்வதற்காக, பள்ளிபாளையம் சார்பதிவாளர் அலுவலகத்தில் பெறப்பட்ட கடிதத்தில், மேற்படி புலம் அமைந்துள்ள பகுதி தெரு மதிப்பில் உள்ளது.

வ.எண்.	தெரு மதிப்பு பெயர்	மதிப்பு (சதுரடி 1க்கு)	மதிப்பு (சதுர மீட்டர் 1க்கு)
1	வார்டு 6, ஆயக்காட்டுர் தெரு	335/-	3600/-

மேற்படி வழிகாட்டி மதிப்பின் அடிப்படையில் நிலமாறுதல் செய்யப்படவுள்ள புறம்போக்கு நிலத்தின் மதிப்பு சதுரடி ஒன்றிற்கு ரூ. 335/- என நிலமதிப்பாக நிர்ணயம் செய்யலாம். அதன்படி நிலமாறுதல் செய்யப்படவுள்ள நிலத்தின் மொத்த பரப்பு 1.62.0 ஹெக்ட (அல்லது) 4.00 ஏக்கர் (அல்லது) 174301 சதுரடி மதிப்பு ரூ. 5,83,90,830/- என நிர்ணயம் செய்யலாம்.

5. மாவட்ட வருவாய் அலுவலர் கருத்து:-

நாமக்கல் மாவட்டம், குமாரபாளையம் வட்டம், பள்ளிபாளையம் கிராமம், சர்வே எண். 378 மொத்த விஸ் 2.66.5 எக் நிலத்தில் விஸ். 1.62.0 எக் நிலத்தினை அனைவருக்கும் வீடு வழங்கும் திட்டத்தின் கீழ் அடுக்குமாடி குடியிருப்புக்கட்டிடம் அமைக்க தமிழ்நாடு குடிசை மாற்று வாரியத்திற்கு முன்முடிவு அனுமதி வழங்கலாம் என மாவட்ட வருவாய் அலுவலர் தணிக்கை குறிப்பில் பரிந்துரை செய்துள்ளார்.

6) உத்தரவு:-

திருச்செங்கோடு வருவாய் கோட்டாட்சியர் முன்மொழிவு அறிக்கை, நாமக்கல் மாவட்ட வருவாய் அலுவலரின் தலத்தணிக்கை குறிப்பு ஆகியவை நன்கு பரிசீலனை செய்யப்பட்டன.

நாமக்கல் மாவட்டம், குமாரபாளையம் வட்டம், பள்ளிபாளையம் கிராமம், சர்வே எண். 378 மொத்த விஸ் 2.66.5 ஏக்கர் நிலம் கிராம கணக்குகளின் படி அரசு புறம்போக்கு அக்ரஹாரம் இனாம் என வகைபாடு செய்யப்பட்டுள்ளது. உத்தேச உட்பிரின் படி மேற்படி புலத்தில் விஸ். 1.62.0 ஏக்கர் நிலம் மட்டும் தமிழ்நாடு குடிசை மாற்று வாரியம் மூலம் அனைவருக்கும் வீடு கட்டும் திட்டத்திற்காக, அரசாணை (நிலை) எண்: 67 வருவாய் (நிழு5(2) துறை, நாள்: 04.02.2000) என்படி, நிலக்கிரயம் ஏதும் வசூலிக்காமல், முன்னுழைவு செய்து கொள்ள கீழ்க்காணும் நிபந்தனைகளுக்குட்பட்டு அனுமதி வழங்கி உத்திரவிடப்படுகிறது.

நிபந்தனைகள்:

1. கிராம நிர்வாக அலுவலர் மற்றும் குறுவட்ட நில அளவீடு ஆகியோரால், முன்னுழைவு அனுமதி வழங்கப்பட்ட புலத்தினை அளந்து அத்து காண்பிக்கப்பட்ட பின்பு தான் கட்டிடம் கட்டும் பணி ஆரம்பிக்க வேண்டும்.
2. எந்த நோக்கத்திற்காக முன்னுழைவு அனுமதி வழங்கப்படுகிறதோ அந்த நோக்கத்திற்கு மட்டுமே பயன்படுத்த வேண்டும்.
3. எதிர்காலத்தில் குறிப்பிட்ட புலமே அல்லது அதன் ஒரு பகுதியோ தேவையில்லை என்றால் வருவாய் துறையிடம் மீண்டும் நிலத்தினை ஒப்படைக்க வேண்டும்.
4. இந்த நிபந்தனைகளை ஏற்றுக்கொண்டு சம்மத கடிதம் ஏழு தினங்களுக்குள் அனுப்பிவைக்க வேண்டும்.

ஒம்./- கா.மெகராஜ்,
மாவட்ட ஆட்சித்தலைவர்,
நாமக்கல்

//உத்தரவுபடி//

08-11-2020
மாவட்ட ஆட்சியரின் கூடுதல்
நேர்முக உதவியாளர்(நிலம்),
நாமக்கல்.

பெறுதல்

1. நிர்வாகப்பொறியாளர்,
தமிழ்நாடு குடிசை மாற்று வாரியம்,
சேலம் கோட்டம், சேலம் -7
2. வட்டாட்சியர், குமாரபாளையம். ---அனுமதி வழங்கப்பட்ட புலத்தில் பணி துவங்கப் படுவதை உறுதி செய்து கொள்ள வேண்டியது.

நகல்:

1. வருவாய் கோட்டாட்சியர், திருச்செங்கோடு
2. குறுவட்ட நில அளவீடு, பள்ளிபாளையம்.
3. கிராம நிர்வாக அலுவலர், பள்ளிபாளையம் கிராமம், திருச்செங்கோடு வட்டம்.
4. எல்2 இருக்கையின் இருப்பு கோப்பிற்கு



RC.No: 1983/2019/A2
Date: 19-11-2020

Taluk office,
Komarapalayam

POSSESSION CERTIFICATE

We on this day .11.2020 hereby hand over and take over the site for formation of ADB HFA Scheme – Construction of 520 nos of houses to Encroachers in water bodies of Cauvery River in Pallipalayam Municipality in the following S.F.Nos with Extent noted below in Pallipalayam Village , Kumarapalayam Taluk, Namakkal District. (as per District Collector, Namakkal Proceedings Vide R.C.No:38393/2017/L2 dated:08.01.2020)

1	Name of the Taluk	:	Komarapalayam
2	Name of the Village	:	Pallipalayam
3	SF.No	:	378/2
4	Total Extent of Land	:	1.62 Hectare
5	Extent of Land Handed over	:	1.62 Hectare
6	Classification	:	Aragaram eanam
7	Four Boundaries	:	North – SF no 368 South – SF no 21&53 East - Aayakattur road West - SF no 18 &19
8	Purpose	:	For ADB -AHP scheme Construction of 520houses for Encroachers in water bodies in Cauvery River at Pallipalayam Municipality limit.

Encl: FMB of S.F.No:378/2

Handed Over by


TAHSILDAR,
Kumarapalayam

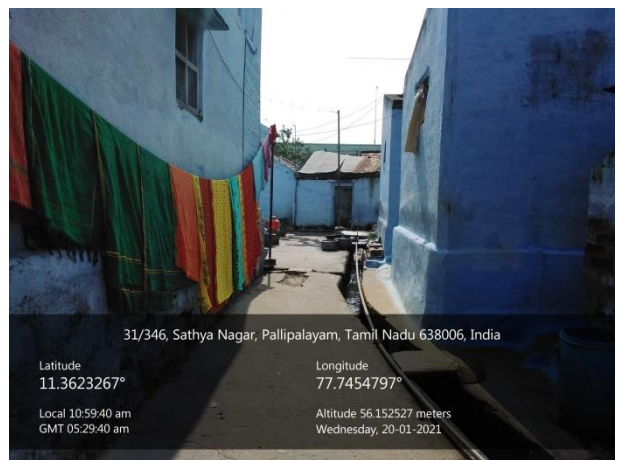
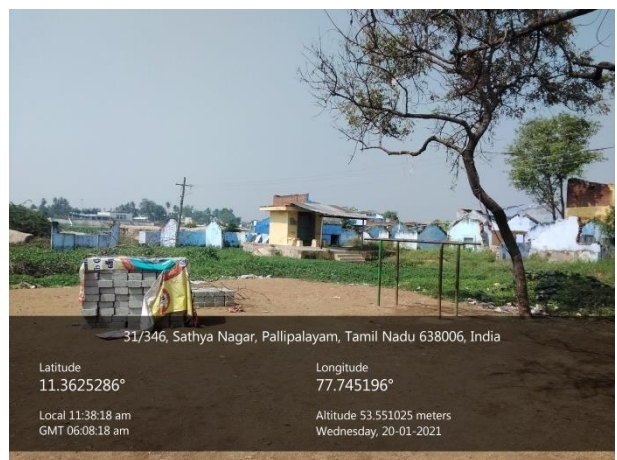
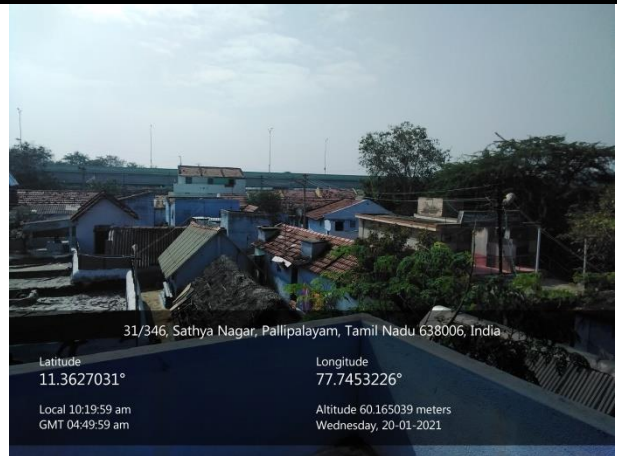
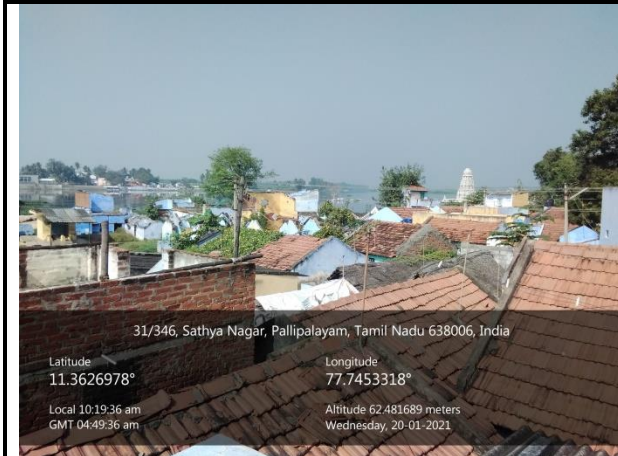
Taken Over by


19/11/2020
ASSISTANT ENGINEER,
Tamilnadu Slum Clearance Board,

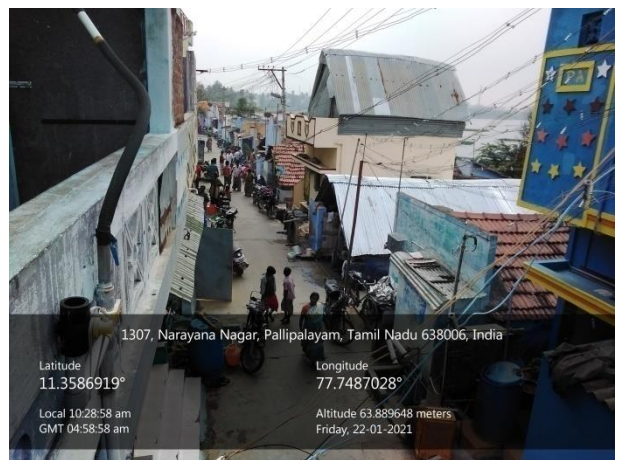
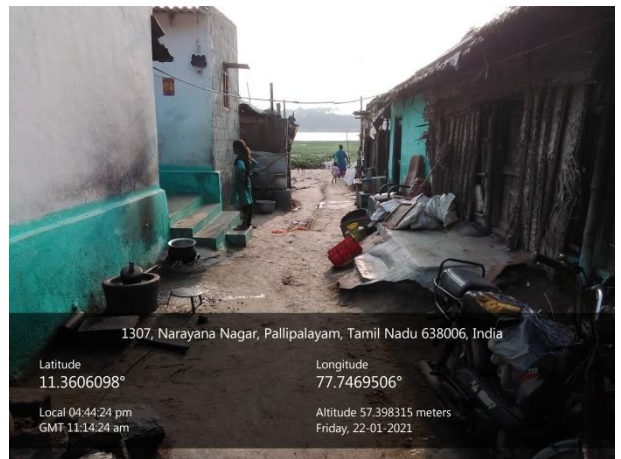
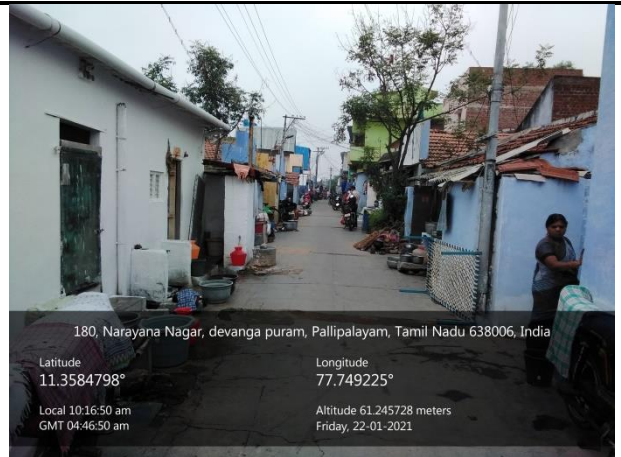
Settlement Photographs

Cauvery Nathi ora Street

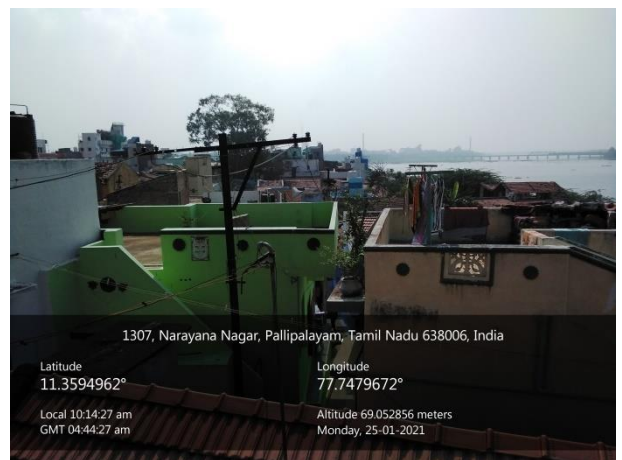
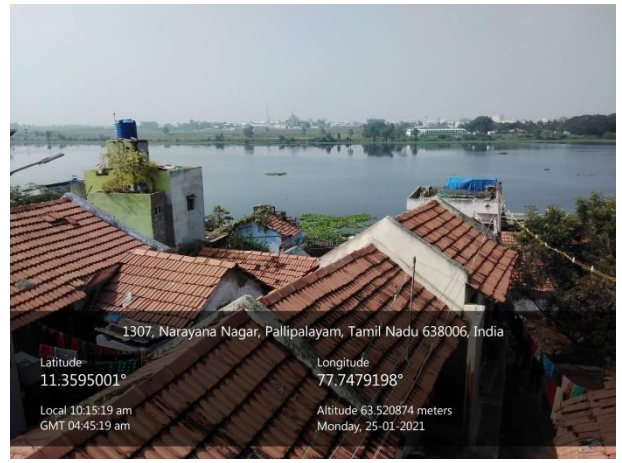
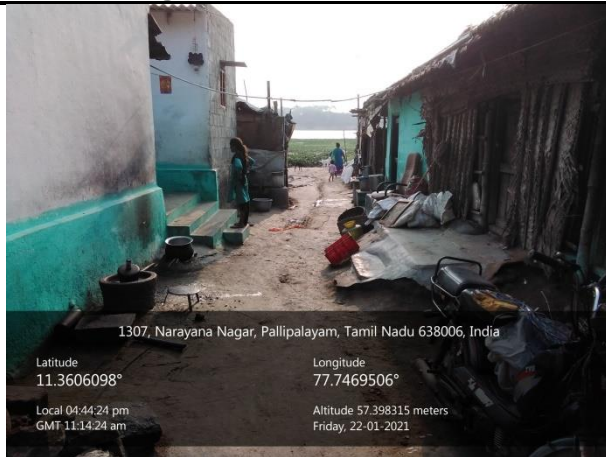




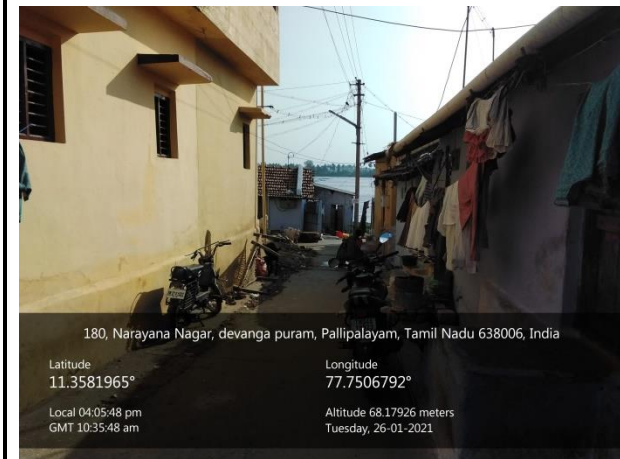
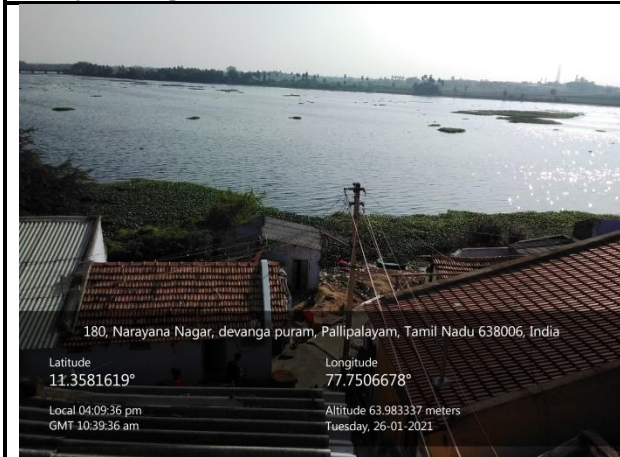
Meenavar Street



Janatha Nagar



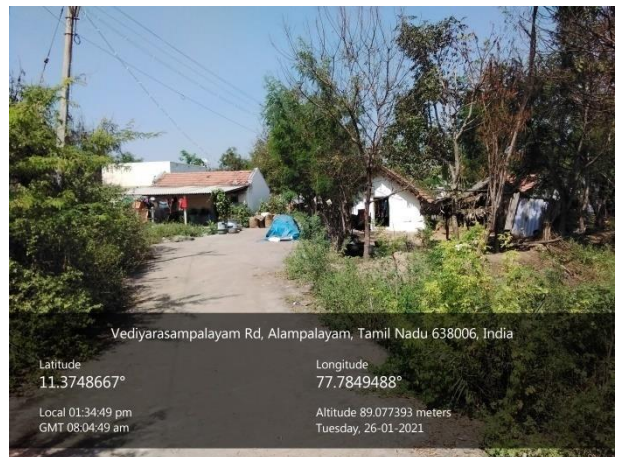
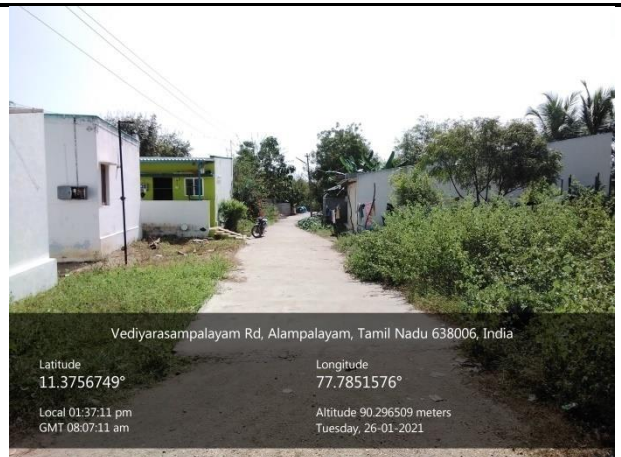
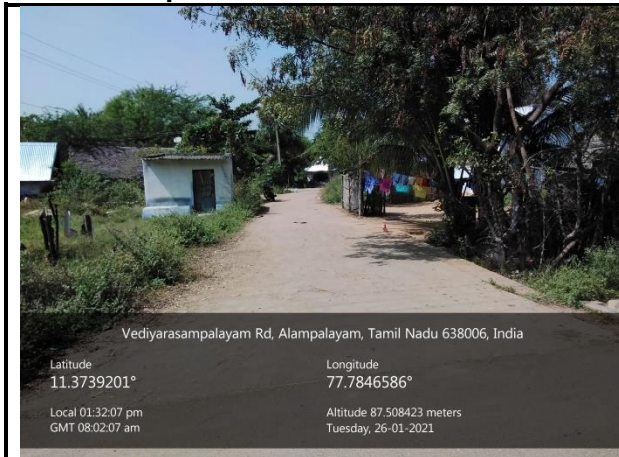
Periyar Nagar





Natta Goundar Pudur







Venkatesapuram







Summary of Common Property Resources



SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
Cauvery Nathi ora Street					
1	Place of Worship	Sri Madurai Veran Koil	25 Years Old	P.K.Shamugam, Bavadi St, Pallipalayam. Ph: 94873 67767	
2	Place of Worship	Kaverikarai Murugan Koil	50 Years	Mr. V. K. P. Gopalasamy Chettiyar, Mr. Gunasekaran (Cashier) and Mr. Senthilnathan Sivam (Gurukkal) Ph:98427 40003, 99429 06954	



SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
3	Place of Worship	Kaverikarai Murugan Koil	50 Years	Mr. V. K. P.Gopalasamy Chettiyar, Mr. Gunasekaran (Cashier) Ph:98427 40003	
4	Community Hall	24 Manai Telugu Chettiyar Sri Omkali Amman Koil Community Hall	Since 1942	Mr. R. M. Murugan (Community President), Mr. S. P. Murugan (Parambari Dhramakartha) and Mr. N. Marimuthu Ph:94429 66705, 99444 994572, 79042 07408	



SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
5	Public Toilet	Public Toilet	7 Years Old	Sathya Nagar, Pallipalayam. 7 Gents Toilet and 7 Ladies Toilet	
6	Public Toilet	Public Toilet	15 Years Old	Sathya Nagar, Pallipalayam. Dilapidated, not in use for past 7 years	



SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
7	Public Toilet	Public Toilet	6 Years Old	Sathya Nagar, Pallipalayam. 10 Ladies Toilet	
8	Place of Worship	Kaveri amman and Muniappan Koil	40 Years Old	Mr. M. Manikandan and M. Prahakaran Ph:75024 96985, 93446 84401.	



SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
Natta Goundar Pudur					
9	Place of Worship	Kannimar Karuppana Samy Koil	60 Years Old	Main Festival Aadi 18 and Vinayakar Sadurthi	
Meenavar Street					
10	Steps leading down (<i>Padithurai</i>) with Washing Facilities	Steps leading down (<i>Padithurai</i>) with Washing Facilities	5 Years Old	Pallipalayam Municipality	

SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
11	Place of Worship	Maduraiveeran and Angalaparameshwari Koil	47 Years Old	<p>Main Festival: Aadi 18 and Masi Sivarathiri</p> <p>Mr. Sundar, Mr. Ganesh and Mr. Thangavelu Poosari. Ph:97887 96368, 94888 89780, 90958 89987.</p>	
12	Place of Worship	Vinayakar Koil	45 Years old	<p>Main Festival: Vinayakar Sadurthi</p> <p>Mr. Loganathan and Ms. A. Malliga Ph:90420 03400,90421 04924</p>	

SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
13	Public Toilet	Public Toilet	8 Years Old	9 Ladies Toilet	
14	Place of Worship	Chithivinayakar Koil	55 Years old	Main Festival: Vinayakar Sadurthi Mr. Selvam, Ph:98655 84045	

SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
Janatha Nagar					
15	Place of Worship	Arulmigu Sri Veeramathi Amman and Sri Karuppannasamy Thiru Koil	40 Years Old	Mr. A. M. Selvam and Mr. A. Chandran, Ph:97888 72968, 73739 36504	
16	Place of Worship	Sri Selva Vinayakar Koil	30 Years Old	Main Festival; Vinayakar Sadurthi Mr. Sasikumar and Mr. Suresh Ph:97882 88797, 77086 86182	

SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
17	Steps leading down (<i>Padithurai</i>) with Washing Facilities	Steps leading down (<i>Padithurai</i>) with Washing Facilities	4 Years Old	Pallipalayam Municipality	
Venkatesapuram					
18	Place of Worship	Sri Muthu Mariamman koil and Sri Karpaga Vinayakar koil	28 Years old	Main Festival; Vinayakar Sadurthi and Panguni Month Festival	

SNo	CPR Type	Identification	Estimated Years (as reported by the community)	Person in charge Details	Photographs
Periyar Nagar					
19	Place Of Worship	Nagathamman Koil	8 Years Old	Main Festival: Aadi 18 Mr. M. Murugan and S. Murthy (Dharmakartha) Ph:78455 55791	
20	Steps leading down (<i>Padithurai</i>) with Washing Facilities	Steps leading down (<i>Padithurai</i>) with Washing Facilities	5 Years Old	Pallipalayam Municipality	

Census and Baseline Socio- economic Survey Guidelines

A. Census Requirement and Contents

The date of census is the cut-off date for those who do not have legal standing for eligibility of assistance under the project. People moving into the project area after this cut-off date will not be entitled to support. Persons, who were not enumerated during the census but can show documentation or evidence that the person is rightfully a displaced person, will be included. TNUHDB is responsible for such verification. Only those displaced persons identified by TNUHDB will be considered eligible for support under the subproject.

B. Census Requirement and Contents

A census of households and individuals located within the project area has to be undertaken to register and document the status of the displaced persons. It will provide a demographic overview of the population served by the resettlement plans and profiles of household assets and main sources of livelihood. It will cover 100% of the potential displaced persons within the project impact area.

- (i) **Resource Base.** The resource base including land, water and forest etc., with an assessment of its development and ecological potential in the pre-project conditions. During the conduct of the census, legal boundaries of affected properties and the rights of way are to be verified. Structures trees and other assets are to be recorded.
- (ii) **Economy Base.** The economy base of the displaced persons including the type and quantum of production, consumption pattern, related economic institutions and allocation of various productive resources.
- (iii) **Household Census.** Household census covers immovable property owned by the displaced persons and other resources in their possession/use. These surveys will be carried out in association with local and host communities as well as with the local representatives.
- (iv) **Social Structures.** This includes social structure, norms, customs, cultural centers, and traditions, patterns of leadership and institutions of social network.
- (v) **Displaced Persons.** The census will identify tenants, encroachers and employees. During the census, those displaced persons who are dependent on the affected structure for their livelihood, shall also be identified and listed along with their income. Furthermore, the census will also identify displaced persons who are Scheduled Caste populations in accordance with lists of the Government, and the vulnerable displaced persons such as those above 60 years of age, physically handicapped and those BPL.

D. Census Procedures

3. The following procedures are to be adopted in carrying out the census:
 - (i) Preliminary screening to provide the minimum information on social impacts;

- (ii) Verification of boundaries of the project area, to document existing structures, land plots and other physical assets. This involves:
 - (a) Identification of suitable resettlement sites, in close proximity to the affected area if required;
 - (b) All encroachments, private assets, and other assets in the project area are to be documented;
 - (c) Assets, structures, land holdings, trees, etc. to be recorded; and
 - (d) All information is to be computerized; photography/video recordings to be used to document existing structures.
- (iii) The baseline socioeconomic survey shall cover information on the various categories of losses and other adverse impacts likely under the project;
- (iv) The census shall identify potential displaced persons with special attention to vulnerable groups; and
- (v) Assessment on the value of various assets to be made.

E. Database Management

- (i) **Data Sources.** As a pre-requisite for conducting the primary household surveys, relevant information is to be collected from secondary sources. These include:
 - (a) Revenue records maintained at the ULBs/District Collector's Office with regard to land particulars for facilitating the compensation of private assets and resettlement;
 - (b) Census records for demographic information;
 - (c) Planning Commission Department, to get information on various developmental programs for specific sections of population like those living BPL, Scheduled Castes, etc.; and
 - (d) Local organizations including NGOs in order to involve them and integrate their activities in the economic development programs of the displaced population.
- (ii) **Data Collection.** Household level contacts and interviews with each displaced household for completing the household socio-economic profile. Each of the households surveyed and the structure/ land likely to be affected by the project has to be numbered, documented and photographed. Public consultation exercises in different project areas to be conducted with the involvement of displaced persons. In these exercises, women are to be involved to elicit their views and opinions on the overall planning of resettlement activities. Discussions with a cross-section of the displaced persons will help towards understanding the problems and preferences of the displaced persons.
- (iii) **Data Analysis.** The analysis will cover population, population density, age, sex ratio, literacy rates/education, gender issues, religious groups, income, occupation and poverty line.

Data Update. The PID is responsible for implementation of the resettlement plans, should conduct a rapid appraisal to continuously update information.

Minutes of the Consultations

1

Inclusive, Resilient and Sustainable, Housing for the Urban Poor Sector Project in Tamil Nadu (IRSHUPSP)

Pallipalayam Consultations, March 2022 – a Report

Discussion with the District Collector, Namakkal

Time and date: 10.00 a.m., 30th March 2022

Venue: Collector's Chamber, Collectorate, Namakkal

The following people were participated in the discussion: No of Participants:

1. Ms. Shreya Singh, District Collector, Namakkal
2. Mr. Simpson, Consultant, ADB
3. Mr. S. Dhanasekaran, Executive Engineer, TNUHDB- Salem PID
4. Ms. Devika, CDO, TNUHDB – Salem PID

The District Collector, Namakkal District was met at the District Headquarters of Namakkal District. Pallipalayam, our project area is part of Namakkal District.

Simpson explained the purpose of the discussion with her, explained the project components in detail – which include design of the house, cost, amenities to be provided in the new resettlement area, distance of the new location from the current location, resettlement plans, tentative time taken for completion. Simpson also explained to her the Consultation plans, schedule, locations of the consultation and the sites covered in each of the consultations. The purpose of the consultation was discussed in detail.

Mr. Dhanasekaran explained to the District Collector various steps which have already been completed in connection with the project, the number of houses to be built and the current technical status of the project.

After the discussion, the District Collector assured the team of the support from the District Administration for the consultations and for the project. Since the local body elections have already been completed and elected representatives are in place, she suggested that we include elected representatives, who include Chairman of Town Panchayats, President of Rural Panchayats and Counsellors in the process of consultations where ever it is possible.

Consultation - I**Time and date:** 11.30 a.m., 30th March 2022**Venue:** Thevangoor Community Hall, Cauvery Nadhi Ora Street, Pallipalayam**Sites Covered:** Cauvery Nadhi Ora Street and Natta Gowdan Pudhu**No of Participants:** Male 42, Female 125 and the total 167**Officials Participated:**

1. Mr. S. Dhanasekaran, Executive Engineer. TNUHDB
2. Ms. D. Karthika, Revenue Inspector, Pallipalayam
3. Mr. Muthia Pillai, CCDO, TNUHDB
4. Mr. Sathiyathan, AE, PWD, Mettrur
5. Mr. A. Bosco, Social Development Specialist, TNUHDB
6. Mr. P. Ranjith Kumar, VAO, Pallipalayam

ADB Consultants:

1. Mr. Simpson, ADB Consultant
2. Mr. Pushpanathan, ADB Consultant

Ms. Devika, CDO welcomed the gathering and explained the purpose of the consultation.

Brochures were distributed to all participants of the consultation.

Mr. Simpson informed the participants that the major objectives of the consultation is to explain the project components and to listen to the participants their views and concerns if any. He



explained to the participants that the after a careful study and analysis that the Department of Housing, Government of Tamil Nadu through TNUHDB has designed this project with a financial support from the Asian Development Bank (ADB).

Simpson said that the people who are going to be resettled will be given with a house free of cost. The beneficiary will not be asked to pay any contribution towards the house and each house is worth of Rs. 12 lakhs (1.2 million INR). Besides the house, the new resettlement location designed with facilities such as water supply, electricity connection, bus stop with bus connectivity, Solar Street lights, Open market, Shopping complex, community hall, Primary school, Ration shop, Fruit Garden, Social gardening, walkway, parking facility, Sewage Treatment Plant (STP), rain water harvesting facility, solid waste management facility. He also mentioned about the shifting allowance of Rs. 10,000 per family, subsistence allowance of Rs. 2,500 for 12 months to each household during and after the resettlement.

Simpson also explained that the participants need not worry about the immediate months and they have time to prepare many things before the actual resettlement takes place. He further said that they will not be disturbed at least for another two years as the process of construction, allotment and transfer of legal title all of them need to be done before people would be asked to move from the current place; and he said that the process would take another couple of years for completion. He has requested people not to trust any false propaganda.



Mr. Dhanasekaran, Executive Engineer, TNUHDB explained the participants about the technical details of the project and the plan of each house which include a living room, bed room, a kitchen, bathroom and a washroom. He also mentioned about the facilities to keep the livestock.

Mr. Bosco explained the social security measures in the project and how gender sensitive that the project is going to be. He said as per the rules of the new government in Tamil Nadu, the title of all houses given through the TNUHDB will be in the name of a women of the family and therefore it will ensure a kind of inbuilt social security for women.

Mr. Pushpanathan explained the need for moving out of the current location on two grounds such as safety and environmental reasons. He also assured the people that the environmentally good houses and the blocks would be built with lot of ventilation and air circulation. He asked people to refer to the brochure given to them for information related to the environmental aspects and plans.

S. No	Issues and Concerns raised	Response.
1	We have been living here over 40 years and we want to stay here for the rest of our time.	However long you have been living here this can not be your own place
2	Give us patta for this place. This was promised by the then government 10 years ago	Patta cannot be given to anybody who is staying on an encroached land and more importantly near water body.
3	Patta is given to people living in far more remote places than where do we live. Give us Patta	In the new area of re-settlement, Patta will be issued to every individual and the property from then onwards would become your own and later your heirs.
4	Give us Individual houses instead of Apartments – we are not used to living in such houses	The Executive Engineer said that facilities are provided to anyone living anywhere because it is a basic need and that can not be claimed as a reason for over staying in the place.
5	We are comfortable in the current location with all facilities such as water, electricity, transportation connectivity.	It was also mentioned that the concerns and issues will be communicated to authorities for consideration if possible.

The consultation ended with a vote of thanks by Ms. Devika, CDO

Consultation - II

Time and date: 02.30 p.m., 30th March 2022

Venue: Mariyamman Temple Compound, Venkatesapuram, Pallipalayam

Sites Covered: Venkatesapuram

No of Participants: Male 13, Female 34 and the total 47

Officials Participated:

1. Mr. Muthia Pillai, CCDO, TNUHDB
2. Mr. Sathiyathan, AE, Mettur Section, PWD
3. Mr. A. Bosco, Social Development Specialist, TNUHDB
4. Mr. P. Ranjith Kumar, VAO, Pallipalayam

Civil Society Representatives:

1. Mr. Karthik raj, President, Town Panchayat
2. Ms. Shanmugapriya, Vice President, Town Panchayat
3. Mr. Gunasekaran, Counsellor
4. Mr. Chinnusamy, President, Disability Welfare Association, Pallipalayam

ADB Consultants:

1. Mr. Simpson, ADB Consultant
2. Mr. Pushpanathan, ADB Consultant

Ms. Devika, CDO welcomed the gathering and she explained the purpose of the meeting.

Brochures were distributed to the participants.

Mr. Muthia Pillai explained the Resettlement plan. He gave details of the house that is going to be provided to each of the families to be resettled. He mentioned about the size of the house, living room, bed room, kitchen and other rooms in the house. He also explained to the participants the allowances such as Rs. 10, 000 at the time of shifting, Maintenance allowance for a period one year at Rs. 2,500 per month. He said that a team of people would continue to visit and address issues and concerns during the process of construction and resettlement.



Mr. Simpson, ADB Consultant said that the officials have gathered here mainly to listen to the participants and he has assured the people that everyone will be given opportunity to express the views and opinion on the project and concerns if they any. Simpson informed the participants that this project implemented with a support from ADB will not ask the beneficiaries to pay any money as part of the contribution; instead, the house will be given completely free of cost. Simpson further said that the houses are built with quality and there will be very close monitoring of the quality both by the Government of Tamil Nadu (TNUHDB) and the Asian Development Bank.

Simpson explained the facilities that are planned to be provided in the campus within which the new houses are going to be built. The facilities would include regular water supply, electricity connection, bus stop with bus connectivity, solar powered street lights, open market, shopping complex, community hall, primary school, fair price shop, social gardening, walkway, parking facility, Sewage Treatment Plant (STP), rain water harvesting facility and solid waste management facility. He further said that the participants will not be disturbed at least for another two years as the process of construction, allotment and transfer of legal title all of them need to be done before people would be asked to move from the current place; and he said that the process would take another couple of years for completion.

He has invited people to bring to the notice of the officials at any point of time during the process of construction which would take at least two years.



Mr. Pushpanathan talked about the importance of moving out of this place as it would be safer to be away from flood and it will also help authorities to revive the water body for many different environmental reasons. Pushpanthan assured people of the quality construction and environmentally friendly living in the new location

S. No	Issues and Concerns raised	Response.
1	Will you remove people who live only on the edges of the bank or everyone	A proper study was done and list of houses to be resettled was prepared and it was adequately informed to the people concerned; and only those people would be resettled.
2	Will there be any provision to keep the livestock in the new place	A provision is made to keep the livestock in the new premises. You can check the facility while the process of construction going on
3	We have been living here for the past 45 years and allow us to stay here permanently.	The number of years lived will not guarantee entitlement of any encroached land especially on the water body; for safety and environmental reasons.

6

4	Now you give lot of promises of the new place but who will follow it up and ensure that they are actually given.	The Implementing agency – PIU, The EE, TNUHDB and another team that would stay with them were introduced to them.
5	What are the facilities you are planning to provide us in the new place.	Besides the house – free of cost the facilities to be provided include regular and proper water and electricity supply, drainage system, Primary health center, primary school, bus shelter and bus connectivity, playground, garden, walkway, ration shop (Public Distribution Shop), Multi-purpose open air market place and library, street lights with solar power, and parking place etc.
6	Explain the plan of the 400 sq ft house that you are planning for us.	The house will include a living room, bed room, kitchen, Bathroom and a washroom.
7	We have no problem here. Give us Patta instead of spending money on building a house in a new place.	Patta cannot be given to anyone if it is an encroached land which is otherwise be used for some other purpose.

The consultation ended with a vote of thanks by Ms. Devika, CDO-Salem PID

Consultation - III

Time and date: 11.00 a.m., 31st March 2022

Venue: Municipality Community Hall, Janatha Nagar, Pallipalayam

Sites Covered: Meenavar Street, Periyar Nagar and Janatha Nagar

No of Participants: Male 75, Female 109 and Total: 184

Officials Participated:

1. Mr. K. G. Nanjappan, Superintending Engineer, Coimbatore Division, TNUHDB
2. Mr. Tamilarasu, AEE, TNUHDB
3. Mr. A. Bosco, Social Development Specialist, TNUHDB
4. Mr. P. Ranjith Kumar, VAO, Pallipalayam
5. Mr. B. Gopi, Environmental Specialist, TNUHDB- Trichy Div.

Civil Society Representatives:

1. Mr. Selvaraj, Chairman, Pallipalayam Municipality
2. Mr. Balamurugan, Vice-Chairman, Pallipalayam Municipality
3. Mr. Yuvaraj, Counsellor
4. Ms. Mangala Azhagar, Counsellor
5. Mr. Saravanan, Counsellor
6. Mr. Senthil, Counsellor
7. Mr. Sampooranam, Counsellor
8. Ms. Shanmugapriya, Vice President, Town Panchayat
9. Mr. Gunasekaran, Counsellor
10. Mr. Chinnusamy, President, Disability Welfare Association, Pallipalayam

ADB Consultants:

1. Mr. Simpson, ADB Consultant
2. Mr. Pushpanathan, ADB Consultant

The Consultation started with a welcome note by Devika, CDO and she also introduced the purpose of the meeting.

Each of the participants was given a project brochure.



Simpson, ADB Consultant cleared the doubts of some people that the houses will not be disturbed immediately and it would take place at least after a couple of years as the process of construction requires time.

He explained that the consultation is for explaining all components of the project to the beneficiaries to make them completely informed of the development. He said it should be an informed concern of the people to get involved in the project. The second objective, Simpson explained is to listen to the participants about their views and concerns and to respond.

Simpson listed out the facilities to be provided in the new location such as regular water supply, electricity connection, bus stop with bus connectivity, solar powered street lights, open market, shopping complex, community hall, primary school, fair price shop, social gardening, walkway, parking facility, Sewage Treatment Plant (STP), rain water harvesting facility and solid waste management facility. Simpson said that the new houses, worth little more than Rs. 12, 00, 000 would be completely free of cost to the beneficiaries and there will not be any contribution from the beneficiaries collected.

It was also explained that the government, with a support from the Asian Development Bank provides new houses to the people who are in vulnerable area especially along the water bodies. There are 520 houses in this scheme and each of them is 400 square feet in size.



Pushpanathan informed the participants that the new houses will be constructed with high standards and with environmentally good. He mentioned that there will be a park, open area and the blocks are going to be well ventilated. Single unit of the house will also be built with adequate natural light and air.

Mr. Bosco informed the participants that a team of people would always be available during the next two years to listen to any issues and concerns and to take them to appropriate levels to rectify. He said that the project is designed with social security aspects including supporting them for new employment opportunities and skill trainings. He also said that the project is gender sensitive and will incorporate women empowerment components in it including giving the legal right of the new house in the name of a women in the house.

S. No	Issues and Concerns raised	Response.
1	Living in an apartment is difficult for us and we are not used to it. Give us independent houses.	The space constraint compels the Board to decide on the type of houses which can be provided to people free of cost.
2	We are living here for more than 32 years on a rented house and the owners do not treat us with respect therefore give us the new houses at the earliest.	The project would help people like immensely and we will work towards completing it within the given period.
3	I live on a rented house in the current location. Will you give me also a new house or it is only for the owner of the house?	The people who live in a rented house would be given house in the new site free of cost if they are listed among the people under the project.
4	I live here on a patta land for the past 53 years and why do you want to move me from here?	It is not possible for issuing patta for a land that belongs to the river. Encroachment can not be claimed a right to have entitlement.
5	I am a fisherman and I need to live here closer to the river. Build a wall if you think we need to be protected instead of shifting me to a new place.	The new location is not far from the current and it is just about 4 k.m. away. One can find ways to continue fishing or can take assistance from the project team which would help them in linking people with opportunities and skill development

The meeting ended with a vote of thanks by Devika, CDO – Salem PID

Consultation with the NGOs:

Time and date: 3.00 p.m., 31st March 2022

Venue: Municipality Community Hall, Janatha Nagar, Pallipalayam

ADB Consultant

1. Simpson, ADB Consultant

NGO Representatives:

1. Mr. Elangovan, Program Coordinator, Women's Organization in Rural Development.
2. Ms. Malar, Community Organiser, WORD, Pallipalayam
3. Ms. Radha, Community Organiser, WORD, Pallipalayam
4. Mr. V. Chinnu Samy, President, Disability Welfare Association, Pallipalayam

TNUHDB Team:

1. Ms. Devika, CDO, TNUHDB
2. Ms. Vinotha, Community Officer, TNUHDB
3. Ms. Shakila, Animator, TNUHDB
4. Mr. Salai Ganesh, Technical Assistant, TNUHDB
5. Mr. Rajalingam, Technical Assistant, TNUHDB
6. Ms. Uma Maheshwari, Community Participant Assistant, TNUHDB

A consultation was organised with NGOs working among the APs in the current location.

Ms. Devika welcomed the participants and introduced the project and its need. The NGO representatives asked few clarifications to understand the project better.

Mr. Simpson explained the following to the NGOs:

- Need and the significance of the project
- Resettling the people on a safe location
- Reviving the water body for wider environmental reasons
- Houses, design and composition and the free of cost
- Facilities to be provided within the compound where people are going to be resettled.
- Shifting allowance and maintenance allowance for one year
- Support for identifying employment opportunities
- Skill training to be given to people



Simpson also requested the NGOs to communicate the importance and benefits of the project.

The NGO representatives responded positively and assured that they would be talking to people about this project while they would be meeting them on other purposes. They also requested Mr. Simpson to convene another meeting where more NGOs can take part and be engaged in the good work of communicating to the APs who are going to be resettled.

Template for Information Disclosure

Sub-project Information	Description
Name of the subproject, executing agency/implementing agency and town	
Proposed subproject technical details and project benefits	
Summary of subproject impacts	
Entitlements	
Graduation program for livelihoods	
Relocation schedule	
Environmental assessment and mitigation plan	
Consultation and disclosure requirements	
Implementation arrangement and grievance redress mechanism (GRM) information	

Note: A subproject specific brochure has been prepared containing information about the project design, resettlement assistances available, grievance redressal mechanism and livelihood support through the graduation program. The brochure was printed and distributed during consultations. A copy of the brochure (in Tamil) distributed amongst affected families proposed for relocation to Pallipalayam resettlement site is given below



நகர்ப்புர ஏழை எளியோர்க்கான நிலையான ஒன்றிணைந்த வீடுகள் திட்டம்

பள்ளிபாளையம்

தமிழ்நாடு நகர்ப்புர வார்ட்டை. லாண்ட்டு வாரியம்,
5, காபாஜர் சாலை, சென்னை
மின்னஞ்சல் முகவரி : protuhdb@gmail.com
வலைத்தளம் : <http://www.tnscb.org>
அஞ்சல் குறியீடு : 600005

பிபி டிபான்
ஏஜன் டிபான்
ஏஜன் டிபான்
காடுகாட்டி டிபான்

ADB

வாழ்வாதாரம், விளையாட்டு உள்ளிட்ட சமூக வசதிகள்



சமூகப் பண்ணை



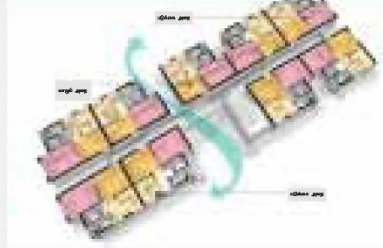
பிரதான வீதி



வீட்டுள் வரையம்



மாதிரி பிளாக் அமைப்பு - 3டி காட்சி



மாதிரி பிளாக் அமைப்பு - 3டி காட்சி



Sample Grievance Form
(To be available in Tamil)

The Proposed Inclusive, Resilient and Sustainable Housing for the Urban Poor Project welcomes complaints, suggestions, queries, and comments regarding program implementation. We encourage persons with a grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

In case you want to include your personal details but want information to remain confidential, please type CONFIDENTIAL above your name.

Date		Place of Registration	
Contact Information/Personal Details			
Name:		Gender: Male Female	Age:
Home Address			
Village/Town			
District			
Phoneno.			
E-mail			
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your Grievance below: If included as an attachment/note/letter, please mention here:			
How do you want us to reach you for feedback on your comment/grievance?			

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)			
Verified through:	Note/Letter	E-mail	Verbal/Telephonic
Reviewed by: (Names/Position of Official(s) reviewing grievance)			
Action Taken:			
Whether Action Taken Disclosed:		Yes	No
Means of Disclosure:			

Monitoring Indicators

Ref.	Resettlement and Rehabilitation Activities	Progress	Remarks
Preconstruction activities and R&R activities			
1	Assessment of resettlement impacts due to changes in project design (if required)		
2	Preparation/updating of resettlement plan based on changes in project design		
3	Approval of resettlement plan from ADB		
4	Disclosure of resettlement plan		
5	Establishment of Grievance Redress Mechanism		
6	Capacity building of PID		
7	Verification of displaced persons census list; finalization of compensation and assistance		
Resettlement plan implementation			
1	Disbursement of assistance to affected persons		
2	Disbursement of special assistance to vulnerable groups		
3	Relocation of affected persons		
4	Plan for retaining the community property resources		
5	Reinstallation of public utilities that are used by other user community (un-affected community)		
6	Records of grievance redressed		
7	Income restoration measures through training		
Income Restoration			
1.	Reestablishment of income generating activity to earlier levels of production / enterprise		
1.	Restoration of pre project income levels and living standard		
3.	Training provided		
4.	Sustainability of income activity		
5.	Adequacy of assistance for establishment of income activity		
Social measures during construction as per contract provisions			

Ref.	ResettlementandRehabilitationActivities	Progress	Remarks
1	Prohibition of employment or use of children as labor		
2	Prohibition of forced or compulsory Labor		
3	Ensure equal pay for equal work to both men and women		
4	Implementation of all statutory provisions on labor like health, safety, welfare, sanitation, and working		
5	Maintenance of employment records of workers		



TAMIL NADU URBAN HABITAT DEVELOPMENT BOARD

Project Name: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project.

BIDDING DOCUMENT

For

Procurement of works for

**Construction of 520 (G+3) tenements including Development works at
Pallipalayam scheme in Komarapalayam Taluk at Namakkal District.**

Under Open Competitive Bidding

(Following ADB's single stage two envelope bidding procedure)

Part 1 - Technical bid: Volume 2 – Technical Specifications

Issued on: 02 March, 2024

Invitation for Bids No.: IRSHUPSP/NCB/04

OCB No.: IRSHUPSP/PAL/04

Employer: Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu

Country: India

Issued by Office of
Superintending Engineer, Project Monitoring Unit,
Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project
Tamil Nadu Urban Habitat Development Board,
No.5, Kamarajar Salai, Chennai – 600 005,
Tamil Nadu, India.
E-mail: tnuhdbprocurement@gmail.com

GENERAL SPECIFICATIONS

The term Indian Standard Specifications herein after referred to as IS means the relevant Indian Standard Specifications with all Amendments published upto the date of submission of tenders.

A Statement of relevant IS applicable to this context, is as follows.

LIST OF INDIAN STANDARDS

Sl. No.	Short Title	I.S. Number
I.	CEMENT	
	Specification for 53 grade ordinary portland cement	IS: 12269:1987
	Specification for portland pozzolana cement – fly ash based	IS: 1489-1 : 2015
	Portland Slag Cement - Specification	IS: 455:2015
	43 grade ordinary portland cement - specification	IS: 8112-2013
	Ordinary Portland Cement , 33 grade- specification	IS: 269: 2015
II	COARSE AND FINE AGGREGATES	
	Specification for Coarse and fine aggregates for concrete	IS: 383-2016
	Specification for sand for plaster	IS: 1542:1992
	Specification for sand for Masonry Mortors	IS: 2116:1980
	Method of Tests for aggregates for concrete	2386-1963 (Part I to VII)
III	STEEL	
	High strength deformed steel bars and wires for concrete reinforcement -Specification	IS: 1786:2008
IV	CONCRETE	
	Plain and Reinforced Concrete – code of practice	IS: 456: 2000
	Concrete mix proportioning - Guidelines	IS: 10262: 2009
	Concrete admixtures - Specification	IS: 9103: 1999
	Code of practice for Ready-mixed Concrete	IS: 4926:2003
	Concrete structures for storage of liquids – code of practice – General requirements	IS: 3370 (part 1) : 2009
	Concrete structures for storage of liquids – code of practice – Reinforced cementstructures	IS: 3370 (part 2) : 2009
	Method of test for strength of concrete	IS:516-1959
V	FOUNDATION	
	Code of practice for design and construction of foundation in soils: GeneralRequirements	IS: 1904:1986
	Code of practice for design and construction of shallow foundations on rocks	IS 12070-1987

Sl. No.	Short Title	I.S. Number
	Code of practice for Site Investigations for foundations in gravel boulder deposit	IS: 10042-1981
	Code of practice for determination of Bearing Capacity of shallow foundations	IS: 6403-1981
	Code of practice for subsurface investigation for foundations	IS: 1892:1979
VI	BRICKS, BLOCKS AND OTHER MASONRY BUILDING UNITS	
	Specification for common burnt clay building bricks	IS: 1077: 1992
	Specification for Concrete Masonry units – Hollow and solid concrete blocks	IS: 2185 (part 1): 2005
	Autoclaved Cellular (aerated) concrete blocks	IS: 2185 (Part 3) : 1984
	Specification for burnt clay flyash building bricks	IS: 13757: 1993
VII	DESIGN LOADS	
	Design loads (other than earthquake) for buildings and structures – code of practice – Wind loads	IS: 875 (part 3): 2015
	Code of practice for design loads (other than earthquake) for buildings and structures – Dead loads	IS: 875 (part 1): 1987
VIII	CHEMICAL ADMIXTURES	
	Specification for admixtures for concrete	IS: 9103: 1999
IX	DOORS, WINDOWS AND VENTILATORS	
	Specification for wooden flush door shutters (solid core type)	IS 2202
	Plywood face panels	IS 2202 (Part 1): 1999
	Particle Board face panels and hardboard face panels	IS 2202 (Part 2): 1983
	Specification for steel doors, windows and ventilators	IS: 1038: 1983
	Specification for steel door frames	IS: 4351:2003
	Specification for solid panel foam UPVC door shutter	IS: 15931:2012
	Specification for moulded raised high density fibre (HDF panel door)	IS: 15380: 2003
	Specification for precast reinforced concrete door and window frames	IS: 6523:1983
	Specification for Door Shutters - Methods of Tests	IS 4020 (Parts 1 to 16) : 1998
X	DUCTILE DESIGN AND DETAILING	
	Ductile design and detailing of reinforced concrete structures subjected to seismic forces – code of practice	IS: 13920:2016
XI	EARTH QUAKE RESISTANT DESIGN	
	Criteria for earthquake resistant design of structures	IS:1893 (part – 1): 2016
	Earthquake resistant design and construction of buildings – code of practice.	IS: 4326: 2013

Sl. No.	Short Title	I.S. Number
	FIRE SAFETY	
XII	Code of practice for fire safety of buildings (general) : Details of construction	IS: 1642 (2013)
	Code of practice for fire safety of buildings (general) : Electrical Installation	IS: 1646 (2015)
	PILE FOUNDATION	
XIII	Guidelines for Non-destructive integrity testing of piles	IS: 14893: 2001
	Design and Construction of Pile foundations – code of practice – Bored cast in- situ concrete piles.	IS 2911 (part 1/ sec 2): 2010
	Design and Construction of Bored cast in- situ piles founded on rocks - guidelines	IS 14593: 1998
	STRUCTURAL SAFETY OF BUILDINGS	
XIV	Structural safety of buildings on shallow foundations on rocks – code of practice	IS: 13063: 1991
	PLUMBING SERVICES – WATER SUPPLY	
XV	Specification for UPVC pipes for potable water supplies	IS 4985:1995
	Code of practice for water supply in building	IS 2065:1983
	Laying and jointing of UPVC pipes	IS 7634 (part 3) : 2003
	PLUMBING SERVICES – DRAINAGE AND SANITATION	
XVI	Specification for UPVC pipes for soil and waste discharge systems inside buildings including ventilation and rain water system	IS 13592: 2013
	Specification for high density polyethylene pipe for sewerage	IS: 14333: 1996
	Specification for UPVC injection moulded fittings for soil and waste discharge system for inside and outside buildings including ventilators and rain water system.	IS 14735:1999
	Unplasticized non-pressure polyvinyl (PVC-U) pipes for use in underground drainage and sewerage system.	IS.15328:2003
	Code of practice for installation of Septic tanks	IS: 2470:1980 (part 1 and part 2)
	Handbook on water supply and drainage with special emphasis on plumbing	SP: 35: 1987
	Guidelines for roof top Rainwater Harvesting	IS: 15797:2008
	FLOORING AND WALL FINISH	
XVII	Specification for Ceramic Unglazed Vitreous acid resisting tiles	IS: 4457:2007
	Ceramic tiles – Method of test, sampling and basis for acceptance	IS 13630
	Specification for pressed ceramic tiles	IS: 15622: 2006
	EARTH WORK	
XVIII	Method of Measurement of building and Civil Engineer Works Part-I Earth work	IS: 1200-1992 (Part I)
	Safety code for excavation works	IS: 3764-1992

SI. No.	Short Title	I.S. Number
XIX	OTHER SUBJECTS	
	Recommendations on stacking and storage of construction materials at site	IS: 4082-1996

Note:

The General Technical Specifications shall be those confirming to the INDIAN STANDARD SPECIFICATIONS as published by BUREAU OF INDIAN STANDARDS (BIS) from time to time with all amendments published upto the date of submission or Tenders.

In the absence of any definite provision in the aforesaid specifications, reference may be made to the specifications prescribed in the Tamil Nadu Building Practice and where even these are silent, the construction shall conform to sound Engineering practice as approved by the Engineer. In case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the contractor.

“Equivalency of Standards and Codes: wherever reference is made in the contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, of relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified shall be accepted subject to the Project Manager’s prior review and written consent. Difference between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Project Manager at least 28 days prior to the date when the Contractor desires the Project Manager’s consent. In the event the Project Manager determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents”.

Note:

If any ambiguity or discrepancy is found in this Technical Specification, the Engineer shall issue any necessary Clarification or instruction in line with the prevailing Indian Standard codes.

SECTION - 1
SITE OF WORK

Clearing and Grubbing

Clearing and leveling Site

The portion of the right-of-way where required for constructing the work under these specifications shall be cleared of all trees, bushes, rubbish and other objectionable matter. Trees designated by the Engineer-in-charge shall not be cut and shall be protected from injury. Such cleared material shall be disposed of, as provided in sub-paragraph 'c' below or removed from the site of work before the date of completion of the contract as approved by the Engineer-in-charge. The clearing operation shall be in accordance with clauses 4.1, 4.1.1, 4.2 and 4.3 of I.S. 4701-1982 Indian code of practice for earth work in canals. Surface boulders either loose or partly embedded in the ground will have to be removed and stacked as directed.

Grubbing

The area described or shown on the relevant site plan shall be cleared of all obstructions, loose stones, non-required materials and rubbish of all kinds. All brushwood shall be cleared and the roots grubbed up. No trees shall be cut down and removed without the instructions of the Engineer-in-charge. Those which are cut down shall be grubbed up. The same remarks apply to jungle clearance. Trees to be preserved will be designated by the Engineer-in-charge. Those which are cut down shall be grubbed up. The same remarks apply to jungle clearance. Trees to be preserved will be designated by the Engineer-in-charge.

The products of the clearing shall be stacked in such place and manner as may be ordered by the Engineer-in-charge and the ground shall be left in a perfectly clean condition; all products of the clearing shall be the property of Government and shall be disposed of as the Engineer-in-charge may direct.

All holes or hollows, whether originally existing or produced by digging up roots shall be carefully filled up with earth, well rammed to the design density and levelled off, as may be directed.

Disposal of Cleared and Grubbed Material

The disposal of cleared and grubbed material shall be in accordance with clause 4.1.1 of I.S. 4701-1982 code of practice for earth work on canals. All waste materials to be burnt shall be piled neatly and when in suitable condition shall be burnt completely to ashes. Piling of waste material for burning shall be done at such a location and in such a manner as would not cause any fire risk. Necessary precautions shall be taken to prevent spreading of fire to areas beyond the limits of cleared site. Suitable materials and equipment for prevention and suppression of fire shall be kept available at all times.

The material to be disposed of may be buried for which Para 1.2 and 2 of specification 16 of TNBP shall apply.

Payment

For the clearance of scrub jungle, light jungle, heavy jungle with or without uprooting etc. Payment will be made as provided for in the tender documents. The contractor shall include the cost of clearing of site and grubbing in the price bid in the bill of quantities of the contract for the relevant finished item of work for which clearing and grubbing as mentioned in the above para are required unless otherwise it is given as a separate item in the contract. No payment towards removal of small stones and boulders of size less than 0.01 cubic metre will be made, and the rate quoted for excavation will be considered to include this item. However, payment will be made for the removal of surface boulders of sizes greater than 0.01 cubic metre but less than 3 cubic metres, either loose or partly embedded in the ground, at the rate quoted in bill of quantities for the actual quantity to be removed, based on stack measurement applicable for the relevant strata classification after deducting 40% towards voids.

Benching will be paid as separate item, per 1 (one) running metre of bench at the rate provided for in the tender documents.

Filling low lying area

- a) At any time during the execution of work, if it is found that the filling earth is transported from areas other than chosen for deepening Eri, payment will not be made and is liable to attract penalties.
- b) Pre-levels as taken by the Anna University / the agency designated by the Superintending Engineer will be given to the contractors for verification before commencement of work. If the contractor represents that the firm is not satisfied with the computation of levels, levels will be taken by Anna University / the agency designated by the Superintending Engineer in presence of the contractor. The contractor has to bear the charges.

The level furnished by Anna University / the agency designated by the Superintending Engineer is the final.

- c) After filling, final levels will be taken by Anna University / the agency designated by the Superintending Engineer. The contractor should sign the final levels also. Payment will be made based on the difference between the pre and final levels for the filled-up portions with the filling earth at different stages. The payment will be made as per the quantity computed by Anna University / the agency designated by the Superintending Engineer.
- d) If any intermediate payment is desired by the contractor, levels at that stage will be taken and quantity arrived at a deduction in the quantity will be made based on the consolidation achieved. The decision of the Executive Engineer is final and binding for proposing the quantity to be deducted for interim bills.
- e) Pre final payment shall however be restricted only to 90% of the total value of work satisfactorily completed and finally measured for. Pre-final payment will be assessed based on the consolidated final levels. Release of the remaining 10% shall be effected only after and immediate monsoon period of 3 months (October to December), but in any case not later than 12 months (Commencing from the last date of measurements). Shortfall if any should be made good by the contractor.
- f) The contractor shall make his own arrangements for the machineries, power roller, clean fresh water etc., for use on the works and shall meet all charges there for.
- g) The contractor shall make his own arrangement for the required machineries such as earth mover, bulldozer, lorry, tipper, power roller, vibratory roller. However, in case the Tamil Nadu Urban Habitat Development Board arranged for any item of the machineries / equipment's, the recovery shall be made as decided by the Tamil Nadu Urban Habitat Development Board, in addition to mobilization charges.
- h) No payment will be made for the excess earth brought by the contractor and such surplus earth brought to the site shall be disposed off by the contractor at his own cost in the places shown. The written instruction of the TNUHDB authorities should be obtained for bringing earth beyond the place originally located for refilling.
- i) Flood damages etc.:- The contractor may take insurance at his cost against losses due to the unprecedented floods and other and natural calamities. No claim shall be entertained on this account and paid for.
- j) The seignorage and other charges payable to the District Collector are to be borne by the contractor. The contractor should handover all the receipt of full payment made to the District Collector towards seignorage charges paid by him to the Executive Engineer. The receipt shall be in the name of the contractor concerned. If the seignorage charges part or full payment is not made to the District Collector, the amount due to the District Collector will be recovered from the bills.
- k) Only materials capable of giving on compaction in field, a dry density of more than 15.00 KN/m³ shall be used for the filling. For assessment of suitability of the materials for use in the work, the contractor may get the materials duly tested, for compact ability in the laboratory indicated by the Executive Engineer (at the cost of the contractor) in accordance with Proctor's Procedure. Notionally given a dry density of 16.50 KN/m³ or more on compaction at optimum moisture content in the laboratory are suitable for the work.
- l) Although the laying of materials shall proceed in 15cm layers and further consolidated, dry density tests will be carried out only when a consolidated thickness of 15cm is achieved.
- m) One set of two core samples for every 3000 square meter area of each layer shall be taken and tested. The average dry density shall not be less than 15.00 KN/m³. The contractor shall bear the expenses of the above tests, which shall be carried out in Highways research laboratory or any other lab as directed by the Executive Engineer.
- n) It is hereby made clear that for any stagnation of water or inundation of water due to any reason what so ever in the fillingsite or at the commencement of work at the time of handing over of site, for the execution of work or during execution of work, the contractor should make his own arrangement to bail-out the water at his own cost. The department will not accept or entertain any plea for bearing this cost or allowing extension of time on this score to complete the work.

Setting out of the work

Monsoon Damages

Damages due to rain or flood shall have to be made good by the contractor till the work is handed over to the department. The responsibility for desilting and making good the damages due to rain or flood rests with the contractor. No extra cost is payable for such operations and the contractor shall, therefore, have to take all necessary precautions to protect the work done during the construction period.

Removal of Silt and Water

Accumulated silt and water in the structures for the works partly done by the Contractor in this or previous seasons should be removed and no extra payment will be made, for such removal of silt and water. The unit rate of excavation is deemed to include cost for removal of such silt and water.

SECTION – 2

Excavation

Classification of Excavation

Except as otherwise provided in these specifications material excavated will be measured in excavation to the lines shown on the drawings or as provided in these specifications and all materials as required to be excavated will be paid for at the applicable price bid in the schedule for excavation. No additional allowance above the price bid in the schedule will be made on account of any of the material being wet. Bidders and the contractors must assume all responsibility for deducing and concluding as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavation. The Government does not represent that the excavation can be performed and maintained at the paylines described in these specifications as shown on the drawings.

Excavation for Structures

General

Excavation for the foundation of structures shall be to the elevation shown on the drawings or as directed by the Engineer-in-Charge. In so far as practicable the material removed in excavation for structures shall be used for backfill and embankments.

Foundations for Structures

All trenches in soil other than rock or hard compact soil more than 1.5m deep, into which men enter shall be securely shored and strutted and timbered.

All trenches in soil soft or fissured rock or hard soil exceeding 2 m in depth, into which men enter shall be securely shored and timbered.

Notwithstanding anything said above, it shall be understood that the need for shoring shall receive careful and frequent consideration even in trenches of less than 1.5 or 2m in depth (as the case may be). When there is doubt as to the safety of the work without shoring, no further, excavation or other work shall be continued until adequate shoring is provided.

Where the sides of trenches are sloped but not to within 1.5m of the bottom the vertical sides shall be shored and the shoring shall extend at least 30 cm above the vertical sides. When open spaced sheathing is used, a toe board shall be provided to prevent material rolling down the slope and falling into the part of the trench with vertical walls.

Shoring and timbering shall be carried along with the opening of the trench but when conditions permit protection work, such as sheet piling may be done before the excavation commences.

All loose stones, projecting clumps of earth, pockets of unsuitable material which might come down on the workers in the trench or any condition which is a hazard, shall be either removed or the excavated sides adequately braced and the trench suitably guarded. On steps slopes workmen shall not be permitted to work one above the other.

The contractor shall prepare the foundations at structure sites by methods which will provide firm foundation for the structures. The bottom and side slopes of common excavation upon or against which the structure is to be placed shall be finished to the prescribed dimensions and the surfaces so prepared shall be moistened and tamped with suitable tools to form firm foundation upon or against which to place the structure. The contractor shall prepare the foundation for the structures as shown on respective drawings. The natural foundation material beneath the

required excavation shall be moistened if required and compacted in place.

If the Engineer-in-Charge considers it necessary to consolidate the foundation strata by grouting cement slurry, the drilling and grouting or any other foundation treatment shall be done by the contractor as directed by the Engineer-in-Charge and the payment will be as per the general contract document in respect of extra items. Densities of the compacted foundation materials and the testing thereof shall be in accordance with paragraph 3.1.2.

Separate payment will not be made to the contractor for moistening and compacting the foundation of structures. The contractor shall include cost thereof in the price bid per cubic metre of the item of the bill of quantities for preparation of foundations.

When unsuitable material is encountered in the foundation for structure the Engineer-in-Charge will direct additional excavation to remove the unsuitable material. The additional excavation shall be refilled as follows. In excavation in soils, the over excavation shall be filled in by selected bedding material and compacted. In excavation in rock it shall be filled by cement concrete 1:5:10 (One cement, five sand and ten aggregate of maximum size 40mm by volume). No separate payment for excavation backfill will be made as per clause 3.2.2(a).

Extra Excavation and Over Excavation

Should remains of old building, be met with the material shall be removed with wedges and levers. Blasting will not be allowed, without the permission in writing of the Engineer-in-Charge.

If bad ground or loose soil is met with, the contractor, will be responsible for reporting the to the Engineer-in-Charge who will issue such orders as may be necessary. For extra, concrete and masonry arising from bad ground, the contractors shall be paid treating this as additional quantity as per the contract data of contract documents.

All excavated earth, which is unfit or surplus to requirements for filling in, shall be spread as instructed by the Engineer - in-Charge at the contractor's expense.

If at any point, in common excavation the foundation material is excavated beyond the lines required to receive the structure or if at any point, in common excavation the natural foundation material is disturbed or loosened during the excavation process, it shall be compacted in places or where directed, it shall be removed and replaced as prescribed by the Engineer-in-Charge. Any excess excavation or over excavation performed by the contractor for any purpose or reason except for additional excavation as may be prescribed by the Engineer-in-Charge and whether or not due to the fault of the contractor shall be at the expense of the contractor. Filling for such excess excavation or over excavation shall be at the expense of the contractor.

Measurement for Payment

Excavation for structures will be measured for payment, for box cutting with vertical sides, of foundation dimensions. The contractor will have to make his own arrangements for shoring, strutting provision of adequate slopes for the sides to prevent slips etc. and no separate charge will be paid for any incidental charges arising either during excavation of foundation or construction of the structure.

The quantity for payment of excavation in soils and rock will be arrived at by taking pre levels and finished levels of respective strata. Block levels will be taken at one metre or closer intervals. The levels will be plotted on a graph sheet and average levels arrived at for purpose of determining the quantity of excavation. The contractor has to sign or his acceptance has to be recorded in the cross section sheets. Final payment will be based on levels only. The contractor shall expose the surface of the strata for the inspection of Engineer-in-Charge for taking levels whenever the classification in strata gets changed.

Payment

Payment for excavation for structures will be made at the unit price per cubic metre in the bill of quantities for excavation for structures shall include the cost of all labour and materials for construction, with of all pumping and dewatering, of all other work necessary to maintain the excavation in good order during construction, where required shall include the cost of disposal of the excavated material except that required overhaul will be paid for.

SECTION – 3 MASONRY WORKS

Section 3.1 Materials

M-Sand For Masonry

a) General

The term M-sand is used to designate fine aggregate with maximum size of particle 4.75 mm. The M-sand shall be of course category conforming to the Indian Standard Specifications IS-2116-1980. 'Sand for masonry mortars' as revised from time to time.

Where M-sand from different sources are being used at the same time, these shall be blended to ensure uniform grading in successive batches. Variations in the grading of M-sand being obtained from the same source shall be controlled by means of the fineness modulus test.

The following control limits shall be used.

Controlled to limits of plus and minus 0.25 of running average of ten consecutive test samples. For natural sand, fineness modulus shall be greater than 2.30 and less than 3.10.

For manufactured sand, the specifications should be the same as in relevant section under specifications for concrete.

b) Quality of sand

The sand shall consist of natural sand, crushed stone or crushed gravel sand, or a combination of any of these.

The sand shall be hard, durable, clean and free from adherence coatings and organic matter and shall not contain more than permissible limit of clay balls or pellets as specified further below.

The sand shall not contain any harmful impurities, such as iron pyrites, alkalis, salts, coal, mica shale or similar laminated or other materials in such form or in such quantities as to affect adversely the hardening, the strength, the durability or the appearance of the mortar applied or to attack any reinforcement used in the masonry work.

The permissible limits of all deleterious materials, organic and inorganic impurities and all relevant tests for the fine aggregate should satisfy with IS 383 – 2016 and IS 2386-1963.

Sand shall generally conform to specifications given in paragraph 6.3.6 except that the sand for mortar shall conform to the grading of sand given in clause 4 of **I.S.2116-1980** as detailed below, in Table 4(B).

Table 3 (B): Grading of sand for use in Masonry Mortars

I.S. Sieve Designation Mass	Percentage passing by Mass
4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 micron	40 to 100
300 micron	5 to 70
150 micron	0 to 15

A sand whose grading falls out-side the specified limits due to excess or deficiency or coarse or fine particles may be processed to comply with the standard by screening through suitably sized sieves and/or blending with required quantities of suitable sized sand particles. If the sand brought to site is not clean, it must be washed clean in water. Fine dirt sand, or sea sand, or sand containing saline impurities shall on no account be used.

c) Cost

The cost of sand for masonry will not be measured and paid separately and the cost of sand including the cost of stripping and transporting and storing and royalty charges shall be included in the unit price per cubic metre bid therefore in the relevant item of work in the bill of quantities for which this sand is required.

d) Cement

The contractor has to make his own arrangement for procurement of cement of required specifications. Ordinary portland cement conforming to I.S.269-2015 shall be used for Masonry works. Portland pozzolana cement conforming to I.S.1489-2015 may also be used for masonry work, in the event of non-availability of ordinary portland cement with the approval of Engineer-in-charge.

e) Water

The permissible limits for water to be used in Construction works such as Concreting, Masonry works, curing etc., should be in accordance with IS 456-2000.

Mortar

Preparation of Mortar

Unless otherwise specified the cement mortar used in masonry works shall be cement mortar mix 1:4 (one cement four sand by volume). Mixing shall be done thoroughly preferably in a mechanical mixer. In such case, the cement and sand in the specified proportion shall be mixed dry thoroughly in the mixer operated manually or by power. Water shall be added gradually and wet mixing continued at least for 2 minutes. Water should not be more than that required for bringing the mortar to the required working consistency as specified in clause 9.1.1 of I.S. 2250-1981. The mix shall be clean and free from injurious kind of soil, acid, alkali, organic matter or deleterious substances.

Time of use of Cement Mortar

Cement mortar shall be used as soon as possible after mixing before it has begun to set, within 30 minutes after the water is added to the dry mixture. Mortar unused for more than 30 minutes should not be used and shall be removed from the site or work. The cost of such wasted mortar shall be borne by contractor. The use of retempered mortar will not be permitted to be used for the masonry.

Tests of Mortar

Mortar test cubes shall be cast for the mortar used on the work and shall be tested in accordance with Appendix-A of I.S. 2250-1981 code of practice for preparation and use of Masonry mortars. Such cubes shall develop a compressive strength of at least 50 Kgs./Sq.cm for cement mortar mix, 1:5 and 75 kgs./Sq cm for mortar mix 1:4. Mortar not conforming to the specifications will be ejected and the cost of such wasted mortar shall be borne by the contractor.

Measurement and Payment

Cement mortar will not be measured and paid separately and its cost including cost of materials, mixing, transporting and placing shall be included in the unit price per cubic metre in the bill of quantities of the contract.

3.3.Curing

All masonry surfaces shall be treated as specified to prevent loss of moisture from mortar until the required curing period is elapsed or until prior to placement of other masonry or concrete or backfill against surfaces. The contractor shall make his own arrangements to procure and convey water for curing.

All masonry built with cement Mortar shall be kept watered continuously for a minimum period of two weeks from the date of construction. Watering shall be done carefully so as not to wash out the mortar, joints or disturb the masonry in any manner.

If the contractor fails to do curing to the satisfaction of the officer in charge of the work, the latter will either make arrangement for curing the masonry at the risk and cost of the contractor or order the masonry to be pulled down. The masonry so pulled down should be rebuilt by the contractor at his own cost.

SECTION – 4 PLASTERING AND POINTING

Materials

Sand for Mortar for plastering and Pointing

General

Sand in Mortar for plastering and Pointing generally conform to specification as per IS 1542-1992.

The particle size grading of sand for plaster work for internal as well as external walls and ceiling as analyzed by the method described in IS 2386 (Part 1) : 1973 shall be as specified in Table 4 (A). Where the grading falls outside the limits of the grading zones of sieves other than 150, 300 and 600 micron IS Sieve by a total amount not exceeding 5 percent, it shall be regarded as falling within the grading.

Table 4 (A)

Requirement of Grading for sands for External Plastering and Rendering

I.S. Sieve Designation	Percentage by weight passing I.S. Sieve
10.00 mm	100
4.75 mm	95 to 100
2.46 mm	95 to 100
1.10 mm	90 to 100
600 microns	80 to 100
300 microns	20 to 65
150 microns	0 to 15

NOTE - For crushed stone sands and crushed gravel sands, the permissible limit on 150 micron IS Sieve is increased to 20 percent. This does not affect the 5 percent allowance.

Cost

The cost of sand for mortar for plastering and pointing will not be measured and paid separately and the cost of sand including the cost of stripping and transporting and storing and royalty charges shall be included in the unit price per m3 bid therefore in the relevant item of work in the bill of quantities for which this sand is required.

Cement

Ordinary portland cement conforming to IS 269-2015 shall be used for preparation of mortar for plastering, pointing and for masonry work. In the event of non-availability of ordinary portland cement, portland pozzolana cement conforming to IS 1489- 2015 may be used with the approval of Engineer-in-charge.

Water

The permissible limits for water to be used in Construction works such as Concreting, Masonry works, curing etc., should be in accordance with IS 456-2000.

Mortar

Preparation of Mortar for plastering work

Unless otherwise specified in BoQ, the cement mortar used in plastering work shall be in cement mortar 1:3 (one cement, three sand by volume).

Preparation of Mortar for Pointing

The cement mortar used in pointing work shall be cement mortar mix 1:4 (one cement four sand by volume).

Plastering with cement Mortar

Preparation of surface

The roughening of the background improves the bond of plaster. All joints shall be thoroughly raked. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering as otherwise freshly exposed surface may tend to absorb considerable amount of water from the plaster. The surfaces shall be wetted evenly before applying the plaster. Care shall be taken to see that the surface is not too dry as this may cause lack of adhesion or excessive suction of water from the plaster. A fog spray may be used for this work. As

far as possible, the plaster work shall not be done under hot sun.

1.3.2 Laying,of plastering with cement mortar

The mortar used for plastering shall be stiff enough to cling and hold when laid. To ensure even thickness and true surface, plaster shall be applied in patches of 150 mm x 150 mm of the required 20 mm thickness at not more than 2 metres intervals horizontally and vertically over the entire surface to serve as guides. The surface of these guides shall be truly in the plane of the to be finished plaster surface and truly plump. The mortar shall then be applied to the surface to be plastered between the guides with a trowel. Each trowel full of mortar shall overlap and sufficient pressure shall be used to force it into thorough contact with the surface. On relatively smooth surfaces, the mortar shall be dashed on with the trowel to ensure adequate bond. The mortar shall be applied to a thickness slightly more than that specified, using a string, stretched out between the guides. This shall then be brought to a true surface by working with a long wooden float with small-motion. The surface shall be periodically checked with a string stretched across it. Finally, the surface shall be rendered smooth with a small wooden float, over working shall be avoided. All corners, rises and junctions shall be brought truly to a line with the necessary rounding or chambering.

If it is necessary to suspend the work at the end of the day it shall be left in a clean horizontal or vertical line not nearer than 150 mm from any corner or rises or on parapet tops or on cooings etc. when recommencing the work, the edges of the old work shall be scraped clean and treated with cement slurry before the new plaster is laid adjacent to it. After the first coat is done it shall be kept undisturbed for the next 24 hours and thereafter kept moist and not to be permitted to dry until the final rendering is applied.

After the plaster has sufficiently hardened cement slurry with cream like consistency shall be applied as thinly and evenly and rubbed to a fine condition. The finished surface shall be cured with water for a minimum period of 14 days.

Should the mortar crack or perish, the work shall be removed and redone at the contractor's expense or should the contractor fail to cure the work to the satisfaction of the Engineer-in-charge the latter may cure the work at the risk and cost of the contractor.

All portions which sound hollow when tapped or found to be soft or otherwise defective shall be cut out in regular shape and redone as directed by the Engineer in charge.

Measurement and payment

a. Plastering

The measurement of plastering will be in units of square metres and it shall be paid at the relevant unit prices bid per one square metre of plastering in the bill of quantities which unit price shall include the cost of materials, their conveyance, charges for preparation of mortar including mixing charges and charges for performing the plastering work as illustrated in this division including curing.

b. pointing

Unless specified in the contract document, no separate payment will be made for pointing random rubble masonry and coursed rubble masonry and the unit prices for the rubble masonry in the bill of quantities, shall include the cost of materials, their conveyance, charges for preparation of mortar including mixing charges and charges for performing the pointing work as illustrated including curing.

SECTION – 5 CONCRETE

General concrete Requirements

Composition

a. General

The I.S. 456- 2000 code of practice for plain and reinforced concrete shall be followed.

Concrete shall be composed of cement, sand, coarse aggregate water and admixtures (if any) as specified and all well mixed in batching plant by weight or in concrete mixer and brought to the proper consistency. The contractor shall provide such means and equipments as are required to accurately determine and control the relative amounts of various material required for the concrete. Such means, the equipment and its operation shall be subject, at this time, to the approval of the Engineer-in- charge. The measuring and weighing equipment shall operate with the degree of accuracy specified by the Engineer in charge.

For works in which water tightness is required the specification in I.S.3370 (part 1 & Part 2) 2009 shall be applied.

Mixing

Concrete shall be mixed in a mechanical mixer and shall be as dense as possible, plastic enough to consolidate well and stiff enough to stay in place on the slopes.

Mixing shall be continued until there is a uniform mixing of the materials and the concrete is uniform in colour and consistency. The mixing time shall be at least 2 min as per IS 456-2000.

Concrete classification

It is related to the specified 28 days compressive Strength as provided in the Table below:-

Classification of concrete (IS.456-2000)	Max. size Aggregates (mm)	Characteristic Compressive Strength N/mm ² for 15 cm cube at 28 days
1. M-10	40	10
2. M-15	40/20	15
3. M-20	20	20
4. M-25	20	25
5. M-30	20	30

The minimum frequency of sampling of concrete of each grade and Test Specimen shall be in accordance with the clause 15 of IS 456-2000.

The test shall satisfy the following criteria

- i. The average strength of any 3 consecutive sample shall be greater than the specified strengths;
- ii. The overall coefficient of variation for any ten consecutive sample strength shall be less than 15%;
- iii. Not more than 10% of the specimen strengths shall be less than 85% of the specified strength.

Note: The mix shall be designed to produce the grade of concrete having the required workability and characteristic strength not less than appropriate values given in above table.

a. Nominal maximum size of aggregates

For sizes of aggregates IS 383-2016 shall apply. The coarse aggregate to be used in concrete shall be as large as practicable, consistent with required strength, starting of reinforcement and embedded items, and placement thickness. The size of the coarse aggregate to be used will be determined by the Engineer-in-charge and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregate for concrete in structures shall be as indicated in the relevant drawings appended to the contract documents. Smaller coarse aggregate than specified shall be used where the opinion of the Engineer-in-charge that proper placement of concrete is impracticable with the size of the aggregate specified in the drawings.

Designation of size	Nominal size range
20 mm aggregate	4.75 to 20 mm
40 mm aggregate	20 mm to 40 mm

generally coarse aggregate of maximum nominal size of 40 mm shall be used in M 7.5 and of 20 mm size in M 10 grade concrete bed.

A. Mix proportions

The proportions of various ingredients to be used in the concrete for different items of the work are given in the bill of quantities. In proportioning concrete, the quantity of both cement and aggregate should be determined by mass. Water shall be either measured by volume in calibrated tanks or weighed. Wherever the quantity of concrete involved in a particular work is small, nominal mix concrete may be allowed with the specific approval of the Engineer-in-charge who may also allow volumetric batching/proportioning for the restricted quantity. The proportion of materials for nominal size concrete shall be in accordance with IS 456-2000. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked. Adjustments shall be made as directed to obtain concrete having suitable workability, impermeability, density, strength and durability with out the use of excessive cement. The acceptance of rejection of concrete shall be as per the acceptance criteria laid down in clause 15 of I.S.456-2000.

The net water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water cement ratio for various grades of concrete shall be as determined and ordered by the Engineer- in-charge. Admixtures of pozzolana, if ordered, shall conform to the requirements specified in I.s. 9103-1979 (Indian Standard Specification for admixtures for concrete).

Test Strength of samples

The test results of the sample shall be the average of the strength of three specimens. The individual variation should not be more than ± 15 percent of the average. If more, the test results of the sample are invalid.

Standard Deviation

i) Standard deviation based on test result

a) Number of test results:-

The total number of the results required to constitute an acceptable regard for the calculation of standard deviation shall be not less than 30 attempts shall be made to obtain the 30 test results, as early as possible, when mix is used for the first time.

(ii) Determination of standard deviation:-

(a) Concrete of each grade shall be analysed separately to determine its standard deviation

(b) The standard deviation of concrete of a given grade shall be calculated using the following formula from the results of individual test of concrete of that grade

$$\text{Estimated standard deviation} = \sqrt{\frac{\sum \Delta^2}{n-1}}$$

Where T = deviation of the individual test strength from the average = number of sample test results

Where sufficient test results for a particular grade of concrete are not available the value of standard deviation given in the following table may be assumed.

Table (as per IS 456, 2000)

Grade of Concrete Deviation-(N/mm ²)	Assumed standard
M10.....	3.5
M15.....	3.5
M20.....	4.0
M25.....	4.0
M30.....	5.0

Acceptance Criteria

The Characteristic Compressive Strength Compliance Requirement should be in accordance with the Table 11 of IS 456-2000:

Concrete is liable to be rejected if it is porous or honeycombed; its placing has been interrupted without providing a proper construction joint. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-charge.

d. Consistencies

The degree of Workability and Slump value should conform IS 456 – 2000 and IS 1199 – 2018.

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Engineer-in-charge reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Engineer-in-charge. The use of any equipment which will not readily handle and place concrete of the specified slump will not be permitted.

To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted to compensate for any variation in the moisture content or grading of the aggregates as they enter the mixture. Addition of water to compensate for stiffening of the concrete after mixing but before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

Design Mix

The Contractor must furnish the Design Mix proportion to be adopted in the Ready Mix Concrete works as per the agreement specification, obtained from Anna University, Chennai / IIT, Madras / P.W.D for using in this work within 45 days from the Date of acceptance of Agreement in consultation with the Executive Engineer concerned. The site will be handed over to the successful tenderer immediately after obtaining the Design Mix proportion or 45 days from the date of signing of the Agreement, whichever event occurs earlier and the period of contract will be reckoned from the date of handing over of the site. In the event of failure to submit the Design Mix within the stipulated period of 45 days, it can be submitted after the handing over of the site on the 45th day. However, the connected concrete works should be commenced only after the submission of the Design mix to the satisfaction of the S.E/E.E.. Obtaining of Design Mix in time as stated above, is the sole responsibility of the successful tenderer and TNUHDB will not be held liable in whatsoever manner it may be. No price escalation will be allowed on account of this provision which is mainly intended to provide a reasonable work plan for the completion of works. The Superintending Engineer reserves the right to cancel the agreement or to withdraw this time concession at his/her site discretion and if necessary at the risk and cost of the contractor if there is a delay or willful misuse of the provision by the successful tenderer in this regard. This condition is applicable only when Design Mix parameters are involved in the contracts. Otherwise this condition will not be applicable.

5.1.2. Concrete quality Control Measures and concrete quality Assurance Test programme

a. Concrete quality Control Measures

The contractor shall be responsible for providing quality concrete to ensure compliance of the contract requirements.

- b. Making and curing concrete test specimens in the field: will confirm to I.S. 516-1959.
- c. Capping cylindrical concrete specimens will conform to I.S.516-1959.
- d. Compressive strength of concrete specimens will conform to I.S.,516-1959 and para 16 (16.1, 16.2 & 16.3) of I.S. 456-2000-core testing.

b. Sampling Procedure and Frequency

A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested., i.e. the sampling should be spread over the entire period of concreting and should cover all mixing units.

c. Frequency

The minimum frequency of sampling of concrete of each grade shall be in accordance with the following:

Quantity of concrete M ³	Number of samples
1 to 5	1
6 to 15	2
16 to 30	3
31 to 50	4
51 and above part thereof.	4 plus one additional sample for each additional 50 M3 or part thereof.

Note: At least one sample shall be taken from each shift. Where concrete is produced at continuous production unit, such as ready-mixed concrete plant, frequency of sampling may be agreed upon mutually by suppliers and purchasers.

Test Facilities

The Samples shall be collected and the tests conducted in the presence of the engineer or his authorized representatives. Alternatively, the contractor may test the materials during execution of works at the laboratories approved by the Engineer at the contractor's own cost provided that the samples are collected and given proper identification marks in the presence of the engineer or his authorized representative.

5.1.3 Cement

a) General

Cement shall conform to clause 4 of I.S. 456-2000 for the purpose of specifications. Cement used shall be one of the following two types with prior approval of the Engineer-in-charge.

1. ordinary or low heat portland cement conforming to I.S.269-2015 (I.S. Specification for ordinary and low heat Portland cement third revision).
2. The provisions of this paragraph apply to cement for use in cast-in-place concrete required for items such as concrete pipes, precast concrete structural members and other precast concrete products, for grout and mortar and for other items is provided for in the applicable paragraphs of these specifications covering the items for which such portland cement is required.

The contractor shall make his own arrangements for the procurement of cement for the work either bagged or in bulk as required by specification of the works. Each shipment of bagged cement shall be stored separately so that it may readily be distinguished from other shipment and shall be stored in a dry enclosed area protected from moisture. Storage of materials shall be as described in I.S.4082-1977 (I.S. Recommendation on stacking and storage of construction materials at site). To prevent undue aging of bagged cement after delivery, the contractor shall use bags of cement in the chronological order in which they were delivered to the job site. All storage facilities shall be subject to approval of the Engineer-in-charge and shall be constructed to prevent easy access for inspection, and identification.

3. Acceptancy of cement

Tested cement will be supplied by the contractor according to clause 10.1 of I.S. 269-2015 in the Building centre of TNUHDB/Anna University / IIT, Madras / Central and State Govt. laboratories and necessary certificate to be produced before its actual use in the work, with the prior approval of the Executive Engineer.

- (a) The samples for the test should be collected only in the presence of the Executive Engineer or the officers authorized by him.
- (b) The contractors should inform the Executive Engineer in charge of the work about the arrival of cement consignment, each time and maintain minimum stock of cement quantity as specified by him.
- (c) The rejected cement consignment if any should be removed from the site immediately at their risk and cost.
- (d) The quantity of cement required for testing shall be supplied by the contractors at free of cost.
- (e) The contractors are responsible for the storage of cement and make all arrangements for the stock and safety at site of work.
- (f) The contractors should produce the manufacturer's certificate for which the cement supplied by them.

- (g) The contractors shall procure in standard packing of 50kg per bag from the authorized manufactures. The contractors shall make necessary arrangements at their own cost to the satisfaction of Engineer-in-charge for actual weight of random sample from the available stock and shall conform with the specification laid down by the Indian Standards Institution as per IS 8112/1989.
- (h) The contractor shall store the cement of 30 days requirement at least in advance to ensure the quality of cement to be brought to site and shall not remove the same without the written permission of Engineer-in-charge.
- (i) The contractor shall further at all times satisfy the Engineer-in-charge on demand by production of records and test books or by submission of returns and other proofs as directed that the cement is being used as tested and approved by Engineer-in-charges for the purpose and the contractor shall at all times keep his record upto date to enable the Engineer-in-charge to apply such checks as he may desire.

4. Recovery of Cost of cement in wasted concrete etc.

The cost of cement used in wasted concrete, in replacement of damaged or defective concrete, in extra concrete required as a result of over excavation, and in concrete placed by the contractor's operations shall be borne by the Contractor himself. No extra payment will be made to contractors for such additional quantity.

Admixtures

The contractor shall use Air Entraining admixtures as directed by the Engineer-in-charge.

Admixtures shall be of uniform consistently and quality and shall be maintained at the job site at uniform strength of solution. Admixtures shall be batched in liquid form in containers capable of measuring at one time the full quantity of each admixture required for each batch chemical admixtures which harm the quality and strength of concrete shall not be used in the concrete.

Admixtures to be used in concrete shall confirm to I.S. 9103-1979 Indian Standard Specifications for Admixtures for concrete.

Water

The water used in making a curing of concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter injurious amounts of oils, acids, salts and other impurities etc. as per I.S. specification No.456-2000.

The Engineer-in-charge will determine whether or not such quantities of impurities are objectionable.

Such determination will usually be made by comparison of compressive strength, water requirement, time of set and other properties of concrete made with distilled or very clean water concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with I.S. 3025-1964 shall be as tabulated below.

PERMISSIBLE LIMITS FOR SOLIDS IN WATER

1. Organic	Maximum permissible limit 200 mg / litre
2. Inorganic	300 mg / litre
3. Sulphate (as So4)	500 mg / litre
4. Chlorides (as CL)	2000 mg / litre for plain concrete work and 500 mg / litre for RCC work..
5. Suspended matter	2000 rng / litre

If any water to be used in concrete, mortar, or grout is suspected by the Engineer-in-charge of exceeding the permissible limits for solids, samples of water will be obtained and tested by the Engineer-in-charge in accordance with I.S. 3025-1964.

Sand (Fine Aggregate)

a. General

The term sand is used to designate aggregate most of which passes 4.75 millimeter I.S. sieve and contains only so much coarse materials as permitted in clause 4.3 of I.S.383-2016. Sand shall be predominantly natural sand which may be supplemented with crushed sand to make up deficiencies in the natural sand gradings.

All sand shall be furnished by the contractor from any approved sources specified in the contract.

Sand as delivered to the batching plant. Shall have a uniform and stable moisture content. Determination of moisture content shall be made as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge according to weather conditions (I.S. 456-2016).

b. quality

The sand shall consist of clean, dense, durable, uncoated rock fragments, as per I.S. 383-2016. Sand may be rejected if it fails to meet any of the following quality requirements.

Organic Impurities in sand

Colour no darker than the specified standard in clause 6.2.2 of I.S. 2386 part 11 1963. (Indian Standard method of test for aggregates for concrete parts estimation of deleterious materials and organic impurities).

Sand shall be screened before use. If sand brought to site is not clean it must be washed clean in water. Fine drift sand or sea sand or sand containing saline impurities shall on no account to be used.

Sodium Sulphate Test for Soundness

The sand to be used shall pass a sodium or magnesium sulphate accelerated test as specified in I.S. 2386 (Part-V) 1963 for limiting loss of weight.

Specific Gravity:

2.6 Minimum

Deleterious

substances

The amounts of deleterious substances in sand shall not exceed the maximum permissible limits prescribed in table 1 clause 3.2.1 of I.S.383-2016 and shall be described as Fine aggregates, grading zones – I,II,III and IV, sand complying with the requirements of any of the four grading zones is suitable for concrete. But, sand conforming to the requirements of grading zone- IV shall not be used for reinforced cement concrete work.

5.1.7 Coarse Aggregate

a. General

For the Purposes of these specifications the term "coarse Aggregate" designate clean well graded aggregate most of which is retained on 4.75 mm t.S. Sieve and containing only so such finer material as permitted for various types described under clause 2.2 of I.S.383-2016. Coarse Aggregate for concrete shall consist of uncrushed stone, or crushed stone and partially uncrushed and crushed stone.

Coarse Aggregate for concrete shall be furnished by the Contractor from the approved quarries specified in the contract documents. The contractor shall unless otherwise specified in the tender notice and subsequently on this basis in contract be responsible for payment of seignorages, quarry fees etc., on all materials.

Coarse Aggregate as delivered to the building plant shall generally have uniform and stable moisture content. In case of variations, clause 9.2.3 of I.S. 456-2000 shall govern during batching.

b. Quality

The coarse aggregate shall consist of naturally occurring (crushed or uncrushed) stones, and shall be hard, strong, durable clear and free from veins and adherent coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials. Coarse aggregate will be rejected if it fails to meet any of the following requirements.

1. Los-Angeles Abrasion Test

The abrasion value of Aggregates when tested in accordance with the method specified in I.S. 2386 (Part IV) using Los- Angles machine shall not exceed 30% for Aggregate to be used in concrete for wearing surface and 50% for aggregate to be used in other concrete.

2. Aggregate Crushing Strength Test

Aggregate crushing value, when determined in accordance with I.S. 2386 (Part IV) 1963. The aggregate impact value shall not exceed 45% by weight for aggregates used for concrete for other than wearing surfaces, and 30% by weight for concrete for wearing surfaces such as runways, roads and payments.

3. Soundness Test

The coarse aggregate to be used for all concrete works shall pass a sodium or magnesium sulphate accelerated soundness test specified in I.S. 2381 (Part V) 1963 and the average loss of weight after 5 cycles shall not exceed the limits specified in clause 3.6 of I.S. 383- 2016.

4. Specific Gravity: should be 2.60 Minimum

5. Deleterious Material

The maximum quantity of deleterious materials in coarse aggregates shall not exceed the limits specified in Table 1 of I.S. 383-2016 When tested in accordance with I.S. 2386-1963.

c. Separation

The coarse aggregate shall be separated into nominal sizes during production of the aggregate. Just prior to batching the coarse aggregate shall be rewashed by pressure spray and finish screened on multideck vibrating screen capable of simultaneously removing undersized and oversized aggregate from each of the nominal aggregates entering the batches occurred during intermittent and batching then a dewatering screen will be required after the finished screens to remove the excess free moisture. Finish screen shall be mounted over the batching plant or on the ground adjacent to the batching plant. Finished screens shall be so mounted that the vibration of this screen will not be transmitted to batching bins or scales and will not affect the accuracy of the weighing equipment in any other manner.

The method and rate of feed for finish screening shall be such that the screen will not be overloaded and will result in a finished product which meets the grading requirements of these specifications. Coarse aggregate shall be fed to the finished screen in a combination of alteration of nominal sizes which will not cost noticeable accumulation of poorly graded coarse aggregate in any bin. The finish screened aggregate shall pass directly to the individual batching bin in such a manner as to minimize breakage. Below 2.36 mm materials passing through the finish screens, shall be wasted unless it is tooted back through a sand classifier in a manner which causes uniform blending with the natural sand being processed. Water from finish screening shall be drained in such a manner as to prevent aggregate wash water from entering the batching bins and weighing hoppers. Washing and finish screening requirements shall be subject to approval by the Engineer-in- charge.

Coarse aggregate for concrete shall be separated into various nominal maximum sizes specified in the relevant drawings. Separation of the coarse aggregate into the specified sizes after finish screening shall conform to the grading requirements specified in table - 2 of I.S. 383-1970, when tested in accordance with I.S. 2386--(Part-1) 1963 (Method of test for aggregate for concrete part -1) particle size and shape.

Coarse aggregate for mass concrete may be separated as previously herein specified. Separations of the Coarse aggregate into the various sizes shall be sue that when tested in accordance with I.S. 386 (part-1) 1963 shall conform to the requirements specified in Table- 3 of I.S. 383-2016.

Sieves used in grading tests will be standard mesh sieves conforming to I.S. 460 (part-1) 1978 (specification for test sieves part-1 wire cloth test sieves).

5.1..8 Production of sand and Coarse Aggregate

a. General

Sand and Coarse aggregate for concrete, and sand for mortar and grout, may be obtained by the Contractor from the approved source shown in the contract documents.

Tests performed on samples of sand and coarse aggregate obtained from the approved sources mentioned in the contract documents indicated that they are generally suitable. Well in advance of their usage on the works, the contractor shall have his own testing of materials and satisfy himself that they conform to the specification mentioned herein for use in the works.

No separate payment will be made for such tests. If sand and coarse aggregate are to be obtained from a deposit not previously tested and approved by the Engineer-in-charge, the Contractor shall submit representative samples for pre-construction test and approval, not less than 60 days before the sand and coarse aggregates are required for use. Each sample shall approximately consist of 100 kg. of material. In addition to pre-construction tests, the approval of deposits, the Engineer-in-Charge may test the aggregates for their suitability during their processing. The Contractor shall provide such facilities as may be necessary for procuring representative samples free of cost at the aggregate processing plant at the batch plant. Final acceptance of aggregates will be based on the samples taken from the batch plant or mixing platform.

But use and development of any such deposit shall be subject to the approval by the Engineer-in-charge. Any royalties (seigniorage or other charges) required for materials taken from deposits not owned by the State Government and controlled by the Department of Mines and Geology, Government of India shall be paid by the Contractors.

b. Developing Aggregate Deposits

If the Deposit is owned by the State Government and controlled by the Department of Mines and Geology, the portion of the deposit used shall be located and operated so as not to detract the usefulness of the deposit or any other property of the Government, and so as to preserve, in so far as practicable, the future usefulness on value of the deposit. The Contractor shall carefully clear the area of deposit, from which the aggregates are to be produced, of trees, roots, bush sod, solid, unsuitable sand and gravel and other objectionable matter. Materials including stripping, removed from deposits owned by the Government and controlled by the Director of mines and Geology, Government of India and not used in the work covered by these specifications shall be disposed off as directed.

Due to the overall construction programme, it is quite likely that more than one contractor may elect to use one of the sources named in the contract document. The Contractor shall be responsible for coordinating his work such that it does not interfere with the operations of other contractors who are also using any given source.

c. Processing Raw Materials

Processing of the raw materials shall include screening and washing as necessary to produce sand and coarse aggregate conforming to the requirements of paragraphs 8.1.6 and 8.1.7 processing of aggregates produced from any source owned by the State Government and controlled by the Department of Mines and Geology shall be done at an approved site. Water used for washing aggregate shall be free from objectionable quantities of salts, organic matter and other impurities. Oversize metal may be crushed to correct aggregate particle size, and excess material in individual coarse aggregate size fractions may be crushed to give the largest practical yield of usable concrete aggregate.

Suitable types of crushers shall be used with the prior approval of the Engineer-in-charge for producing coarse aggregates. Crusher fines produced in the manufacture of coarse aggregates may be used in sand. Crushed stone, sand, crushed gravels and crusher fines if used shall be predominantly cubical in shape and shall be blended uniformly with natural sand by routing them together through sand classifier. Crusher coarse aggregate shall be blended uniformly with coarse aggregate by routing both together through the classifying screens.

In the process of developing and producing aggregates from approved sources for work under these specifications, the provisions of Environmental quality protection shall apply.

d. Cost

This shall be included in the applicable prices bid in the schedule for concrete filler road works in which the aggregates are used, which prices shall include the cost of stripping and transporting and storing materials. The Contractor shall not be entitled to any additional compensation for materials wasted from a deposit, including crushed fines, excess materials of any of the sizes into which the aggregates are required to be separated by the contractor, and materials which have been discarded by the reasons of being above the maximum sizes specified for use.

Mixing

a. General

The Concrete ingredients shall be thoroughly mixed in mechanical mixers designed to positively ensure uniform distribution of all the component materials throughout the concrete at the end of the mixing period. Mixing shall be done as per clause 9.3 of I.S.456-1978. The mixer should comply with I.S. 1791-1985 (I.S. Specifications for batch type concrete mixers).

The concrete as discharged from the mixer, shall be uniform in composition and consistent from batch to batch. Workability shall be checked at frequent intervals as per I.S. 1199-1959. Mixers will be examined regularly by the Engineer-in-charge or his authorized Engineer for changes in condition due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform distribution of the materials so that the mass is uniform in colour and consistency and to the satisfaction of the Engineer-in-charge. If there is segregation after unloading the concrete should be remixed.

Any mixer that at any time produces unsatisfactory mix, shall not be used until repaired. If repair attempts are unsuccessful, a defective mixer shall be replaced. Batched size shall be at least 10% of, but not in excess of the rate capacity of the mixer unless otherwise authorized by the Engineer-in-charge.

Form work

a. General

Form shall be used wherever necessary, to confine the concrete and shaping it to the required lines. If a type of form does not consistently perform in an acceptable manner, as determined by the Engineer-in-charge, the type of form shall be changed and method of creation shall be modified by the contractor subject to approval of the Engineer-in-charge.

Plumb and string lines shall be installed before, and maintained during concrete placement. Such lines shall be used by the contractor's personnel and by the Engineer-in-charge and shall be in sufficient number and properly installed as determined by the Engineer-in-charge. During concrete placement, the contractor shall continuously monitor plumb and string lines, form positions and immediately correct deficiencies.

Forms shall have sufficient strength to with-stand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used, forms shall be sufficiently rigid to effectively transmit energy from the form vibrators to the concrete. While not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips shall be placed in the corners of forms and at the top of wall placement to produce beveled edges on permanently exposed concrete surfaces. Interior angle of inter-secting concrete surfaces and edges of construction joints shall not be bevelled except where indicated on the drawings.

Suitable struts of stiffeners of ties shall be used for the form work wherever necessary. All supports shall be braced and cross braced into two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping, by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the formwork is supported on soils, planks, sleepers etc., shall be used to properly disperse the loads. In case, the supports rest on already completed beam or slab, suitable props shall be provided under the latter.

The joint between the form work and existing concrete shall also be 'grant tight'. Forms shall overlap the hardened concrete in the lift previously placed by not more than 75mm and shall be tightened against the hardened concrete so that when concrete placement is resumed the forms will not allow loss of mortar at the construction joint.

The form work shall be of well seasoned timber or steel. When timber forms are used, they shall be lined, with mild sheet or other suitable smooth faced non-absorbent materials as specified. Supports may be of timber or steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the support. The details of the proposed form work and supports shall be submitted to the Engineer-in-Charge and got approved before erection.

In case of columns, retaining walls of deep vertical component the height of the column shall facilitate any placement and compact in of concrete and suitable arrangement may be made for securing the form to the already poured concrete for placing the subsequent lifts. No steel ties or wires used for securing this form work shall be left exposed on the face of the finished work. Suitable inserts for blackouts for electrical and other service fixtures where necessary shall be provided in the required locations as specified. Cleaning and oiling of forms at the time the concrete is placed in forms, the surfaces of the forms shall be free from encrustations of mortar, grout or other foreign material. Before concrete is placed, the surface of the forms shall be oiled with a

commercial forms of oil.

b. Removal of Forms

The stripping of form work shall conform to clause 10.3 of I.S. 456-2000. The contractor shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on upper sloping faces of concrete such as forms on the water sides of warped transitions, shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed immediately by the specified curing.

To avoid excessive stresses in concrete that might result from swelling of forms. Wood for wall openings shall be loosened as soon as the loosening can be accomplished damages to the concrete. Forms for the openings shall be constructed so as to such loosening. Forms shall be removed with care so as to avoid injury to and any concrete so damaged shall be repaired in accordance with paragraph 6.3.21.

c. Cost

The cost of furnishing all materials and performing all work for constructing forms, including any necessary treatment or coating of forms are to be included at applicable prices bid in the schedule.

Tolerances for Concrete Constructions

a. General

Tolerances are defined as allowable variations from specified lines, grades, and dimensions and as the allowable magnitude of the surface irregularities. Allowable variations from specified lines, grades and dimensions are listed in table given under sub paragraph (b) below.

The intent of this paragraph is to establish tolerance that are consistent with modern construction practice that the governed by the effect that permissible variations may have upon a structure. The Government reserves the right to diminish the tolerances set-forth herein if such tolerances impair the structural action, operational function or architectural appearance of a structure or portion thereof.

Concrete shall be within all stated tolerances even though more than one tolerance may be specified for a particular concrete structure. Provided that the specified variation for one element of the structure to exceed its allowable variation. Where tolerances are not specified for a particular structure, tolerances shall be those specified for a similar work. As an exception to clause 2 of the general provisions, specific tolerances shown herein in connection with any dimension shall govern. The Contractor shall be responsible for finishing the concrete forms with in the limits necessary to insure that the completed work will be within the tolerances specified. Concrete work that exceeds the tolerance limits specified shall be remedied in accordance with the sub paragraphs (d and e).

b. Variations From Specified Lines, Grades And Dimension

Hardened concrete structures shall be checked by the contractor and will be subject to such inspection and measurement as needed to determine that the structures are with in the tolerance specified in the table below.

Variation is defined as the distance between the actual position of the structure or any element of the structure and the specified position in plan for the structure or the particular element. Plus or minus variations shown as (+) indicate a permitted actual position up or down and in or out from the specified position in plan. Variations not designated as plus or minus indicate the maximum deviation permitted between designated successive points on the completed element of construction.

Specified position in plan is defined as the lines, grade and dimensions described in these specifications or shown on the drawings or as otherwise prescribed by the Engineer-in-charge.

NOTE: Tolerances apply to concrete dimensions only, but not for positioning of vertical reinforcing bars or dowels.

C. Concrete surface Irregularities

1. General

Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or gradual and are measured relative to the actual concrete surface.

2. Abrupt surface Irregularities

Abrupt surface irregularities are defined herein as offsets such as those cause be misplace or loose forms, loose knots inform number, or other similar, forming faults. Abrupt surface irregularities are measured using a straight

irregularity and the magnitude of the offset is determined by direct measurement.

3. Gradual Surface Irregularities

Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface. Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The magnitude of the gradual surface irregularities is defined herein as a measure of the rate of change in slopes of the concrete surface.

The surface irregularities shall not exceed 6mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 metre in length.

The magnitude of gradual surface irregularities on concrete shall be checked by the contractor to ensure that the surfaces are within the specified tolerances. The Engineer-in-charge will also make such checks of hardened compliance with such specifications.

d. Repair of Hardened Concrete Not within Specified Tolerances

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance with paragraph 6.3.21 and shall be accomplished in a manner approved by the Engineer-in-Charge.

Concrete repair to bring concrete with the tolerances shall be done only after consultation with a representative of Engineer-in-Charge regarding the method of repair. The Engineer-in-Charge shall be notified as to the time when repair will be performed.

Concrete shall be finished in a manner which will result in a concrete surface with a uniform appearance. The tins and any rough projections can then be rubbed down and the whole surface brought to an even finish by rubbing with an wooden float using a mortar of one part cement by two parts of coarse sand as an abrasive, the mortar at the same time filling the voids. A neat cement work shall then be applied to give a smooth surface. If the concrete has set hard, the tins and rough projections, if any, shall be removed by using corburandum brick or a paved grinding machine by chipping, before finishing off with the smoothing wash. If the work of chipping is not done with care or if the surface exposed after removal of the forms cannot be satisfactorily dealt with in this manner due to bad form work or for other reasons, a coat of cement plaster of 1:2 of thickness as ordered by the Engineer-in-charge shall be applied. No extra payment will be given for finishing concrete surface as instructed above in this clause.

e. Prevention of Repeated Failure To Meet Tolerances

When concrete placements result in hardened concrete that does not meet the specified tolerances, the contractor shall submit to the Engineer-in-Charge an outline of all preventive actions such as modification to forms, modified procedure for setting screeds, and different finishing techniques to be implemented by the contractor to avoid repeated failures. The Engineer - in - Charge reserves the right to delay concrete placement until the contractor implements such preventive actions which are approved by the Engineer-in-Charge.

Reinforcing Bars

a. General

Reinforcing bars shall be placed in the concrete as shown in the drawings or as directed. For anchoring the concrete to the Hard rock provision of Anchor rods is made in the Drawing and the contractor shall place these anchor rods to the spacing and depth shown in the drawings.

b. Materials

- a) The Contractors have to make their own arrangements to procure standard quality of steel from the reputed dealers with prior approval of the Executive Engineer.
- b) The quality of steel should confirm to Indian Standard specification code I.S.226 for Mild Steel and I.S.1786 for Ribbed Tor Steel (CTD bars).
- c) The steel supplied shall be sound and free from cracks harmful surface flaws, lamination, rough and imperfect edges other defects.

- d) The contractors with prior approval of the Executive Engineer have to make their own arrangement to test each consignment of steel from the Government testing laboratory at their risk and cost for strength, section weight and diameter and produce the test certificate before its actual use in the works which will be allowed in bills.
- e) The results should pass the test as prescribed in the relevant IS codes. Tests also includes of physical properties such as 0.2% proof stress, Tensile strength, percentage of elongation and Bend test.
- f) Tolerance on weight:- The tolerance on weight for bars shall confirm to relevant ISI specifications.
- g) The contractor should produce the manufacturer's test certificate for each consignment.
- h) 6mm MS steel is to be supplied only in the form of coils.

Unless shown otherwise on the drawings the reinforcement to be used shall be High yield strength deformed (H.Y.S.D.) bars of grade F.E. 415 conforming to I.S. 1786-1985 (I.S. specification for high yield strength deformed steel bars and wires for concrete reinforcement).

c. Transporting reinforcements.

Reinforcements shall be transported to the site of work or to the place of storage by such means and in such a manner that the reinforcements is neither damaged nor deformed. The unloading of the reinforcements shall be done at the nearest convenient place where it is to be processed further. Particularly in cases where unloading is required to be done by hand, it is important that the vehicle should be brought as close as possible to the stacking or bending place in order to avoid carrying overlong distances. As far as possible, at the time of unloading the bars should be separated by sizes and lengths.

d. storage of reinforcement

The actual location of the stacking place of reinforcements depend upon the site condition, but it should be such that thereinforcement could be conveniently received and supplied to the operational centres in the site. On works covering large areas it might be an advantage to stack the measurement at different places close to the areas where they are likely to be used most.

In order to ensure that the reinforcement bars are kept in good condition that they should not be left in direct contact with the ground but they should be stacked on top of an arrangements of timber sleepers or the like. Suitable racks may also be used for stacking reinforcement it tiers. Where space is extremely limited, bars may also be stacked vertically but the vertical stacking has the disadvantage that it is more difficult to get the bars in and out and in identifying bars of different sizes and lengths. In storing bars, attention shall be paid to avoiding distortions and to preventing deterioration and corrosion.

e. Placing

Reinforcement shall be bent and fixed in accordance with the procedure specified in I.S. 2502-1963 (code of practice for bending and fixing of bars for concrete reinforcement). All reinforcement shall be placed and maintained in the position shown in the drawings splices shall be located where shown in the drawings, provided that the location of the splices may be altered subject to the written approval of the Engineer-in-Charge.

Subject to the written approval of the Engineer-in-Charge, the contractor may for his convenience, splice bars at additional locations other than those shown on the drawings. All additional splices allowed shall be at the expense of the contractor. In order to meet design and space limitation on splicing, some bent bars may exceed usual clearance cutting and bending of such bars from select lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the centre lines of the bars. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position, and amount after it has been placed, but before being laid with concrete.

Before reinforcement is embedded in concrete the surface of the bars and the surfaces shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease or other foreign substances which in the opinion of the Engineer-in-Charge are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap, or equivalent treatment is considered objectionable.

As specified in clause 11.3. of I.S. 456-2000 unless otherwise specified by the Engineer-in-Charge, reinforcement shall be placed with the following tolerances.

- a. For effective depth 200mm or less = \pm 10 mm
- b. For effective depth more than 200mm = \pm 15 mm

- c. The cover in no cases be reduced by more than one third of specified cover or 5mm which ever is less.

Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbances of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Engineer-in-Charge and in conformity with the requirements of clause 11.4 of I.S. 456-2000. Chairs, hangers, spacers and other supports for reinforcement shall be of concrete, metal or other approved material. Concrete cover shall be as shown on the drawings.

f. Reinforcement Drawings

The Engineer-in-Charge will supply drawings of reinforcement details and bar bending schedules for adoption.

g. Measurement and Payment

Measurement for payment of reinforcement bars will be based on the weight of the bars placed in the concrete in accordance with the drawings supplied by the Engineer-in-Charge in conformation with those specified drawings has been determined at the time of embedment. Except as otherwise provided below payment for furnishing and placing reinforcing bars will be made at the unit price per one quintal bid in the bill of quantities for furnishing and placing reinforcing bars, which unit price shall include the cost of reinforcing bars, attaching, wire ties or other approved supports and of cutting, bending cleaning securing and maintaining in position reinforcing bars as shown on the drawings.

The total weight of bars placed as reinforcement in concrete shall be arrived at by adding the products of lengths of each size and mass per meter (vide Table 1 and para 6.2.1. of IS 1786-1985) of that size of rod.

h. Dowels

The dowels shall be of same H.Y.S.D. bars of grade Fe 415 conforming to I.S. 1786-01985 as used for reinforcement.

Details for dowels shall be as shown on the drawings or as directed by the Engineer-in- Charge. Dowels shall be placed in the concrete where shown on the drawings or where directed and will be accepted for compliance with requirements as to size, shape, length, position, and amount after they have been placed but before being covered by concrete.

Before the dowels are embedded in concrete, the surfaces of dowels shall be cleaned of all dirt, grease or other foreign substances which in the opinion of the Engineer-in-Charge are objectionable. The dowels shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete.

Measurement for payment of dowels will be made only on the weight of the dowels placed in the concrete in accordance with the drawings or as directed. Payment for furnished and placing of dowels will be made at the unit price per one quintal bid in the bill of quantities for furnishing and placing of reinforcing bars which unit price shall include the costs of furnishing all the materials and for placing the dowels as required.

Preparation for Placing

a. General

No concrete shall be placed until all form work installation of items to be embedded and preparation of surface involved in the placement have been approved.

The Contractor shall supply concrete placement checkout cards (Placement Register) satisfactory to the Engineer-in- Charge and shall provide a water tight container for such cards at the convenient location near each individual concrete placementsite. The cards shall list all the various work items for example "cleanup" and "embedded items" required prior to placement of concrete. After each work item for an individual placement has been completed that item on the cards shall be signed by contractor or his representative signifying completion of the required work. Engineer authorized by the Engineer-in-Charge will inspect the work during and after completion of each phase of the preparation and if the work is satisfactory will sign the check- outward placement register. Approval of preparation to placement will not be complete until the contractor or his representative and above authorized Engineer have approved by signature all applicable items for that placement.

All surfaces of forms and embedded materials shall be free from curing compound, dried mortar for previous placements, and other foreign substances before the adjacent or surrounding concrete placement is begun.

Prior to beginning concrete placement, the contractor shall make ready a sufficient number of properly operating

vibrators and operators and shall have readily available additional vibrators to replace defective one during the progress of the placement. The Engineer's representatives at the placement may require that the contractor delay the start of the concrete placement until the number of working vibrators available is acceptable.

FOUNDATION SURFACES

All surfaces upon or against which concrete is to be placed shall be free from frost, ice, water, mud and debris.

1. Rock surfaces shall be free from oil, objectionable coatings, and, loose semi-detached and unsound fragments. Immediately prior to placement of concrete, surfaces of rock shall be washed with an air water jet and shall be brought to a uniform surface dry condition.
2. Earth foundation surfaces shall be wet to a depth of 15cm, or to impermeable material whichever is less before concrete is placed.

Construction Joints

Construction joints are defined as concrete surfaces upon or against which concrete is to be placed and to which new concrete is to adhere but which have become so rigid that the new concrete cannot be incorporated integral with that previously placed. The provision of construction joints shall conform to clauses 12.4.1 and 12.4.2 of I.S. 456 - 2000.

When the work has to be resumed on a surface which has hardened such surface shall be roughened. It shall then be swept clean and thoroughly wetted. For vertical joints neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of the concrete.

Where the concrete has not fully hardened ail laitance shall be removed by scrubbing the wet surface with writ or bristle brushes, care being taken to avoid dislodgement of particles or aggregate. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry. On this surface, a layer of concrete not exceeding 150 mm in thickness shall first be placed and shall be,well rammed against old work, particular attention being paid to corners and close spots, and work thereafter shall proceed in the normal way.

GUIDELINES ON PREPARATION OF CONSTRUCTION JOINTS (LIFT JOINTS)

Objective

The objective in concrete placement in walls 1 cross drainage structures, etc., is to be absolutely sure of achieving a good bond at the joints between the successive concrete "lifts". The surface of each lift has to be thoroughly cleaned of all laitance, grout, and dirt before concrete for the next lift is placed.

Green Cutting

The surface of the respective lift shall be thoroughly green-cut with an air water jet. Green cutting is usually done 8 to 12 hours after the top surface of a concrete lift had been completed and sufficiently hardened. The actual time for taking up the green cutting operation shall depend upon the following factors:

- Concrete placement temperature;
- atmospheric temperature;
- concrete mix; and
- slump.

The air-water jet will remove the thin surface film of laitance and grout to expose clean surface.

- a. **Green cutting**, if done at the proper time, shall Yield very good results. When started too early, it shall result in over sutting and removing too much mortar. It is also liable to loosen the aggregate particles and leaving too poor a surface to bind the fresh concrete. On the other hand, if green-cutting is delayed to long, the cutting action of the air and water jet would be ineffective for proper removal of laitance. It, therefore, requires much greater care and judgement for proper use at the proper time.
- b. **Skill of Jet Operator** Besides determining the proper time for initiating green-cutting, the process will require constant attentionon the part of the air-water jet operator. By correct manipulation of the high velocity air-water jet, a trained operator can ensure theremoval of the thin surface film of laitance and grout effectively and at the same time leaving the aggregate stones, already embedded in the mortar, undistributed.

- c. **Proper Air - Water Gun** : In addition to the skill of the jet operator, a proper air-water gun is also a vital requirement for effective green-cutting. The issuing nozzle must be about 460 mm (18 inches) long to ensure the requisite cutting force close to the concrete surface. A dimensioned sketch of an air-water gun is enclosed as sketch 1.
- d. **Quantum of Compressed Air and Water**, For effective green cutting, it is essential that the air pressure should be around 6.33 to 7.03 Kg/Cm² (90 to 100 lbs. per square inch). It should not be allowed to fall below 90 lbs per square inch. The water pressure, of course, should be sufficient to bring the water into effective influence of the air pressure. As an approximate estimate, the quantity of compressed air required by the green-cutting gun is 2 cubic meters per minute (70 cfm) and the quantity of water 60 gallons (273 litres) per minute.
- e. An important aspect to be taken note of is that 'Green Cutting' as an exclusive operation shall be fully useful only if the next lift of concrete is placed within 3 to 4 days (or a maximum of 5 days) of the placement of the previous lift. If there be a delay in concrete placement beyond this period, the laitance will come upto the concrete surface again at some places. Removal of such laitance shall then be not possible by the ordinary green-cutting operation alone. light sand blasting of even the green-cut lint's shall need to be resorted to. However, if there is excessive delay in concrete placement, it will require either "wet sand blasting" or the application of high pressure 'water blaster' to remove the laitance for effective binding with the fresh concrete. The effort to achieve this will be considerably less if green cutting has already been done.
- f. **Sand Blasting:**

Sand blasting is the process of roughening and cleaning the surface of old and set concrete by means of coarse sand and air applied under pressure of 90 to 100 pounds per square inch (6.33 to 7.03 kilograms per square centimeter) through the nozzle, so as to erode the laitance and grout from the old and fresh concretes monolithic. Sand blasting of rock is also done so that concrete may be placed on or against a clean surface as required according to specifications.

There are two types of sand blasting, namely "wet sand blasting" and "dry sand blasting". In wet sand blasting water is also used along with sand and air under pressure, while in the latter, only sand and air under pressure are used. Normally the concrete and rock surface etc., are wet sand blasted to keep down the dust.

The percentages of different sizes of sand particles for efficient sand blasting shall be as follows

size	Percentage
8 mesh per inch (25.40 millimetres)	26
16 mesh per inch (25.40 millimetres)	30
30 mesh per inch (25.40 millimetres)	23
50 mesh per inch (25.40 millimetres)	21

For effective sand blasting it is essential that pressure of air should be between 90 to 1000 pounds per square inch (6.33to 7.03 kilograms per square centimeter). If pressure falls below 90 bounds per square inch (6.33 kilograms per square centimeter), sand blasting becomes ineffective. If sand having large percentage of fines is used, it will not provide the requisite cutting power and the whole effort goes waste. A good quality well graded "Sand-blast sand" is needed for achieving the objective of sand blasting.

- g. **High Pressure Water Blasters.** Green cutting is far cheaper than sand blasting, Proper quality sand (known as sand-blast sand) is the most expensive item and special efforts are needed to arrange such sand. A high pressure water blaster offers a workable alternative to sand blasting, On the Sardar Sarovar Project, indigenously manufactured water blaster are being used which can develop pressures in the range of 50-150 bars, with their water jet capacity adjustable to 880-1760 litres per hour (viz 15 litres/minute - 30 litres/minute). The equipment has a very small sand blasting attachment as well.

h. **Summary:**

Green - cutting offers the most economical methodology in the preparation of good construction joints. It has, however, to be initiated at the proper time and with a proper air - water gun (as per enclosed dimensional sketch) to yield the best results. It is far cheaper than sand blasting. If a delay of more than 3 to 5 days is anticipated in placing the concrete over the previous lift, the concrete surface of the lifts should be properly 'green-cut' and thereafter (say one day prior to placement of concrete) it should be light sand-blasted or water blasted in order to remove the "re-appeared" laitance.

D. Contraction Joints

Contraction joints serve to provide for volumetric shrinkage of monolithic concrete and for movement between monolithic unit at established joints, thus preventing formation of objectionable shrinkage cracks elsewhere in concrete. Prior to application of wax based curing compound to contraction joints, the surfaces of all joints shall be cleaned thoroughly of accretion of concrete or other foreign material by scraping, chipping or other means approved by the Engineer-in-Charge. Water stops, reinforcing bars and other embedded items shall be free of curing compound when adjoining concrete is placed.

Placement of concrete

a. General

The contractor shall notify the Engineer-in-Charge before batching begins for placement of concrete. Placing shall be performed only in the presence of an authorized Engineer's representative. Placement shall not begin until after preparations are complete and the concrete placement check out card has been signed by the contractor or his representative and the authorized representative of the Engineer-in-Charge substantiating completion of all preparation for that placement.

All surface upon or against which concrete is to be placed shall be prepared in accordance with paragraph 6.3.16. Retempering of concrete will not be permitted. Any concrete which has become so stiff that proper placing cannot be assured shall be wasted.

Concrete shall not be placed in standing water except with written permission of the Engineer-in-Charge and the method of placing shall be subject to approval. Concrete shall not be placed in running water and shall not be subjected to running water until after the concrete has hardened.

Concrete shall be deposited as nearly as practical in its final position and shall not be allowed to flow in such a manner that the lateral movement will cause segregation of the coarse aggregate from the concrete mass. Methods and equipment employed in depositing concrete in forms shall minimize clusters of coarse aggregate clusters that occur shall be scattered before the concrete is vibrated.

Forms shall be constantly monitored and their position adjusted as necessary during concrete placement in accordance with paragraph 6,3.12.

All concrete shall be placed in approximately horizontal layers. All construction joints which intersect exposed concrete surfaces all be made straight and level to plumb except as shown otherwise on the drawings.

The placing of concrete shall be in accordance with clause 12.2 of I.S. 456-2000.

If concrete is placed monolithically around openings having vertical dimension greater than 60 cm, or if concrete in decks, floor slabs, or other similar parts of structures is placed monolithically with supporting concrete, the following requirements shall be strictly observed.

1. Concrete shall be placed upto the top of the formed openings at which point further placement will be delayed to accommodate settlement of fresh concrete. If levels are specified beneath nearly horizontal structural members such as decks, floor slabs, beams and girders such levels being between the nearly horizontal members and the vertical supporting concrete below. Concrete shall be placed to the bottom of the bevels before delay of placement.
2. The last 60 cm or more of concrete placed below horizontal members or bevels shall be placed with a 50 mm or less slumps and shall be thoroughly consolidated.

In placing concrete on unformed slopes so steep as to make internal vibration of the concrete impractical without forming, the concrete shall be placed ahead of non-vibrating slip form screed extending approximately 0.75 meters back from its leading edge. Concrete ahead of the slip form screed shall be consolidated by internal vibrations so as to ensure complete filling under the slip form.

A cold joint is an unplanned joint resulting when a concrete surface harden before the next batch is placed against it cold joints would be allowed only in the event of equipment breakdown or other unavoidable prolonged interruption of continuous placing. If such unavoidable delays in placing occur which make it appear that unconsolidated concrete may harden to the extent that later vibration will not fully consolidate it. The contractor shall immediately consolidate such concrete to a stable and uniform slope. If delay of placement is then short, enough to permit penetration of the under lying concrete placement shall resume with particular care being taken to thoroughly penetrate and re-vibrate the concrete surface placed before the delay. If concrete cannot be penetrated with vibrator the cold joint shall be then treated as a construction joint.

Care shall be taken to prevent cold joints when placing concrete in any part of the work. The concrete placing rate

shall ensure concrete is placed with the previously placed adjacent concrete in plastic so that the concrete can be made monolithic by normal use of vibrators/tamping.

Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete. A cold joint may necessarily result from prolonged heavy rainfall. The Contractor shall not be entitled to any additional payment, over the unit prices bid in the schedule for concrete, by reason of any limitation in the placing of concrete, required under the provisions of this paragraph.

b. Transportation

The transportation of concrete still conforms to clause 12.1 of I.S. 456-2000. The methods and equipment used for transporting concrete from the batch plant to its final position in to placement and the time that elapses during transportation shall not cause measurable segregation of coarse aggregate or slump loss during transportation exceeding 5 centimeters.

Concrete shall be deposited as near as practical to its final position. The use of Aluminium pipe or Aluminium chutes for delivery of concrete will not be permitted. Concrete buckets shall be capable of promptly discharging concrete of the specified mix design and the dumping mechanism shall be capable of discharging at one location shall portions of concrete from a full bucket.

If used to transport concrete, the truck mixers shall meet the applicable requirements of paragraph 6.3.10. If used to transport concrete, the truck mixers shall meet the applicable requirements of paragraph 6.3.10.

The transporting equipment for placing concrete shall readily handle the place concrete of the specified slump, The Contractor shall when directed, replace in-adequate transporting equipment with acceptable equipment.

c. Compaction

The compaction of concrete shall conform to clause 12.3 to I.S. 456-2000. Concrete shall be consolidated by vibrators 1 tampers. The vibrations shall be sufficient to removal all undesirable air voids from the concrete, including the air voids t rapped against the forms. After consolidation, the concrete shall be free of rock pockets and honeycomb areas and shall be closed tightly against all surfaces of forms and embedded materials. All concrete shall be properly consolidated before it hardens.

Except as herein after provided, consolidation of all concrete shall be by immersion-type vibrators. Immersion type vibrators shall be operated in nearly vertical position and the vibrating head shall penetrate and re-vibrate the concrete in the upper portion of the underlying layer. Care shall be exercised to avoid contact of the vibrating head with embedded items and with formed surfaces which will later be exposed to view. Concrete shall not be placed upon either plastic concrete until the previously placed concrete has been thoroughly consolidated.

Form vibrators shall be used in conjunction with slip form lining machines to consolidate concrete in canal linings. Such vibrators shall be arranged for effective uniform consolidation of the concrete. The Engineer-in-Charge or his representative may remove samples of the hardened concrete for testing and examination, and the contractor shall repair, at no cost to the Government, concrete from which such samples are removed.

Immersion type vibrator shall be operated at speeds at 7000 revolutions per minute when immersed in concrete. Form vibrators shall operate at speeds of atleast 6000 revolutions per minute when being used to consolidate concrete. The contractor shall immediately replace improperly operating vibrators with acceptable vibrators.

5.1.16. FINISHES AND FINISHING

The requirements for finishing of concrete surface shall be as specified in this paragraph, paragraph 6.3.12 and 6.3.13. or as otherwise indicated on the drawings. The contractor shall notify the Engineer-in-Charge before finishing concrete. Unless inspection is waived, in each specific case, finishing of concrete shall be performed only when on Engineer's representative is present. General surfaces will be tested by the 'Engineer-in-Charge in accordance with paragraph 6.3.13 where necessary to determine whether the concrete surface is within the specified tolerances shall be repaired in accordance with paragraph 6.3.21.

Interior surfaces shall be sloped for drainage where shown on the drawings or as directed. Surfaces which will be exposed to the weather and which would normally be level, shall be sloped for drainage.

Floating may be performed by use of hand on power driven equipment. Floating shall be started as soon as the screeded surface has stiffened sufficiently by and shown to the minimum necessary to produce a surface what is force from screeded mark and in and uniform in texture. Joints and got shall be tooled where shown on the drawing or as directed.

After the surfaces of road way slabs of concrete bridges, have been wood floated, the surfaces shall be given a

broom finish. The finish shall be applied when the water sheet has practically disappeared. The broom shall be drawn transversely across the pavement with adjacent strokes slightly overlapping. The brooming shall be completed before the concrete is in such condition that the surface will be torn or unduly roughened by the operation. The finished surface shall have a uniform appearance and shall be free of corrugations exceeding 1.5 millimetres in depth. Broom shall be of quality, size and construction and be so operated as to produce a surface finish satisfactory to the Engineer-in-Charge.

PROTECTION

The contractor shall protect all concrete against damage until final acceptance by the Engineer-in-Charge.

The Contractor shall provide protection to prevent erosion to fresh concrete whenever precipitation either periodic or sustaining is imminent or occurring.

When precipitation appears imminent, the contractor shall immediately make ready at the placement site all materials which may be required for protection of fresh concrete. The Engineer-in-Charge may delay placement of concrete until adequate provisions for protection against weather are made.

All fresh concrete surfaces shall be protected from contamination and from foot traffic until the concrete has hardened. Hardened concrete surfaces which have to receive finish shall be protected against damage from foot traffic and other construction activity by covering with protective mats, plywood or by other effective means. Methods of protection shall be subject to approval by the Engineer-in-Charge.

Curing

a. General

The contractor shall furnish all materials and perform all work required for curing concrete.

The uniformed top surfaces of concrete shall be cured for 28 days with a damp sand cover or curing mat over. The sand or curing mats shall both be kept so wet as to allow water to drain from them and stain other concrete. The sand or curing mats shall be removed after the expiry of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or backfill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed within 24 hours after the concrete has hardened sufficiently conforming to clause 10.3 of I.S. 456-2000 to prevent structural collapse of other damage by careful form removal. Where required, repair of all minor surface imperfections shall be made immediately after form removal and prior to curing. Minor surface repair shall be completed within 2 hours after form removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after form removal until initiation of curing.

b. Material

Concrete cured with water shall be kept wet for at least 28 days from the time the concrete has attained sufficient set to prevent detrimental effect to the concrete surfaces. The concrete surfaces to be cured shall be kept wet by covering them with water-saturated material by using a system of perforated pipes, mechanical sprinklers or porous hose, or by other methods which will keep all surface continuously (not periodically) wet. All curing methods are subject to approval of Engineer-in-Charge.

c. Cost

The cost of furnishing all materials and performing all work for curing concrete shall be included in the price bid in the bill of quantities for the concrete on which the particular curing methods are required.

Repair of Concrete

a. General

Concrete shall be repaired in accordance with clause 5.7 of I.S. 3873-1978. Imperfections and irregularities on concrete surface shall be corrected in accordance with paragraph 6.3.13 and clause 5.7 of I.S. 3873-1978.

b. Types of Repair

All repairs shall be made with concrete. Repairs to concrete surfaces and addition where required shall be made by cutting regular opening into the concrete and placing fresh concrete to the required lines. The chipped openings shall be sharp and shall not be less than 70 mm in depth. The fresh concrete shall be reinforced and chipped and troweled to the surface of the openings. The mortar shall be placed in layers not more than 20mm in thickness after being compacted and each layer shall be compacted thoroughly. All exposed concrete surfaces shall be cleaned of impurities, lumps of mortar or grout unsightly stains.

c. Cost

The cost of furnishing all materials and performing all work required in the repair of concrete shall be borne by the contractor.

Measurement of Concrete

Measurement for payment of concrete required to be placed directly upon or against surfaces of excavation will be made to the lines for which payment for excavation is made.

In measuring concrete for payment, the volume of all openings, arises, embedded pipes and metal work, each of which is large than 0.1 square meter in cross section will be deducted.

Payment for Concrete

Payment for concrete in the various parts of the work will be made at the applicable unit prices therefor in the bill of quantities, under unit price shall include the cost of furnishing all materials and performing all works required for the concrete construction, except that payment for furnishing and placing reinforcing bars will be made at the respective unit price's bid therefore in the schedule.

Ready Mixed Concrete

Ready-mixed concrete may be used subject to the approval of the Engineer and conforming to the specifications of the grade of concrete.

The Contractor shall furnish the name of the ready-mixed concrete supplier to the Engineer for approval along with all necessary documents to prove the quality and grade of the Concrete. He also shall make such arrangements as may be required for the Engineer to inspect the RMC Plant of the Supplier and provide all facilities for sampling of cement, fine and coarse aggregates and admixtures to be taken for testing.

Notwithstanding any such inspection made and/of approval given by the Engineer, the Contractor shall take full responsibility for ensuring that all ready-mixed concrete supplied shall conform to relevant IS codes and the tender Specifications. Concrete that does not comply with these Specifications shall be rejected and removed from Site.

The Contractor shall furnish to and obtain the approval of the Engineer at least 1 day in advance of the date set for each casting of concrete, the number of transit trucks/truck mixers/agitators proposed to be used to supply the concrete and the frequency at which the loads of concrete are to be delivered to the Site.

For each truckload of concrete delivered, the following information shall appear on the delivery note:

- Name of ready-mixed concrete batch plant
- Date and serial number of delivery order
- License number of the truck
- Name of the purchaser
- Name and location of job
- Technical information including specified characteristics concrete strength, agreed slump, maximum size of coarse aggregate specified, trade name of admixture, etc.
- Time of mixing / despatch
- Type of cement
- Quantity of concrete
- Any other requirements as may be instructed by the Engineer.

All delivery notes shall be retained by the Contractor and made available for inspection throughout the duration of the contract.

The Engineer reserves the right to instruct the Contractor to change the supplier due to unsatisfactory performance or to rescind his approval for further use of ready-mixed concrete during the progress of the work, if any of the requirements has, in his opinion, not been satisfactory complied with.

All the constituents for each mix shall be added at the manufacture's plant. No extra water or other material shall be added after the concrete has left the plant.

Excess quantity of water shall not be added to the concrete with the approved mix to increase its workability affected by elapsed time and/or temperature.

While it is not being discharged, the concrete in a transit truck/truck mixer/agitator shall be kept continuously agitated.

The Concrete shall be placed in its final position and left undisturbed within 2 hours from the time when the cement was added to the mix.

Samples of concrete shall be taken in accordance with the requirements of the specification at the point and time of delivery. The sampled concrete shall be tested in accordance with the specification. The Engineer reserves the right to alter the frequency of the sampling.

C. Batching

Cement shall be batched in whole 50 kg bags or measured by weight when stored in a silo. The fine and coarse aggregate shall be measured by weight separately and due allowance be made for the weight of free water in the aggregates. The amount of water added shall be measured with due allowance being made for any free water in the aggregates.

Amount of water added shall be such as to produce dense concrete of required consistency, specified strength and satisfactory workability and shall be so adjusted to account for moisture content in the aggregates. Water-Cement ratio specified in the approved Mix Design shall be maintained. Each time the work stops, the mixer shall be cleaned out, and while recommencing the first batch shall have 10% additional cement to allow for sticking in the drum.

Solid admixtures shall be measured by weight, while liquid or paste admixtures may be measured by weight or volume.

The accuracy of the weighing equipment shall be $\pm 1\%$ of the required weight of the cement, water or of the total weight of the aggregates. The accuracy of volumetric weighing equipment shall be $\pm 1\%$ of the indicated quantity.

Before commencement of work and subsequently as often as the Engineer may direct, measuring equipment shall be calibrated with known weights and volume measures.

Arrangement should be made by Contractor to have the cubes tested in an approved laboratory or in field laboratory, with prior consent of Engineer. Sampling and testing of strength and workability of concrete shall be as per IS: 1199, IS: 516 and IS: 456.

Mixing of Concrete

Concrete shall be mixed in batch type mixers of approved design until the concrete is uniform in color and consistency and must not exceed the mixing time as specified by the manufacturer. The volume of concrete per batch shall not exceed the manufacturer's rated capacity and the mixer drum shall be emptied completely before being refilled. Mixers, which have been out of use for more than 30 minutes, shall be thoroughly cleared before any fresh concrete is mixed. The mixer shall be free from hardened concrete.

The mixing time shall not be less than 3 minutes for portable mixer of 1 m³ capacity and less. For larger capacities, the mixing time shall be increased by 15 seconds for each additional cubic meter. For stationary mixing plant operating at high speed the Engineer may reduce the mixing time required after taking into consideration both the manufacturer's specification and the plant's performance. The mixing time shall be reckoned from the time when all the solid materials are in the mixer. No portion of the time required for discharging shall be considered as part of the mixing time.

No concrete shall be mixed by hand except with the specific consent of the Engineer for a small amount. Where such consent is granted, the Contractor shall at his own expense increase the proportion of cement by 10%. Mixing shall be continued until the concrete is of uniform color and consistency.

Workability & Consistency

The workability shall be to produce a concrete which can be well compacted, be worked into corners of the shuttering and around the reinforcements, to give the specified surface finish and attain the specified strength. The Contractor, subject to the direction of the Engineer, shall determine the required workability for any part of

the work. It shall be reviewed during the progress of the work and adjustments shall be made as directed by the Engineer.

Workability shall be assessed on site at the discharge point of either the mixer or the ready mixed concrete vehicle by means of the slump test. If the measured slump deviates from the agreed value by more than ± 25 mm or one third of the required value whichever is greater, the concrete shall be rejected.

No water shall be added to the concrete subsequent to the completion of the mixing.

Preparation prior to concrete placing

Before concrete is actually placed in position, the inside of the framework shall be cleaned and mould oil applied, necessary inserts/ embedment/ pipe sleeves and reinforcement shall be correctly positioned and securely held, necessary openings, pockets etc., provided.

The Contractor shall make all arrangements like formwork, equipment, proposed procedure etc and obtain prior approval from Engineer. He also shall maintain separate Pour Card for each pour as per the format approved

Transportation of concrete

Concrete shall be transported from the mixing plant to the formwork with minimum time lapse by methods that shall maintain the required workability and will prevent segregation, loss of any ingredients or ingress of foreign matter of water. The concrete shall be distributed by approved means, which do not cause segregation or otherwise impair the quality of the concrete. The rate of supply shall match with the rate of pumping. The pipelines and its supports must not be rigidly connected to formwork. All distributing equipment shall be cleaned before commencing mixing and distribution of the concrete and such equipment shall be kept free set concrete.

Pumping shall commence first with blowing of water through the pipeline, followed by cement mortar, both of sufficient quantities and all these shall be discharged away from the area to be concreted. Pumping and the agitator inside the feeder hopper shall normally be operated in a continuous manner. When a stoppage is unavoidable, the concrete inside the hopper must be maintained at a level high enough to prevent any entry of air into the pipeline to form an air pocket. For temporary stoppage, the concrete in the pipeline shall be moved occasionally by a few strokes of the piston of the pump, thus preventing it from sticking.

Pumping shall be stopped in the following occasions:

- Presence of foreign matters, which may block the valves or pipelines
- Level of concrete in the hopper is too low
- An unsuitable batch of concrete is placed in the hopper
- Extra lengths of pipe are to be added

Foreign matter and unsuitable batch of concrete must be removed immediately from the hopper before pumping is resumed. When extra sections of pipe are to be added, each length of pipe must be thoroughly wetted inside but no free water shall remain the pipe. When the pipeline is exposed to the sun, the line shall be protected against absorption of heat by covering with damp sacking or straw mats during pumping.

Placing of concretes

All concrete shall be transported from the mixer to the place of final deposit as speedily as possible before it has commenced to set, and in no case shall this exceed 45 minutes after mixing. Where retarders are used, such interval may be extended subject to the approval of the Engineer. The method of transit shall be such that it will prevent the segregation, loss of contamination of the ingredients. Accumulation of set concrete on the reinforcement shall be avoided. Concrete shall be placed directly in the permanent position and shall not be worked along the shuttering to that position. For locations where direct placement is not possible and is narrow forms contacted shall provide suitable drops and "Elephant Trunks" concrete shall not be dropped from a height of more than 1.1m.

The concrete shall be thoroughly worked into all parts of the formwork and between and around the steel reinforcement and compacted by using approved immersion type mechanical vibrators to give a dense and compact concrete, free from voids of any kind. External vibrators, if directed by the Engineer shall be used. Steel reinforcement and compacted by using approved immersion type mechanical vibrators to give a dense and compact concrete, free from voids of any kind. External vibrators, if directed by the Engineer shall be used. Steel reinforcement shall be prevented from being displaced or deformed during concreting. After being placed in position, the concrete shall not be subject to any disturbance other than that associated with compacting.

Unless otherwise approved, concrete (for beams and similar members) shall be placed in a single operation to the full thickness and concrete (in walls, columns and similar members) shall be placed in horizontal layers each not exceeding 1m deep. Placing of concrete shall be continuous and no temporary interruption exceeding 30 minutes

shall be allowed. At the completion of associated work with compacting.

No connecting shall be done on site when raining unless permitted and approved by the Engineer, provided that the entire area of the pour is covered or protective measures are taken, to the satisfaction of the Engineer.

All concrete shall be placed in daylight unless an adequate system of lighting is provided and permission in writing for night work is given by the Engineer prior to the commencement of concreting.

Concrete may be conveyed and placed by mechanically operated equipment after getting the complete procedure approved by Engineer. The slump shall be held to the minimum necessary for conveying concrete by this method. When concrete is to be pumped, the concrete mix shall be specially designed to suit pumping. Care shall be taken to avoid stoppages in work once pumping has started.

Except when placing with slip forms, each placement of concrete in multiple lift work, shall be allowed to set for at least 24 hours after the final set of concrete before the start of subsequent placement. Placing shall stop when concrete reaches the top of the opening in walls or bottom surface of slab, in slab and beam construction, and it shall be resumed before concrete takes initial set but not until it has had time to settle as determined by the Engineer. Concrete shall be protected against damage until final acceptance.

While placing concrete the Contractor shall proceed as specified below and also ensure the following.

- Continuously between construction joints and pre-determined abutments.
- Without disturbance to forms or reinforcements.
- Without disturbance to pipes, ducts, fixings and the like to be cast in; ensure that such items are securely fixed. Ensure that concrete cannot enter open ends of pipes and conduits etc.
- Without dropping in a manner that could cause segregation or shock.
- In deep pours only when the concrete and formwork designed for this purpose and by using suitable chutes of pipes.
- Do not place if the workability is such that full compaction cannot be achieved.
- Without disturbing the unsupported sides of excavations; prevent contamination of concrete with earth. Provide sheeting if necessary. In supported excavations, withdraw the linings progressively as concrete is placed.
- If placed directly onto hardcore or any other porous material, dampen the surface to reduce loss of water from the concrete.
- Ensure that there is no damage or displacements to sheet membranes.
- Record the time and location of placing structural concrete.

Placing of concrete under water

concrete placed under water, shall be deposited through a tremmie pipe, the diameter of which shall be at least 8 times the size of the largest aggregate used in the concrete mix.

Construction method of handling the tremmie pipes shall be approved by the Engineer. The pipes shall be waterproof and sufficiently strong to withstand severe handling conditions and any joints must be sealed with adequate gaskets.

During the placing of concrete, the head of balance of the concrete in the pipe shall be just sufficient to balance the head of water and maintain the flow. The bottom of the pipe shall be kept at least 450mm below the surface of the concrete or, where the concrete is less than 450mm thick at least half the depth of the concrete which has already been placed. The flow of concrete shall be kept, as far as possible, smooth and continuous and no stoppages of more than five minutes shall occur.

Laitance and scum may be removed from the surface of horizontal construction joints shortly after the concrete has set by the use of water jets on air lift pumps.

At the commencement of tremmie work the bottom of the pipe shall be sealed before being lowered into position. The seal shall only be broken by the concrete being placed. The concrete placed in contact with the horizontal construction joint shall have a lower proportion of concrete aggregate and a higher proportion of cement than the remainder of the concrete. The proportions shall be agreed with the Engineer's Representative.

A Sufficient number of tremmie pipes shall be provided within any volume of underwater concrete being placed, to ensure that an even distribution of concrete is achieved without excessive flow in any direction. All underwater concrete shall be placed in still water within a cofferdam or formwork, which shall extend above water level.

The proportions of the mixes shall be agreed in accordance with the strength and workability required by the

specification, to allow for losses an addition of 10% of cement should be added to mixes of concrete schedules to be placed underwater.

Depositing & Compaction of concrete

No concrete shall be placed until the steel reinforcement or formwork/ mould has been checked, and approved by the Engineer. Concrete shall normally be compacted in final position within 45 minutes of leaving the mixer. The concrete must not be tipped from a height of more than 1m but shall be lowered in chutes or skips. It shall be placed in layers, and neatly leveled to a smooth surface. It shall not be covered up until passed. When the work is interrupted, the surface of the unfinished concrete shall be thoroughly cleaned, watered, coated with cement grout immediately before further concrete is added and whenever practicable, wooden battens shall be inserted in the unfinished concrete and withdrawn to form a continuous key for further concrete, both in horizontal and vertical joints.

At the junctions between new and existing concrete work, the surface of the existing concrete shall be cleaned and roughened; immediately before the new concrete is deposited the surface shall be cleaned, washed and coated with cement grout.

All concrete shall be compacted to produce a dense homogeneous mass. Concrete shall be normally compacted by means of approved immersion vibrators of minimum 10,000 cycles per minute for internal type and 3,000 cycles per minute for external type or otherwise well rammed between and around the steel reinforcement by hand rammers to ensure compactness and to avoid air-holes or voids and to produce smooth surfaces. Great care shall be taken to prevent the displacement, bending or deformation of the steel before, during or after concreting. Whenever possible all reinforcement members shall be inserted in position before concreting has been started and they shall be temporarily held, fixed, tied or wired securely in position.

Vibration, with any type of vibrator, shall not be continued in any one spot to the extent that pools of grout are formed.

Care shall be taken to avoid any disturbance of concrete, which has become too stiff to regain plasticity when vibrated.

Immersion vibrators shall be inserted vertically at points not more than 450mm apart and withdrawn slowly till air bubbles cease to come to the surface, leaving no voids. When placing concrete in layers advancing horizontal, care shall be taken to ensure adequate vibrations, blending and melding of the concrete between successive layers.

Vibrations shall not be applied by way of the reinforcement. Where vibrators of the immersion type are used, contact with reinforcement and all inserts shall be avoided as far as is practicable. Vibration shall not be used as a means of distributing heaped concrete into position. After being compacted and finished, the concrete must be left absolutely undisturbed while setting.

Joints

Movement Joints

Reinforced concrete shall have joints as shown in the drawings in order to accommodate movements during the construction and operation due to differential loading and settlement, expansion, contraction and relative sliding.

The Contractor shall use only jointing material recommended or approved by the Engineer, as being suitable for their intended purposes, and in all cases shall comply with the Manufacturers instruction.

Good care shall be exercised by the Contractor in the construction of movement joints to ensure a dense and leak proof joint. No concrete or other foreign material shall be allowed to affect the freedom of movement of these joints.

Sliding Joints

Where shown on the Drawings, Sliding Joints between the concrete surfaces shall be made using two layers of 2mm thick preformed plastic sheet or any other approved equivalent material, obtained from an approved Manufacturer, which will produce a coefficient of friction of 0.2 when subjected to a load of 270KN/m².

The bearing surface of the concrete forming the joint, shall be steel float finished to give a smooth level and even surface and shall be free all dust and loose particles.

The two layers of the plastic sheet shall be cut to size taped together with staggered joints between layers. The Concrete bearing surface to receive the plastic sheeting and the underside of the strip, shall be painted with a thin coat of a bituminous emulsion paint immediately before placing in position, and after placing, the plastic sheet, shall be rolled to exclude air voids. After completion of the construction, the Sliding Joint shall be seated internally and externally with a mastic sealant.

Construction Joints

Construction Joints shall comply with IS 11817. Concrete shall be stopped at the end of a period of work only at construction joints, which shall be located in such positions as may be authorized by the Engineer. Such construction joints shall be vertical or horizontal or both as required.

Vertical joints shall be formed by adequately secured rigid stop boards designed to pass continuous steel bars without temporary bending or displacement.

At construction joints, both vertical and horizontal, the surface of the completed concrete shall be prepared by spraying, wire brushing or chipping so that it is free from all laitance, scum and loose material and shows a slightly roughened texture in which the tips of the coarse aggregates are exposed.

In case of walls and columns, the initial 100mm up from the bottom of each lift shall be cast separately to provide "Kicker" for securing the shutter for the wall or column thereto. The surface accepting the kicker shall be treated as above. The kicker shall be vibrated.

All construction joints shall be identified in the construction scheme and shall be approved by the Engineer before actual construction commences.

Generally the position of construction joints, unless otherwise instructed shall be located as follows:

- A joint shall be formed horizontally at the top of a foundation including raft foundation.
- In the case of columns, walls (circular or rectangular) and shafts, horizontal joints shall be formed 25mm below the lowest soffit of beams and /or slabs meeting them at the top.
- Suspended floor slab and beam joints shall be vertical and be located at or near one-third the distance of the span. Joint in slab shall be parallel to the principal reinforcement.
-
- "Kickers" of columns, walls etc. shall be incorporated in the previous concrete from which it projects.
-
- Concrete in an up stand at the bottom of walls/shafts shall be placed at the same time as the slab or other work from which the up stand projects.
-
- In case of raft slab, the joint shall be provided in the middle strip and shall be specially designed to keep the raft damp proof.
-
- All exposed walls such as parapet walls or basement peripheral walls shall be cast in lengths not exceeding 10 meters and shall be constructed on the alternate bay principle.

In general, vertical joints shall be formed away from corners and horizontal joints above splays or openings. Corbels or brackets shall be poured monolithically with the wall, etc.

Concrete shall be placed in one continuous operation upto the construction joint. In case of large volumes of concrete, the Contractor shall arrange for working in shifts in such a way that no interruption to the pour occurs.

Proposals for the casting sequence and the layout of joints shall be submitted by the Contractor for the Engineers approval.

Particular care shall be taken while placing of new concrete near a joint. This concrete shall be well compacted attentively. In the case of in-situ structural joints, preparation shall be carried out preferably when the earlier concrete has set out not hardened. With a fine spray of water or wire brushing, the outer mortar skin may be removed so as to expose the larger aggregates without disturbing them.

When bonding concrete to existing hardened concrete the existing concrete shall be well chipped to expose the aggregate and well washed to remove all loose particles. This surface shall then be "battered" with a rich cement grout immediately prior to new concrete being placed.

"Keys" shall be provided whenever directed at the construction joints.

Joint Fillers

Joint filler shall be as shown on the Drawings, as described hereafter or as directed by the Engineer.

Joint fillers for movement joints, shall be non-fibrous, compressible self-expanding non-resistant work filler, bound with bitumen obtained from and approved Manufacturer.

Joint Sealants

Contraction and expansion joints shall be sealed with poly sulphide sealant or as specified in BOQ/drawing. The sealants shall be in conformity with the manufacturers recommendations having due regard to the period of concreting, the size of the concrete panel and the time when the sealer so to be run. The joints shall be prepared, clean and primed in compliance with the manufacturer's instructions and the surface be neatly finished.

The Contractor shall pay particular attention to the formation, cleaning and drying of joint grooves before application of the appropriate priming and mastic sealing compound. When priming paints are recommended they shall be obtained from the manufacturer of the sealing compound whose recommendations for application shall be adhered to.

Curing & Protection of concrete

Curing shall start immediately after the compaction of the concrete to protect it from:

Premature drying out, particularly by solar radiation and wind; Breaching out by rain and flowing water;
Rapid cooling during the first few days after placing; High internal thermal gradients;
Low temperature or frost;
Vibration and impact, which may disrupt the concrete and interfere with its bond to the reinforcement.

All fresh concrete shall be protected by approved means from rain, sun and drying wind to maintain suitable temperature and moisture until it has set properly. It shall be kept free from any disturbance due to vibration etc. Exposed surfaces of concrete are to be kept moist and covered for seven days after placing, with water bonding saturated sacking, or with an absorbing material, which is kept damp by frequent watering.

An appropriate non-wax base curing compound as approved by the Engineer shall serve as an alternative curing method, and shall not impair the concrete finish in any manner. The application of the curing compound shall comply strictly with the manufacturer's instruction. Curing may also be done by covering the surface with an impermeable material such as polyethylene, which shall be well sealed and fastened. Extra precautions shall be exercised in curing concrete during cold and hot weather.

Special precautions are to be taken for curing of mass concrete with the length, breadth and depth all exceeding 2 meters, where the temperature due heat of hydration is likely to go very high.

Concrete placed below the ground shall be protected from fall of earth during and after placing. Concrete placed in ground containing deleterious substances shall be kept free from contact with such ground and with the water draining there from during placing or for a period of three days or as directed thereafter.

SECTION - 6

BRICK WORK

Brick Masonry

Specification for Building Bricks and classification are covered by I.S. 1077/1970 and 3102/1971.

Bricks are to be well soaked in water before use for a period sufficient for the water to penetrate the whole depth of the bricks. For further instructions regarding soaking and size of bricks to be used IS 2212/1962 and IS 1200 part 111/1970 shall apply. Wetting the bricks assists in removing the dirt, sand and dust from them and also it prevents the suction of water from the wet mortar, as otherwise the mortar is likely to dry out soon and crumble before attaining any strength. Bricks shall not be too wet at the time of use as they are likely to slip on the mortar and proper adhesion of bricks to mortar will not be possible.

Regarding making of bricks IS 2117/1967 shall apply. Specification for facing brick is covered by IS 2691/1972.

Mortar :

Specification is covered by IS 2212/62 should the mortar perish, i.e, become dry white or powdery through neglect of watering, the work shall be pulled down and rebuilt at the Contractor's expense, or should the Contractor fail to watch the work to the satisfaction of the Engineer-in-Charge of the work the later may supply the requisite men to watch the work properly and charge the cost to the Contractor.

All masonry shall be washed down on completion and all strains - lime or otherwise removed from the face.

No bats or out bricks shall be used except where absolutely required for obtaining the dimensions of the different

courses for obtaining the specified bond and where in the opinion of the Engineer-in-charge of the work is of too pretty a nature to warrant the special moulding of bricks of the shape required.

Setting bricks in mortar, bond and making of joints are covered by IS 2212/1962.

No extra payment will be made for the manner of finishing brick work face joints and it shall be included by the Contractor in his unit rate for brick work.

Raking back, when circumstances render it necessary on the same section. of the structure in uneven course the bricks shall be raked back so as to maintain an uniform and effective bond.

Openings : This is covered in para 10.2, 10.4 of IS 2212/1962.

Contract unit rate for brick work are inclusive of Queen and Joints.

Measurement of brick work is covered by IS 1200

Brick work shall generally be measured in cubic metres or otherwise specified.

Walls half brick in width and less shall be measured in square metres stating thickness.

Brick walls of width over half brick shall be measured in multiples of half brick which shall be deemed to be inclusive of mortar joints, irrespective of excess of executed width. Wall exceeding one brick thick by not exceeding three bricks in thickness shall be measured in multiples of half brick which shall be deemed to be inclusive of the mortar joints where fractions of half brick occur due to architectural or other reasons the measurements shall be taken as follows

- a. upto 3/4 brick - actual measurement
- b. Exceeding 3/4 brick - full half brick for walling more than three bricks in thickness the actual thickness of wall shall be measured.

The following shall be taken as half brick measurements

For metric bricks

For bricks 19 x 9 x 9 cm - 1 0.00 cm

For bricks 19 x 9 x 5.7 cm - 10,00 cm

For Bricks other than metric bricks

For Brick of size 9" x 4 1/2" x 3" (23 x 11.5 x 7.5 cm) - 11.50 cm

For Brick of size 8 3/4" x 4 1/4" x 2 3/4" (23 x 11 x 7 cm) - 11.00 cm
For Brick of size 8 3/4" x 4 1/4" x 2 1/4" (23 x 11 x 5.7cm) - 11.00 cm
For Brick Of Size 8 3/4" x 4 1/4" x 2" (23 x 11 x 5 cm) - 11.00 cm
For Bricks of Size 9" x 4 3/8" x 2 3/4" - 11.50cm

Handling bricks:

Bricks shall not be handled in baskets or in other manner which will destroy the sharpness of their edges.

Rounding corners: Corners of rooms or pillars whether interior (or) projecting shall not be rounded by in exceptional cases where it is so desired to round the corners shall be done in plaster for the reentrant corners but will require chiseling of projecting angles before plastering.

Brick on edge coping etc. Para 10 of IS 2212/1962 shall apply. No extra payment will be made for this work, over the Contract rate for brick work. The contract rate shall include the same.

Plinth offsets: Plinth off-sets on the interior faces only should be kept 15cm below floor level (unless finished thickness of floor to be laid will determine, instead of the 15 cm) to allow for the floor paving which is done subsequently coming upon the face of the superstructure. Similarly retaining wall of verandahs etc must be built with due regard to the slope allowed for the floors.

Parapets: All parapets will be measured under the masonry below them and which they are continuous in a floor, the parapet has to be reckoned with the lower floor.

Bricks forming skew back joints shall be specially mould or cut, so as to radiate truly, and defects in this particular shall not be remedied by the extravagant use of mortar nor shall patching up by chips etc. be permitted.

Bricks shall not be dumped at site. They shall be stacked in regular tiers as and when they are unloaded to minimize breakage and defacement of bricks.

In the case of bricks made from clays containing lime Kankar the bricks in stack should be thoroughly soaked in water (docked) to prevent lime blastering.

Brick stacks shall be placed close to the site of work so that least effort is required to unload and transport the bricks again by loading pallets or in barrows. Building bricks shall be loaded or unloaded a pair at a time unless palletised. Unloading of Building bricks or handling in any other way likely to damage the corners or edges or other parts of bricks shall not be permitted.

Bricks shall be stacked on dry firm ground. For proper inspection of quality and ease in counting the stacks shall be 50 bricks long and 10 bricks high, the bricks being placed on edge and preferably the width of each stack shall be two bricks. Clear distance between adjacent stacks shall not be less than 0.8m.

Bricks of different type and classification shall be stacked separately.

Specification for common burnt clay Building Bricks as per IS 1077:1970

The common burnt clay bricks shall be classified on the basis of their minimum compressive strength. The bricks of compressive strength 50Kg/cm² shall be classified as 50. The bricks of classification 50 shall have sub-classification 50A and 50B based on tolerances and shape.

General Quality

Bricks shall be hard-or machine moulded, they shall be free from cracks and flaws and modules of free lime. Bricks of 9cm height shall be moulded with a frog 1 or 2 cm deep on one of its flat side. Bricks of 4 cm height and those made by an extrusion process may not be provided with frogs.

Dimensions and tolerances

The standard size of common building bricks shall be as follows:

	Length Cm	Width cm	Height cm
a) Metric bricks		19	9
		19	9
		19	4
b) For bricks other than Metric bricks		9"	4 1/2"
		9"	4 3/8"
			3"
			2 3/4"

Tolerances: The dimensions of bricks when tested in accordance with 7.15.3 shall be within the following limits:

Sub Clause-A	(a) Length	368 to 392 cm
	(b) Width	174 to 186 cm
	(c) Height	174 to 186 cm (in the case 9 cm high bricks, 77 to 83 cm (in the case 4 cm high bricks)
Sub Clause B	(a) Length	350 to 410 cm
	(b) Width	165 to 195 cm (in the case 9 cm high bricks)
	(c) Height	74 to 86 cm (in the case 4 cm high bricks)

Twenty (or more according to the size of stack) whole bricks shall be selected at random. All blisters, loose particulars of clay and small projects shall be removed. They shall then be arranged upon a level surface successively in contact with each other and in a straight line. The overall length of the assembled bricks shall be measured with a steel tape or other suitable in extensible measure sufficiently long to measure the whole row at one stretch. Measurements by repeated application of a short rule or measure shall not be permitted. If for any reason it is found impracticable to measure bricks in one row, the sample may be divided into all the rows of 10 bricks, which shall be measured separately to the nearest millimetre. All these dimensions shall be added together.

a. Physical properties:

i. Compressive strength: Common building bricks shall have a minimum compressive strength of 50 Kg/cm² when tested in accordance with procedure laid down in table 1 of

IS: 3495 - 1966 (See also note under 1.1)

- ii. The compressive strength of any individual brick shall not fall below the average compressive strength specified for the corresponding class of bricks by more than 20 percent.
- iii. **Water absorption:** When tested in accordance with the procedure laid down in Table 2 of IS : 3495 - 1966 (method of sampling and testing of clay building bricks) the average water absorption of common building bricks shall not be more than 20 percent upto class 125 (see 30-1 below) and 15 percent for higher class, by weight after immersion in cold water for 24 hours.
- iv. **Efflorescent:** When common building bricks are tested in accordance with the procedure laid down in Table 3 of IS: 3495 -1966 (method of sampling and testing of clay building bricks) the rating of efflorescence shall not be more than "moderate" upto class 125 and "slight" for higher classes.

b. Classification of burnt clay solid bricks (as per IS: 3102=1971):

- i. Classes and sub-classes for burnt clay solid bricks shall be as detailed below:

Type of brick	class designation (see not below)	Compressive strength Kg/CM2 min. immersion	Water absorption (24 hrs. %) Max	Efflorescence
1	2	3	4	5
Heavy duty (See IS 2180-1970)	450	450	10	Nil
Common burnt clay building bricks (See IS1077-1970)	400	400	10	Nil
	350	350	15	Slight
	300	300	15	Slight
	250	250	15	Slight
	200	200	15	Slight
	175	175	15	Slight
	150	150	20	Moderate
	125	125	20	Moderate
	100	100	20	Moderate
	75	75	20	Moderate
	50	50	20	Moderate
	35	35	20	Moderate

Note: Each class of bricks shall further be divided into subclasses A, B etc. based on the following.

Sub Clause A - Tolerance limit shall be ± 3 percent and shall have smooth rectangular faces with sharp corners and emit clear ringing sound.

Sub Clause B - Tolerance limit shall be ± 8 percent and shall be permitted to have slight distortion and rounded edge, provided no difficulty shall arise in laying of uniform courses.

- ii. Specification for burnt clay facing bricks as per IS 291-1972

The facing bricks shall be of two classes - (a) Class 1 & (b) Class 11

- iii. **General quality:** The facing bricks shall be made of clay, shale or mixture of these materials with or without admixtures and burnt to meet the requirements of this standard. The colouring material added to be clay shall be of suitable ceramic material, sand shall be well distributed throughout the body. The bricks shall be of uniform colour.
- iv. Bricks shall be free from cracks, flaws and modules of free lime and of even texture. These shall be thoroughly burnt and shall have plane rectangular faces with parallel

sides and sharp straight right angled edge.

- v. The standard sizes of the facing bricks shall be 19 x 9 x 9 cm and 19 x 9 x 4 cm. The permissible tolerances shall be as under.

Dimension	Tolerances	
	Class I cm	Class II cm
19	±3	±3
9	±3	±3
4	±1.5	±2

- vi. The average compressive strength obtained in accordance with the procedure laid down in Table 1 of IS 3495 - 1966 (Method of Sampling and testing clay building bricks) shall not be less than 75 Kg/CM² for class II and 100 KG/cm² for Class I.
- vii. Water absorption requirement when tested in accordance with the procedure laid down in Table 2 of IS: 3495 - 1966 for 24 hours immersion shall not exceed 15 percent.
- viii. When tested in accordance with the method specified in Table 3 of IS: 3495 - 1966 efflorescence requirements shall be 'Nil' for both cases.
- c. When measured in accordance with the method specified in Table 4 of IS: 3495 - 1966 the warpage for both classes shall not exceed 2.5mm.
- d. Nominal thickness of wall. This is the thickness of wall that is stated in the estimates for calculation of quantities. It is a fictitious dimension, which is neither the actual thickness of wall excluding surface finishes like plaster, rendering etc. for necessarily the overall thickness, including such finishes. The following example will illustrate this point.

	Nominal thickness	Actual Thickness
For traditional bricks of 8 inch length (with allowance of 1.14 inch for mortar joint)		
1 Brick	9 inch	8 ½ to 8 ¾ inch
1 ½ Bricks wall	13 ½ inch	13 to 13 ¼ inch
2 Brick wall	18 inch	17 ½ to 17 ¾ inch
For modular brick (with allowance of 1 cm for mortar joint)		
One Brick wall	20 cm	19 cm
1 ½ Brick wall	30 cm	29 cm
2 Bricks wall	40 cm	39 cm

- e. **Bricks** - unless otherwise specified, burnt clay bricks shall conform to the requirement of IS : 1077-1957 specification for common burnt clay building bricks and shall be of the specified class.
- f. **Mortar** - Mortar for masonry shall be prepared in accordance with IS:2250 code for practice for preparation and use of masonry mortars. The selection of mortar will also be governed by the strength required for masonry and reference may be made to IS:1905- 1961 code of practice for structure safety of buildings. Mortar shall be well mixed and shall be transported from the mixing plate form to the site of work in such a manner to prevent formation of laitance or segregation.
- g. **Cement** - Cement used for brick masonry shall be of ordinary or rapid - hardening portland cement conforming to IS 269:1958 specification for ordinary. Rapid - hardening and low heat Portland Cement (Revised) or blast furnace slag cement conforming to IS:455- 1962, specification for Portland Blast - furnace slag cement (Revised).
- h. **Fine aggregate:** Sand shall conform to IS: 2116 specification for sand for masonry mortar.
- i. **Water:** Water used for masonry mortar shall be clean and free from injurious amounts of deleterious materials.

- j. **Bonds and joints:** The primary object of bond is to give strength to masonry but it may also be employed to create artistic effects when the brick work is exposed to view. In brick work the cross joints in any course shall not be nearer than a quarter of a brick length from those in the course below or above it.

The thickness of bed joints shall be such that four courses and these joints taken consecutively shall measure as follows:

- a. In the case of traditional brick: Equal to four times to actual thickness of the brick plus 3 cm
- b. In the case of modular: Equal to 39 cm brick conforming to IS:1077-1957

The face joints of brick may be finished by jointing or by pointing. In jointing, either the face joints of the mortar shall be worked out while still green to give a finished surface flush with face of the brick work, or the joints shall be squarely raked out to a depth of 1 cm while the mortar is still green for subsequent plastering. The face of the brick work shall be cleaned with wire brush so as to remove any splashes of mortar during the course of raising the brick work.

In pointing, the joints shall be squarely raked out to a depth of 1.5cm while mortar still green and raked joint shall be well brushed to remove dust and loose particles and well wetted, and shall be later refilled with mortar to give the required finish. Some such finishes are "flush", "weathered", "tucked" and "ruled".

Laying of brick work: Bricks shall be laid on a full bed of mortar. When laying the bricks shall be slightly pressed so that the mortar can get into all the pores of tile brick surface to ensure proper adhesion. Cross joints and wall joints shall be properly flushed and packed with mortar so that no hollow spaces are left. In case of thick walls (two - brick thick and over) the joints shall be grouted at every course in addition to budding and flushing with mortar.

The course at the top of the plinth and sills at the top of the wall just below the roof slab or floor slab and at the top of the parapet shall be laid with bricks on edge (applicable only in the case of traditional bricks) and at corners and at dead ends the bricks shall be properly radiated and keyed into position by using cut bricks.

Brick with 2 cm deep frog shall be used frog down. Bricks with 1 cm deep frog shall be used either frog up or frog down.

The course shall be aligned and care shall be taken to keep the perpend.

The brick work shall be built in uniform layer corners and other advanced work shall be racked back. No part of a wall during its construction shall rise more than one metre above the general construction levels, to avoid unequal settlement and also in proper jointing. Toothing may be done where future extension is contemplated but shall not be used as an alternative to racking back. All quoins shall be accurately constructed and the height of the course checked with storey rods as the work proceeds. In general, quoin-bricks shall be headers and stretchers in alternative courses, the bond being established by placing a quoin closer next to the queen header. Acute and obtuse quoin closer next to the queen header. Acute and obtuse quoins shall be bonded. Where practicable, in the same way as square quoins. Obtuse quoins shall be formed with squints showing a three-quarter brick on one face and a quarter brick on the other. The arrangement of bond at jambs of openings shall be symmetrical.

Partitions: For half brick partitions to be keyed into main walls, indents shall be left in the latter.

6.26 Fixing of frames : When doors or window frames of timber are fixed in the openings, the fixing shall be done generally with hold fasts of adequate size and strength securely embedded in the brick work or in chases later filled up by cement mortar or concrete. Hold fasts shall be fixed into the brick work for a sufficient length and then turned up at end into across joint, thus avoiding indiscriminate cutting of bricks. Iron hold fasts shall be given a protective coat of bitumen to avoid rusting. Wood work faces in contact with brick work shall be treated with wood preservative to prevent attack from insects and termites.

Fixing of Steel doors and windows shall be done in accordance with IS : 1081 - 1960. Code of practice for fixing and glazing of metal (Steel and Aluminium) Doors, Windows and Ventilator.

The frame shall preferably be fixed simultaneously and the masonry work proceeds, as this construction will ensure proper bond without gaps between the masonry and the framer.

Curing : In hot and dry weather, the mortar is likely to dry up before it has attained its final set and crumble. This shall be prevented by keeping the brick work constantly wet for at least seven days, except in the case of brick work with mud mortar, for which no such curing shall be done.

Workmanship: The following shall be strictly followed:

- (a) All loose materials, dirt and set lumps of mortar which may be lying over the surface over which the brick work is to be freshly started shall be removed with a wire brush.
- (b) All the bricks shall be thoroughly shaken in clean water before use.
- (c) The surface over which the brick work is to be started shall be slightly wetted.
- (d) The first course itself shall be made horizontal by providing enough mortar in the bed joint to fill up any undulations in the bed course.
- (e) Care shall be taken to see that the required quantity of water is added to the mortar at the mixing platform itself and not over the course.
- (f) Care shall be taken to see that there is no through joints and the lap is not less than half the width of the brick and that all the vertical joints are properly filled with mortar.
- (g) The verticality of the walls and horizontality of the courses shall be checked very often with plumb bob and spirit level respectively.
- (h) No portion of the brick work shall be left more than 1 metre lower than the other. Where the masonry of one part has to be delayed work shall be "racked back" suitably at an angle not exceeding 40° according to bond and not toothed.
- (i) Where plastering is required to be done the joints shall be raked to a depth of 1 cm while the mortar is wet to facilitate satisfactory adhesion between the plaster and brick work.

SECTION - 7

WATER SUPPLY

UPVC Water Piping work – General

The item includes supplying of UPVC pipes with fittings of specified diameter including laying, fixing, cutting, jointing, painting etc. For vent, over flow, waste water pipe line etc.

Material

The pipes and fittings shall conform to series IV of IS 4985-1978. PVC pipes and fittings shall be free from cracks, flaws and defects and shall be able to withstand a pressure as mentioned in the schedule.

Examining

Before laying the pipe line, it shall be first examined for damages and cracks. No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

Cleaning

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

Laying

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. All the pipes shall be used in standard length as far as possible. Cut length may be used only where it is necessary to make up exact length.

The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work the open end shall be suitably plugged.

Fixing

The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with GI clamps not less than 2mm thick or with suitable diameter PVC clamps. The clamps shall be

fixed into the wall with GI nails not less than 40mm long and wooden gutties.

Making Joint

The jointing of pipes and fittings generally shall be done with approved make cement solvent including making surface rough. The pipe shall be cut to desired length. Care shall be taken that profile or cut surfaces shall not be changed and the fibrous material shall be removed with scraper or knife.

Detachable Joint

Detachable joints shall be made where pipes of different materials have to be jointed or as specified in the schedule.

The flanges are first pushed over the pipe ends and jointing shall be made by cement solvent.

Painting

The pipe line shall be painted with two coats of approved oil paint of matching color over a coat of primer.

Dewatering

The contract rate shall include bailing or pumping out all the water till completion of work if accumulated during the progress of work either from seepage, springs, rain or any other cause.

Testing

The joints shall be tested hydraulically to a pressure as specified in the schedule. The leaky joints shall be remade and section retested at no extra cost. The period of test shall be for minimum 2 (two) hours.

The rate includes for

1. Supplying of PVC pipes and fittings of specified diameter.
2. Laying and cutting the pipe wherever necessary and wastage.
3. Fixing the pipe line with GI clamps not less than 2 mm thick and GI nails length not less than 40 mm or with PVC clamps, Screws, Wooden gutties etc.
4. Making the solution joint and painting the pipe line
5. Dewatering if necessary till completion of work
6. All necessary materials, labour and use of tools.

Mode of measurement

The measurement shall be for unit running metre length of pipe line laid or fixed or shall be for each unit of water inletconnection fixed. The measurement shall be taken along the longitudinal axis center to center. No measurement shall be recorded separately for fittings, making joint, painting and testing.

Mode of payment

The contract rate shall be for unit running metre length of pipe line laid or fixed or shall be for each unit of PVC water inletconnection fixed.

Any demolition of walls, roof, floor partition or any hole to be made in the same for the purpose of fixing pipes, fittings shall be carried out by the contractor and made good without any additional payment.

Testing

Testing the pipes shall be done wholly at the contractors expense inclusive of all required apparatus, provision of water etc and directed by the Engineer-in-Charge.

SECTION - 8

8.1 1 SANITARY WORKS

MATERIALS

Stoneware pipes shall conform to the specifications as laid down in IS 651-63. Cast Iron Pipes for sewage and water supply shall conform to IS 1536-1967. The specials shall conform to IS 53 Part 3 III - 1977.

Wash basins should be of white glazed earthenware. The top of the wash basin shall be at a height of 83 cm from the finished floor level. Overflows should be of the open type capable of being easily cleaned. The waste fitting should be provided with Unions for connection to lead any other suitable pipe. Basin's shall be fixed on approved cast iron frames or brackets.

Urinals shall be of earthenware glazed. Colour of Urinals shall be specified in the schedule. Each Urinal shall be provided with not less than two fixing holes on each side having a minimum diameter of 6.5mm. At the bottom of the urinal and outlet horn shall not be glazed and the surfaces shall be provided with grooves at right angles to the axis of outlet to facilitate fixing the outlet pipe with cement or suitable binding material. The inside surface of the urinal shall be regular and smooth throughout to ensure efficient flushing. The bottom of pan shall have sufficient slope from the front towards the outlet such that there is efficient draining of the urinal.

Urinals shall be fixed in position using wooden plugs of size 50mm x 50mm at base tapering to 40mm x 40 mm at the top and of length 50 mm. These plugs shall be fixed in wall in CM 1:3. Each urinal shall be connected to waste pipe as mentioned in the schedule.

The matching earthen ware glazed standard Urinal partition shall be fixed with U Clamps made up of non-rusting material.

Closet pans shall be of earthenware glazed inside. Colour of water closets will be specified in the schedule. The back of the pan shall be near vertical as possible to prevent fouling. The area of water shall be large and the depth of seal shall, not be less than 50 mm. The dimensions of water closets shall conform to IS 771 - 1963.

Water closet pan shall be sunk into floor and embedded in a Cushion of average 15 cm of brick jelly concrete in time horton 1:2. The concrete shall be left below the top level of the pan so as to allow for flooring and its bed concrete.

LAYING OF STONEWARE PIPES

The pipes shall be carefully laid to the alignment level and gradients shown on the plans and sections and great care shall be taken to prevent any sand earth or other matter from entering to pipes during laying. As it is not permitted to rectify errors of grade by packing up underneath with earth. Care should be taken to bring to grade. The pipes between manholes shall be laid truly in straight lines without vertical or horizontal undulations. Jointing of pipes shall be done as per IS 4127/1967 paragraph 6.

TESTING

Testing of pipes shall be done wholly at the contractor's expense inclusive of apparatus, provision of water etc and as directed by the Engineer in Charge.

The test will be for an hour or such longer period as may be set by the Engineer in charge. If the water level doesn't fall more than 12mm in length of 90m, the test may be considered satisfactory.

MANHOLES

Inspection chambers and Manholes shall be constructed at the position shown in accordance with plans furnished. All materials and work shall conform to relevant standard specification. The Manhole cover shall conform to IS 1726/1960. All pipes and step irons of type specified shall be built in while the walls are being constructed and fixed in cement mortar 1:3. All pipes entering a manhole shall be relieved of pressure by having an arch turned over them in the brick work.

All brackets lewis both wooden blocks or other materials for fitting sanitary fittings shall be securely fixed into the wall floor or ceiling as the case may be with standard specification in CM 1:3 only.

Any demolition of walls, roofs floors, partition or any hole to be made in the same for the purpose of fixing sanitary fittings or leading pipes to or from sanitary fittings shall be carried out by the contractor without additional payment.

All other fittings and appliances shall conform with the standard specification and as specified by the Engineer in Charge.

SPECIFICATIONS FOR SANITARY FITTINGS DRAINAGE AND WATER ARRANGEMENTS

1. Water closets, basins, urinals sinks and other sanitary ware shall be of approved make as required in the relevant items. The fixing of these shall be in accordance with the special specifications separately attached.
2. The rates shall include all dismantling making holes in walls of slabs and restoring the structures to the original conditions after the completion of the work.
3. The work shall be carried out with least hindrance to the adjoining building and the contractor shall be responsible for any damages caused to the existing fixtures, electric fittings etc., in the course of execution and the contractor shall make good any such damages without claim for extra.
4. The rate of laying stoneware pipes shall include necessary earthwork excavation for trenches (irrespective of nature of all incidental charges such as shoring strutting and bailing out water refilling trenches) after the completion of works and consolidating, removing the surplus earth to places shown within compound and making good the damages to roads and other structures.
5. The rates for laying C.I. Pipes and G.I. Pipes shall include earthwork for trenching and refilling them and fixing with plug, clamps and screws where the pipes are fixed to walls the rates for G.I. Pipes shall also include wrapping them with tarred tape where they are buried in earth tarring the portions embedded in masonry and painting with white lead paint, two coats for portions above ground level.
6. The clamps for G.I. Pipes fittings should not be spaced more than 6 feet apart, the wooden plugs for pipe and bracket fittings should be properly fixed in cement mortar 1:3 in holder make, in masonry with the wide end of wedge plugs inside and no hammered with them and into the walls. The size of plugs should not less than 1" square at this end and 1 1/2" at the other end with depth of not less than 3".
7. Painting with two coats of best white paint (or any other colour approved by the Executive Engineer) over a priming coat of red lead to all flushing tanks, brackets clamps used for fixing pipes) and all lead connections. Painting with two coats of anti corrosive paint of approved colour to all C.I. Soils waste and anti syphonage pipes.
8. The rates shall include all dismantling making holes in the slabs and restoring the structure to the original condition after the completion of the work.

SUPPLYING AND FIXING INDIAN TYPE WATER CLOSETS

1. The Indian type water closet shall be fixed in position at floor level in a bed of concrete brick jelly in lime mortar the proportion being 32:12 1/2 so as to completely embed the closet trap and foot rest. The existing masonry structures after dismantling the floor, making the holes, etc., shall be restored to its original condition after completion of the work. The flooring around the closet shall be finished off in cement mortar 1:3, 1/2" thick with adequate slope around for draining into the closets. The foot rest should be fixed at an angle shown in sanitary Engineer's type designs.
2. The cast iron flushing tank shall be of three gallons capacity of Indian make of approved brand supported G.I. brackets with necessary G.I. chain and handle for pull float ball valve 1/2" lead and brass connections to the closet including necessary connection to the water main and closet complete and wiped solder joints. The flushing tanks and bracket must be painted with white glazed enamel paint 2 coats over a priming coat of red.
3. The fixing of water closets shall include the dismantling of existing floors wherever indicated making holes in masonry walls etc., and restoring structure to original condition after completion of the work. The flushing tank and accessories will be fixed to the walls with necessary clamps and brackets in cement mortar 1:0.

Execution of sewer networks.

1. Transfer the temporary bench mark (TBM) along alignment where sewer is to be laid. It will help in quickly transferring of levels for laying of lines, excavation depth, slope to be provided which requires to be checked at multiple times till the laying is not completed.
2. Mark the alignment for laying of sewer keeping in mind the excavation width / diameter required for construction of manhole chamber.
3. Fix the location of manhole chambers by reconnaissance survey so that the maximum outlets from units can be joined as well as distance between two manhole chambers be ensured with respect to maximum / minimum distance between two consecutives manholes chambers.
4. It should be ensured that the barricading has been carried out properly and display boards for diversion, warning, work in progress, schedule of completion of activity in the area are displayed at required places and proper lighting arrangement at work sites are made during night for convenience & safety of the

people.

5. L section for each lateral, branch, sewer should be checked regularly so that any short coming can be checked and rectified before execution. The alignment and bed level of trench should be checked before preparation of base for pipes. Laying of pipes as per design gradient is the most important factor for successful working of sewerage networks. Therefore, contractor should ensure that the pipes have been laid as per the designed gradient in all sections of sewer line. The alignment and gradient of the pipes, once laid in trench should be checked regularly.
6. Proper safety arrangements like barricading, timbering in trenches, access to trench, proper stacking of construction material, disposal of surplus excavated material should be ensured during construction. Proper shoring will be used where required as directed by the Engineer.
7. Excavation upto invert depth may be with the excavator but rest depth for bedding should be carried out manually with smooth dressing.
8. For sight rail (H-frame) and boning rod for transferring and checking of the levels in trench shall be as per procedure mentioned in clause 3.56 of Manual of Sewerage & Sewage Treatment System by CPHEEO.
9. As directed by the Engineer, proper bed will be prepared for laying of sewer line. Bedding material will be placed if required as directed by the Engineer.
10. Laying & Jointing of Sewer lines:
 - a) All the sewer lines are to be laid perfectly true both in alignment and to gradient specified. In case of spigot and socket pipe, the socket end of the pipe shall face upstream.
 - b) Sewer pipe laying and jointing shall be started and completed only section wise as per the instruction of the Engineer. The sections shall be chosen manhole to manhole. The work of sewer line laying, manhole construction and sewer connections shall be done simultaneously so that all the necessary testing can be done efficiently and effectively.
 - c) After bedding & laying of pipe line the trench shall be filled up to top of pipe with compaction of soil.
 - d) The posts and rails shall in no case be removed until the trench is excavated, the pipes are laid and Engineer gives permission to proceed with the backfilling.
 - e) No trench shall be filled in unless the sewer stretches have been tested and approved for water tightness of the joints. However, partial filling may be done keeping the joints open to avoid any disturbance. The refilling shall proceed around and above the pipes.
 - f) It should be ensured that open ends of the pipes are suitably plugged to prevent entry of sand/soil and other construction material in the sewers at the end of the day.
11. Hydrostatic Test:
 - a) The laying of pipes and further trench filling should be taken up only after satisfactory sectional hydraulic testing of the laid pipe line. In no case a section should be back filled without satisfactory hydraulic testing. Expendable balloons / dummy shall be preferred for plugging of pipe ends instead of masonry packing.
 - b) Entire section of the sewer shall be proved by water tight by filling in pipes with water to the level of 1.50 m. above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The loss of water over a period of 30 minutes should be measured by adding water from a measuring vessel at regular 10 minute intervals and noting the quantity required to maintain the original water level. It should not be more than the permissible limits.
 - c) Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.
12. Construction of Manhole Chambers:
 - a) Manholes should be built at every change of alignment, gradient or diameter, at the head of all sewers and branches, at every junction of two or more sewers. The maximum distance between manholes should be 30 m for sewers which are to be cleaned manually or which cannot be entered for cleaning or inspection. The channel at bottom of manhole should be in curve shape when the flow takes bend.
 - b) After proper ramming & curing of PCC, the construction of chamber first be completed upto crown of the laid pipe with benching concreting so that the monolithic structure can be made with outer walls. Proper slope in benching i.e. 1 in 12 be given from outward to inward.

- c) It should be ensured that the manhole top is flushed with road level. The entire height of the manhole shall be tested for water tightness as per CPHEEO Manual, by closing both the incoming and outgoing ends of the sewer and filling the manhole with water and the drop in water level not more than 50 mm per 24 hours shall be permitted.

13. Flow test:

14. After successful completion of sewer network and all allied works, before commissioning flow test shall be carried out for entire network to ensure following that:

- a) During construction there is no obstruction remain in due to debris or any foreign material which causes obstruction in flow.
- b) There is no missing gap in the sewer line.
- c) The flow is smooth without any turbulence & gradients provided are practically good.

SECTION – 9

PAINTING NEW WOOD WORK AND IRON WORK

Specification for painting new wood work laid down in IS 2338 (Part 1) 167 shall apply.

Specification for painting new iron and steel work laid down in IS 1477 part 1171 shall apply.

Paints, Oils , varnishes etc of approved brand and manufacture shall be used. Ready mixed paint as received from the manufacturer without any admixtures shall be used.

Approved paints shall be brought to the site of work by the contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or atleast a fortnight work. The materials shall be kept in the joint custody of the contractor or Engineer in charge. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Engineer in Charge.

COMMENCING WORK

Painting shall not be started until the Engineer-in-Charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work.

PREPARATION OF SURFACE

The surface shall be thoroughly cleaned and dusted. All rust, dirt, scales, smoke and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer in charge after inspection. before painting is commenced.

APPLICATION

Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its containers, when applying also, the painting shall be continuously stirred in the smaller containers so that its consistency is kept uniform.

The painting shall be laid on evenly and smoothly by means of crossing. and laying off. the later in the direction of the grain of wood. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after laying off is finished. The full process of crossing and laying 1 off will constitute one coat.

Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation.

Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is laid. No left over paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed. No hair marks from the brush or logging of paint puddles in the corners of panels angles of moulding etc. shall be left on the work.

In painting door and windows the putty round the glass panels must also be painted, but care must be taken to see that no paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be

left out in paint In painting steel work, special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

9.2. Painting with ready mixed paint over G.I sheets.

Superior quality ready mixed paint suitable in painting over G.I Sheets, of approved brand and manufacture and of the required shade shall be used.

9.2.2 Preparation of surface for new work

The painting of new G.I sheets shall not usually be done till the sheets have weathered for about a year. When new sheets are to be painted before they have weathered, they shall be treated with a mordant solution prepared by mixing 38 gram of copper acetate in a litre of soft water or 13 gram hydrochloric acid in a solution of 13 gram each of copper chloride, copper nitrate and ammonium chloride dissolved in a litre of soft water. This quantity of solution is sufficient for about 235 m² to 280 sqm of area and is applied for ensuring proper adhesion of paint.

SECTION – 10

10. MISCELLANEOUS 10.01 DOORS AND WINDOWS

Scope

This section covers the general requirement for Timber doors and windows, Aluminium ventilators, etc including supply and installation of all related proprietary, ironmongeries, fitting and fixtures.

Materials and samples

All doors, door shutters, fittings, fixtures etc. to be factory finished, supplied from an approved source and to match approved samples.

Materials

The timber used shall be of the type specified in the BOQ/ drawing and of best quality. All timber shall be natural growth and uniform in texture and shall be well seasoned as per IS 1141. The moisture content shall not exceed the limits as per IS: 287. It shall be free from large, loose dead or cluster of knots, injurious open shakes, rot, decay, discoloration and all other defects and shall conform to IS 883. Wooden doors and window frames and shutters shall conform to the provisions in IS: 4021 – Part 1 & 2.

Flush shutter

Interior wood door shutters shall be 30mm thick phenol formaldehyde synthetic resin thermo pressed flush shutters or as specified. The shutters shall conform to IS: 2202 (Part – I) and the make shall be one of the approved make. The solid core shall be of wood laminate prepared from battens of well-seasoned and treated good quality having straight grains. These battens shall be generally of 50cm length and 2.5cm width. These shall be properly glued and machine pressed together, with grains of each piece reversed from that of adjoining one and shall have the longitudinal joints, staggered. Alternatively, the core shall be of solid teak particle board. Edges of the core shall be lipped internally with first class teak wood battens of 4 cm. Minimum depth, glued and machine pressed along with the core.

Commercial plywood used on facing shall conform to grade I of IS : 303. Thermosetting synthetic resin conforming to IS:848 or moisture-proof plywood grade M.P.F.I shall be used.

Samples of flush doors, block boards, etc shall be submitted to the Engineer for his approval and all shutters etc. supplied for use shall be similar to the approved sample in all respects.

General requirements for woodwork

The woodwork shall be as per the details provided in the drawings. The joinery work shall be accurately set out, framed and finished in a proper workman like manner. No patchwork shall be allowed. Joints shall be simple, neat and strong. Putty shall not be used to cover any defects.

All portions of timber abutting against or embedded in masonry or concrete shall be treated against termites by giving a coat of an approved wood preservative. All the exposed faces of the joinery shall be thoroughly planned. Jointing shall be by means of mortise and tenon, dovetailed joints or as directed by the Engineer.

The whole of joinery to be finished to be dimensions and sizes indicated in the drawings are subject to a

tolerance to

1.50 mm of each plane, face, but no allowance shall be given to flush doors, shutters, ply and other manufactured board etc.

If after execution any shrinkage or bad workmanship is found, the Contractor shall forthwith replace the same all as directed by the Engineer.

Edges of the beams, joists, posts, frames etc. shall be rounded, moulded or chamfered as directed.

The Contractor shall be responsible to deliver all items at site of work. The Contractor will submit a programme of work in such a way that requirements for each floor commencing from Still floor is completed before the requirement of the next floor and arrange to have them fixed in position as the General Building works progresses.

Doors, Windows and Ventilators

These shall be in accordance with the drawing in every detail and all joinery work shall be finished in a workman like manner. The wood used for frames shall be of the variety and quality as specified in the drawing/BOQ and shall follow the requirements as stated above for wood works. Rebates and mouldings shall be provided as shown in the drawing.

Holdfasts shall be of size 165 mm x 50 mm x 3 mm M.S. flat bent to shape with fish tail and shall be fixed to frame with sufficient number of screws as directed and these shall be 3 in number on each side for door & 2 nos. on each side for windows, unless otherwise indicated in the drawings. When door/window frames are to be fixed to RCC wall, holdfasts shall be substituted by suitable arrangements such as anchor bolts, coach screws, raw bolts/grip bolts etc. to secure frames to RCC column or RCC wall as directed by the Engineer. The frame shall be fixed only after getting the approval of the Engineer. The joiner shall perform all necessary mortising, tenoning, grooving, matching, tonguing, housing, rebating and all other works necessary for the proper construction of framing, lining etc. and for their support and fixing in the building.

Glued joints are to be used where provision need not be made of shrinkage or other movements in the connections and where sealed joints are required. All glued joints shall be cross-tongued or otherwise reinforced. All nails springs, etc. is to be punched and puttied.

The door, window and ventilators shall be erected true to line, level and plumb, and shall be upright, square and free from twists. The end of the two sides of the frame shall be adequately embedded into the flooring.

Louvers fixed to ventilators shall be of glass as specified in the drawing/BOQ.

The iron mongeries for doors and windows shall be provided and fixed as shown in the drawing.

Mode of measurement: Doors and windows leaves shall be described, method of fixing indicated and measured in square meters. Each type shall be measured separately. No extra width or labour shall be measured for rebated and or splayed meeting stills of doors and windows.

Glass:

Glass shall conform to IS: 2835 unless otherwise specified, the glass shall be sheet glass of approved make and quality and shall be free air bubbles, waves and other defects. The thickness of the glass glazing shall be as indicated in the drawing/BOQ. Glass shall be clear glass, tinted glass, frosted, pinhead, or reeded, etc., as specified in the drawing/BOQ. Glazing shall be fixed with teakwood beading as per detailed drawings.

Fittings

Fitting shall be of mild steel or aluminium. Some mild steel fittings may have components of cast iron. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. These shall be of the following type according to the material used. Samples and test certificates shall be provided by the contractor and prior approval obtained before using any of the fittings described below.

All fittings shall be made from one of the materials as described below or as specified in the drawing.

Mild Steel Fittings

These shall be bright satin finish black stone enamelled or copper oxidized (black finish) nickel chromium plated or as specified in drawing.

Aluminium Fittings

These shall be anodized to natural matt finish of dyed anodic coating not less than the grade AC 10 of IS: 1868.

Screws for the fittings shall be made of the same material as that of the fittings. However chromium plated brass screws or stainless steel screws shall be used for fixing aluminium fittings. Fittings shall be fixed in the proper position as shown in the drawing and shall be truly horizontal or vertical as the case may be.

Recesses shall be cut to the exact size and depth for the counter sinking of hinges.

Hinges Butt hinges

These shall be of the following type according to the material used

- Mild steel Butt hinges (medium)
- Cast brass butt hinges light/ordinary or heavy
- Extruded aluminium alloy butt hinges

Mild Steel (medium)

These shall be of medium type manufactured from M.S. sheet. These shall be well made and shall be free from flaws and defects of all kinds. All hinges shall be cut clean and square and all sharp edges and corners shall be removed. These shall conform to IS: 1341.

Sampling and criteria for conformity

The number of butt hinges to be selected from a lot shall depend on the size of lot and shall be in accordance with the Table given below. But hinges for testing shall be taken at random from at least 10 per cent of the package subject to a minimum of three, equal number of hinges being selected from each package. All butt hinges selected from the lot shall be checked for dimensional and tolerance requirements. Defects in manufacture and finish shall also be checked. A lot shall be considered conforming to the requirements of this specification if the number of effective hinges among those tested does not exceed the corresponding numbers given below.

Lot size	Sample size	Permissible no of defective hinges
Upto 200	15	0
201 to 300	20	1
301 to 500	30	2
501 to 800	40	2
801 and above	55	3

Note: Any hinge, which fails to satisfy the requirements of any one or more of the characteristics shall be considered as defective hinge and the entire lot rejected.

Tower Bolts

These shall generally conform to IS: 204 (Part. I) & IS: 204 (Part. II). Tower bolts shall be well made and shall be free from defects. The bolts shall be finished to the correct shape and shall have a smooth action. All sharp edges and corners shall be removed and finished smooth. The height of knob of tower bolt when the door, window etc. is in closed position from the floor level shall be not more than 1.9 meter.

Tower bolts shall be as follows

Aluminium barrel tower bolts with barrel and bolt of extruded sections of aluminium alloy. The knob shall be properly screwed to the bolt and riveted at the back.

Unless otherwise specified bolt shall have finish as given below.

Aluminium alloy tower bolts (type 6) Bolt and barrel anodized.

The anodic film may be either transparent or dyed as specified in drawing. The quality of anodized finish shall not be less than grade AC-10 of IS: 1868.

Sampling and Criteria for conformity shall be same as specified in drawing for aluminium-extruded alloys (brass hinges)

Handles:

These shall conform to IS: 4992.

Sampling, criteria for conformity shall be the same as specified in drawing for extruded aluminium alloys (butt hinges)

Test certificates shall be provided by the manufacturer and prior approval obtained before using any of the fittings described below.

10.01.12. Miscellaneous Fittings

Hooks and Eyes

These shall be mild steel or as specified in drawing. Mild steel hooks and eyes shall be copper oxidized (black finish) or as specified in drawing. Cast brass hook eyes shall be finished bright or chromium plated. These shall be well made and free from defects. They shall be finished to the correct shape and dimensions so as to function properly when they are in use. Cast hooks eyes and plates shall be free from casting and other defects. All these shall generally conform to IS: 207. All size of hooks and eyes shall be determined by the length of the hooks

measured out to out. Unless otherwise specified the articles shall be finished bright.

Stopper

Hanging rubber door stopper

Aluminium stopper shall be anodized and the anodic coating shall not be less than grade AC-10 of 15:1868. The size and pattern of the doorstopper shall be approved by the Engineer-in-charge. The size shall be determined by its length.

PVC rigid panel doors

Factory made 28mm thick PVC rigid single panel PVC door shutters made with moulded PVC channel of 5mm thick sheet and 24mm x 59mm wide to form styles and 5mm thick and 59mm wide PVC sheet for top rail and bottom rail on either side and 5mm thick, PVC sheet as gap inset for top rail and bottom rail panelling of 5mm thick and joined together with solvent cement adhesive etc., and the dimension of the frame is 40mm x 50mm and hollow section PVC moulded frame shall be provided.

M.S. ROLLING SHUTTERS

General

This specification covers the design, material, fabrication, delivery and erection of M.S. rolling shutters of self-coiling type (push and pull type or manually operated type), and gear operated type (mechanical type) including all accessories as hereinafter specified.

The shutters shall conform to specifications given in IS: 6248 latest editions. The fixing arrangements shall be as per the drawing / schedule or quantity with regard to whether it shall be fixed on the inside or outside between jambs of opening, on or below the lintel / beam etc.

Lathe sections

Shutters shall be constructed with interlocking lath section formed from tested bright cold rolled steel strips not less than

1.25 mm thick and 75mm wide between rolling centre unless otherwise specified. Each lath section should be continuous signal piece without any weld joint. Each alternate lath section shall be fitted with malleable cast iron or mild steel clips securely riveted at either ends thus locking the lath section at both ends and preventing the lateral movement of the individual lath sections.

Guide Channels

The guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) joint less obstruction. The thickness of sheet not be less than 3.15 mm. The depth of the guide channel should be such that there is sufficient clearance between the curtain and the inner surface of the guide to avoid any rubbing or obstruction for free movement of the curtain. The curtain shall project into the guide at least 40mm upto 3.50 m width and 60mm for greater width. There shall be a clearance of 10mm minimum between the guide wall and end clips. The depth and width of the guide channel shall be as under

<u>Clear width of shutter</u>	<u>Minimum depth of guideChannel</u>
Upto 3.5m	65mm
3.5m upto 8m	75mm
8m and above	100mm

The width of the guide channel shall be 25mm for lath sections with bridge depth of about 12mm and 32 mm for lath sections with bridge depth of about 16mm. Each guide channel shall be provided with a minimum of 3 fixing cleats. The spacing of cleats shall not exceed 0.75m.

Bracket Plate

The bracket plate shall be fabricated out of mild steel 375 x 375 x 3.15 mm upto 3.5 m high, 450 x 450 x 6mm for above 3.5 m and upto 5.5 m high and 500 x 500 x 10 mm for above 5.5 m and upto 6.5m high. Since the bracket plate carries the full load of the shutter, it should have sufficient cross sectional area to resist the shear force and it shall be held in position rigidly by means of suitable foundation bolts. In the case of push and pull shutter extra typing of the bracket plate to the grid channel is to be provided by means of a square bar not less than 20 mm size. An angle 40 x 40 x 6 mm split at one end is to be firmly rivetted or welded at the top line of the bracket to act as foundation holdfasts. The angle shall be extended at least 20cm from the edge of the bracket plate and grouted with concrete.

Roller

The suspension shaft of the roller shall be made of steel pipe conforming to heavy duty of IS: 1161. The size of

pipe shall be 40mm nominal bore for width upto 3m and 50mm nominal bore for above 3m and upto 5m width. The deflection shall not exceed 5mm per metre width.

When the width of the opening is greater than 3.5m, the pulleys shall be interconnected with a cage formed out of mild steel flats of at least 32 x 6mm and mild steel dummy rings made of similar flats so that the torque is distributed uniformly. In such cases self-aligning two row ball bearing shall be provided with special cast iron casings at extreme pulleys at either ends. The caging rings shall have minimum spacings of 15cm and there shall be at least 4 number flats running throughout the length of the roller. In the case of shutters for larger openings where the operation of the shutter is with mechanical gear, the roller shall be fitted with a pinion wheel at one end which is in contact with a worm fitted to the bracket plate. The pulleys shall be interconnected with caging as stated above with two ball bearings.

The springs used in the roller for counter balancing the rolling shutter shall be made either from high tensile spring steel wire or flat spring steel strip of adequate strength to balance the shutters in all position.

Hood cover

Hood covers shall be made of mild steel sheets not less than 0.90 mm thick. The hood cover shall be stiffened with angle or flat stiffeners at top and bottom edge to retain shape. This shall be fixed to bracket plate with angle cleats and supported at the top at suitable intervals.

All gears, worms etc. shall be machine cut worm gear wheels shall be of phosphor bronze and the worms shall be of gun metal unless otherwise stated. Pinion will be of gun metal / phosphor bronze.

Safety Devices

Suitable safety devices shall be provided.

Safety Lever Locks

In addition to padlock arrangements one pair of safety lever locks has to be provided on either end of the bottom lock plate so as to secure the slide bolts in the closed position.

Painting

All component parts of the rolling shutter except springs and the inside of guide channels shall be given one coat of anticorrosive red oxide paint.

Erection

The doors shall be erected complete with all necessary hardware, operating mechanisms complete to suit sizes of openings. Upon completion, doors shall be in best operating condition. All installation and erection work, shall be done in accordance with the manufacturer's specifications. The contractor shall arrange to have at no extra cost to the owner, the services of the manufacturer's supervisors during erection.

After completing the manufacture of the different components of rolling shutter, drives and other accessories, tests shall be carried out at the manufacturer's works in accordance with the approved standards, and in the presence of the Engineer.

Tenders shall clearly state the particular manufacturer's shutters he intends to supply and shall give typical drawings and specifications with the tender.

The price quoted by the tenderer shall include complete supply, transport and erection of the rolling shutters as per above specifications with all accessories, hardwares, gear box, handle for gear, fixing provision (chiselling, drilling breaking of concrete / masonry and making good the same) and shall be inclusive of all scaffolding, material, priming coat, labour tools and appliances complete.

The design of the rolling shutter shall be made for withstanding a wind pressure of 150kg / sq.m. The contractor shall give a guarantee for successful operation and safety against the design wind pressure.

Mode of Measurement

Payment will be made in square metre rate basis and the measurement will be based on the clear structural opening dimensions only and not for full size of shutter. Hood cover will not be measured separately.

SECTION - 11

11. MISCELLANEOUS

STEEL DOORS & WINDOWS

All steel doors and windows shall conform to Is 1038-1968. Appendix A and N.B. Code, Part V of Appendix.

Frames shall be fixed to plumb and accurate as otherwise opening portions will not function satisfactorily. For actual fixing the procedure is usually given by the makers of each type of door and window and shall be followed with such modifications as the Engineer in charge order.

The glazing shall conform to standard specification for glaziers work regarding thickness and type of glass and putty to be used.

DOORS & WINDOWS, FURNITURE AND FITTINGS

Hold fasts shall be made from mild steel flat Iron of specified size. The bolt head shall be sunk into the frame and the other end should be fixed in Cement Concrete block of specified size.

FITTINGS

Fittings shall be of brass or Aluminium or as specified conforming to ISI standards. These shall be well made, reasonably smooth and free from sharp edges, corners, Flaws and other defects. Screw holes shall be counter sunk to suit the head of ly used for different types of doors and windows are indicated in the Schedule. The fittings should be got approved, by the Engineer in Charge. These fitting should be properly fixed using C.P. Nettle Fold Screws.

WEATHERING COURSE AND PRESSED TILES

Weathering course of brick Jelly concrete is laid over RC Slab using 20 mm Gauge broken brick jelly and slacked lime in the proportion as specified without using sand. Necessary slope to drain the rain water shall also be given in the weathering course. The slope shall not be less than 1 in 50 and as directed by the Engineer in Charge.

After six days or after the Concrete laid has hardened, one course of pressed tiles of size 20cm x 20cm x 20mm as approved shall be laid in CM 1:3 with standard water proofing agent and rubbed smoothly.

RAIN WATER DOWNFALL PIPE

The pipes used shall conform to standard specifications. These shall be straight, true and smooth and regular in thickness. Pipes shall be secured to the face of the wall, below all joints by standard holder bat clamps.

WHITE WASHING AND COLOUR WASHING

Wherever scaffolding is necessary it shall be erected on double supports tied together by horizontal pieces over which scaffolding plank shall be fixed. No ballies, bamboos or planks shall rest on or touch the surface which is being white or colour washed.

Where Ladders are used piece of gunny bags shall be tied on their tops to avoid damage or scratcher to walls. For white washing the ceiling proper stage scaffolding shall be erected.

Before new work is white washed, the surface shall be thoroughly brushed free from mortar dropping and foreign matter.

Each coat shall be allowed to dry before the next one is applied. Further each coat shall be inspected and approved by the Engineer-in-Charge before the subsequent coat is applied.

The mineral colours not affected by lime shall be added to white washing. No colour wash shall be done until a sample of the colour wash of the tint is approved by the Engineer-in-Charge.

The contractor shall take precautions to prevent white wash being splashed on the wall, floor and other surfaces and articles not to be white washed. The contractor shall clean all such items to the satisfaction of the executive engineer at his own cost. Ladders, poles, scaffolding etc., shall be shod with gunny bags to prevent damage or scratching of the walls and floors.

Cement painting

Surface preparation.

Any previous coating, line work, loose materials and dirt shall be removed thoroughly by scrapping and washing. The surface shall be wet thoroughly with clean water. When the surface starts drying and there is no sign of water on the wall (the surface must feel damp to touch) the surface is ready for application.

Mixing

Unless otherwise ordered by the Executive Engineer the mixing of the cement paint shall be carried out in accordance with the instructions issued by the manufacturers of the brand of the cement paint that is specified to be used.

Application

The water mixed cement paint shall be kept well stirred before and during use and shall be applied within one hour of preparation. Use flat brush and more horizontally or vertically to ensure perfect covering. During application frequent stirring should be done to ensure homogeneous composition.

Curing

24 hours after the first coat has been applied the surface shall be saturated with water. The second coat shall be applied when the surface is damp to touch. Rewatering the surface shall be done with ample water after 24 hours to ensure perfect setting of the paint film.

12. 20 mm cement concrete surface Ellis pattern

12.1 The cement concrete will consist of hard broken stone chippings, of gauges 3mm to 10mm as per standard specification well mixed with cement (no sand to be added) in the proportion of one cement to three hard broken stone chippings and as instructed by the Executive Engineer.

The cement concrete shall be placed and spread immediately after mixing using a straight edge. The concrete must be well beaten with 2.50 kg wooden thapies until cement slurry comes to the surface and it should be ensured that the consolidation and finishing of surface shall be carried out quickly before the initial setting time of cement. After the slurry comes to the surface the floor shall be polished with trowels to have a uniform finished surface.

To have a fine finish of the floor cement shall be sprinkled over the surface if required and rubbed with polishing stone. After completion of the floor, the same shall be covered with sand or saw dust kept wet for three weeks to have proper curing and the floor may be put into use after a month from the date of finish.

M.S. GRILLS

Materials

All structural steel shall conform to IS 226-1963 sections for grills and shall be free from loose mill scales, rusts, pitting or any other defects affecting its strength and durability.

Fabrication

The grills shall be fabricated to the design and pattern shown in the drawings. All joints shall be made in best workman like manner with slotting and welding as required to the specified size and shape. The edge of the M.S flats shall be suitably mitered before welding to get the desired shape. The joints shall be filled to remove excess stay after welding screws, nuts, washers, bolts, rivets and any other miscellaneous fastenings devices shall be of steel and shall be provided by the contractor. Manufactured M.S Grills then be fixed in between the posts, balusters, M.S. frame work etc. to correct alignment. Any undulations, bends etc. found shall be rectified by the contractor at his own cost. The complete assembly of grill / railing so fixed shall be firm and there shall not be any lateral movements.

Samples

Samples of grill and railings shall be submitted for approval of the Engineer-in-Charge and to be got approved before taking up for mass fabrications.

Installation

The approved grills shall be fixed in position where specified and shown in drawings including in masonry walls, teakwood frames, hand railings etc. Any damages to walls, frames etc. caused during fixing the grills shall be made good by grouting with cement mortar/packing/repairing properly at the contractors cost. Painting shall be done as per the specification specified under painting.

Mode of measurement

Actual area of M.S. grill manufactured and fixed in position shall only be measured in square meter for payment.

All measurements shall be taken to two places of decimal of a meter and area shall be calculated to second place of decimals of a square meter. The rate is to include the cost of all materials, labour, transporting, fabricating, installing, and scaffolding if necessary, grouting etc. complete.

13. CUDDAPAH SLABS

Ordinary slabs shall be accurately rectangular or square with edges chisel dressed all round to a depth of 6mm, plumb from the surface. The surface shall be quite even, without any veins, cracks or flaws and with a uniform slate colour. Earthy flaky stones shall be rejected. The stones shall be of the thickness defines in the relevant scheduled item.

Semi-polished and high polished cuddapah slabs shall conform to the standard specification for ordinary slabs with the further requirement that the edges shall all be dressed at right angles to the surfaces for the full thickness of the slab. The polished surface and the quality of the polish shall be executed to a high standard of workmanship.

14. PVC rigid panel doors

Factory made PVC rigid foam panel doors are made with M.S tube of 19 gauge size 19mm X 19mm has styles and 12mm x 12mm as rails and should be covered with PVC C channel of 5mm thick and width 50 mm. PVC rigid foam sheet of 5mm thick is inserted as inner panels. M.S section are welded and PVC sections are sealed using heat blowers to the styles and rails along with 5mm x 25mm PVC bedding on all and either sides. The vertical M.S tube section 19mm x 19mm (19 gauge) is filled with country wood strips to enhance screw holding capacity for hinges to be fixed to wall and PVC shutters.

SECTION - 12 PILE FOUNDATION (TAMIL NADU BUILDING PRACTICE VOLUME – II SPECIFICATIONS)

Driven in situ pile:

The pile formed within the ground by driving a casing of uniform diameter, permanent or temporary and subsequently filling in the hole so formed with reinforced concrete. For displacing the subsoil the casing is installed with a shoe, at the bottom end.

Piles shall be installed as accurately as possible according to design and drawings IS 2911 (Part 1 / Sec 1) - 2010 covers the design and construction of reinforced concrete driven cast in situ pile.

Greater care should be exercised in installation of single pile or piles in groups. As a guide for vertical pile deviation of 1.50 percent should not normally be exceeded. Piles should not deviate more than 75mm from their designed position at the working level of the piling rig. In a pile group the sequence of installation of piles shall normally be from centre to the periphery of the group or from one side to the other. Sufficient time shall be allowed when installing piles in a group for the freshly poured concrete in a pile to set before installing adjacent piles.

The joint between the shoe and tube shall be effectively sealed so as to prevent entry of sub soil water while driving or withdrawing to forms. If water, sand or slush or any other impurity get into the forms at any stage and if they cannot be removed to the satisfaction of Engineer-in-charge the forms shall be pulled out and driven if so required at the contractors expense and as per the direction of departmental Officers. While withdrawing the form after casting the pile if there is any disturbance to cast in situ pile, the Engineer in charge shall decide whether the piles shall be rejected and a fresh pile will have to be driven in the same place with a new shoe. If this is not possible fresh pile will be driven as per the direction of Engineer in Charge.

Following the founding of the piles at the correct depth, concrete sufficient for a length of one third pile depth shall be placed in the tube before the initial withdrawal. As soon as the skin friction between the earth and tube has been broken withdrawal shall be stopped and the remainder of the concrete placed in the tube after which the withdrawal may proceed.

All concrete in the pile must be thoroughly completed in one operation throughout its length from pile shoe to top of pile as soon as pile driving is completed. Piles shall not be left unconcreted after driving and founding the casing in position at the end of days work. Either the concreting should be carried out the same days or the pile casing stopped well above the founding depth say for 2 or 3 metres and

driving continued next day.

Set

It is the penetration of pile per below. The set depends upon area of pile, load and weight of hammer length of fall, diameter of casing pipe. As soon as the casing pipe is reacted to the founding depth, the set observation shall be made by the Engineer in Charge. Placing of grills and concreting shall be done only after obtaining the approval of Engineer in Charge for all piles.

The reinforced concrete work shall comply in all respects with the Indian Standard Specification and practice. Effective means shall be adopted to ensure to specified cover to the reinforcement as per IS 2911 (Part 1 / Sec 1) 2010 and other aspects as per IS 456/2000. The reinforcement for pile, pile caps shall be as per the design furnished and as per the direction of the Engineer in Charge.

Observation made during the driving of each pile shall be recorded in the proforma as laid down in Indian Standard Number of piles driven their respective length, special features if any should be recorded.

TESTING OF PILES

Test on pile shall be conducted in accordance with IS 2911 (Part 4) - 2013 load test on piles.

The Contractor will conduct loading tests for the piles selected by the Engineer in charge. The test load specified above should be put on a test cap over the pile unaided by another support. The load test on a pile shall not be carried out earlier than 28 days from the time of casting of pile.

The testing equipments instruments loading structures to be used for making the load test shall be got approved by the Engineer in charge. The loading platform should be kept at least 1.50m above ground level to have sufficient headroom to read about.

The top of the pile cap shall be finished even and smooth and true to plane. The dial gauges used shall be of metre units and shall be filled to the datum bars with magnetic basis. The dial gauges should have a sensitive of 0.01 mm. The datum bars shall be of suitable structural section and should be built in position into masonry or concrete at a distance of 5d where d is the diameter of piles.

The test load may be applied by means of an appropriate capacity hydraulic Jack with pressure gauge with remote control pump reacting against rolled steel joists or suitable load frame obtaining reaction. The pressure gauge will be got calibrated from a recognized institution and calibration chart produced to the Engineer in Charge.

The routine load test shall be cyclic load test or as directed by the Engineer-in-Charge.

The method of loading and observation of settlement data shall be as per the procedure laid down in Indian Standard Specification.

Pile Conditions

1. Alternative designs by the tenderer will not be entertained
2. Pile should be driven at the precise location indicated in the pile layout and the details to be followed must be in accordance with the structural drawings supplied by TNUHDB.
3. While pile driving is involved near existing structures, care should be taken to drive the piles without any damage to such existing structures. In case of deep excavation adjacent to piles proper shoring or other suitable arrangements shall be done to guard against lateral movements of the soil stratum.
4. The top of concrete in a pile shall be brought to the formed ground level as directed by the officers. The minimum cut off concrete shall be 45cm below the formed ground level. The reinforcing cage shall be with adequate development length above the cut off level for proper anchorage into the grade beam.

5. Defective piles found while driving or testing shall be removed or left out in position whichever is convenient without affecting the performance of the adjacent piles or the grade beam as a whole and shall not be payable. Defective piles shall be replaced by other piles approved by department.
6. The required water cement ratio should be as per IS: 456 – 2000.
7. Length of pile shall be measured from the tip of pile shoe to cut off level for payment.
8. The rate shall include work in shift system also and no extra payment shall be made for such shift system of work.
9. The load test on piles shall not be carried out earlier than 28 days from the date of casting of piles.
10. The depth at which the termination of the pile shall be decided based on the following set criterion.

The penetration shall not be more than 12mm for 10 blows with a 30KN drop hammer, which is dropped freely over a height of 1.20 meter. An average of three sets will be decided for terminating the piles.

11. After the set is reached, reinforcement will be placed. One-third of the depth to be filled with concrete, after that only the tube can be lifted to certain extent. It shall be repeated until the concrete is spread into entire bore depth.
12. **Load Test:-** Load test to be conducted for the minimum load of 750 KN.
13. Before any load test is conducted, the proposed apparatus and structure to be used for taking the load test shall be got approved by the Executive Engineer.
14. (a) The contractor shall himself arrange for the necessary equipments for the action of loads etc., in the load test and shall remove the same after the test. All the equipment and weight etc., should also be removed from the site after completion to the satisfaction of the Executive Engineer. Rates for testing shall include this and department will not incur any expenditure for supplying or transporting the loads etc.,
- (b) The General behaviour of the pile or pile group during the test period should not disclose any defect.
15. **Settlement:-** The settlement of pile under the load shall be less than 12mm. The number of load tests is @ 1% of total number of piles.
16. During the process of withdrawal, the concrete shall be compacted by raising and dropping the 3 tones hammer on top of the tube. The amount of drops and the rate of striking shall be applied when the pile tube is at its maximum depth and during the pile tube withdrawal the drop may be reduced and the speed of the striking increased.
17. All concrete in the pile must be thoroughly compacted without interruption in one operation throughout its length from pile shoe to top of pile as soon as driving is completed.
18. If forming cast in-situ piles the joints of the piling forms and followers and the bearing of the piling form on its shoe or any driving gear shall be effectively sealed in an approved manner so as driving or withdrawing the form or when the concrete is being shunted into form. If water sand or slush or any other impurity get into form at the stage of casting or driving the piles and if the water, sand or slush or any other impurity cannot be removed to the satisfaction of the Executive Engineer the form shall be pulled out and driven again if so required at the contractor expenses. While withdrawing the form after casting the pile, if it is found that cast in situ pile has been disturbed in any manner, either through the displacement of the

reinforcement or pile as a whole or in part, the same shall be reported by the contractors to Executive Engineer who shall decide whether the pile shall be rejected and a fresh pile will have to be driven in the same place with a new shoe and if this is considered impossible or difficult, fresh piles not less than two in number shall be driven in gravity of the originally proposed group of system to remain undisturbed and the contractor shall not be entitled to any payment on account of the rejected pile or for the extra piles required to preserve the center of gravity of the system of piles undisturbed, no payment be made for any consequential increase in the capping or beams and payment shall be made only for one pile as if it were good pile.

19. Position of each pile is to accurately set out by the contractors in accordance with detailed plans approved by the Executive Engineer.

20. Piles shall be installed as accurately as possible. No pile shall be more than 50mm possible out of the true position shown in approved plan.

21. Records:- Observation made during driving of each pile should be recorded. Number of piles driven and their respective position in a work should be recorded and sent to Executive Engineer's office. When the last four or five blows are given on piles the Executive Engineer or his representatives should be intimated to enable them to record the "set" observations made and recorded each day and shall be sent to the Executive Engineer office on the following day.

22. The rate quoted shall include charges for such items of work as the following and shall be for the finished work in site and shall include at contingent expenses including of taxes or import duties etc.,

Making and setting out the work:- The contractor shall carryout the same with the theodolite and dumpy level and get it checked by the Executive Engineer. The instruments required for accurate alignment should be procured by the contractors.

Provision of rods, stakes ropes, concrete and masonry pillars, for center lines, level, flags and labour, required in setting out the work.

Provision of all necessary scaffolding, centering and labour and appliances for transporting and hoisting and pile driving machinery and appurtenances inclusive of preparation of roads and paths for their transports.

Provision of sheds to keep materials under cover.

Payment for water and electricity charges required for the construction load test etc.,

Arrangements for protecting the work during inclement weather.

Supply of clean pure water required for work and workmen from any source of water supply. Include for all charges of laying pipes etc., and supply of water from the corporation mains for works and workmen.

Disposal as may be directed of all rubbish super flame materials and as they accumulate.

Thoroughly clearing the shale of the work and work site in a clear and orderly condition. Within the initial lead and lift as per standard specification.

Allow for hire of tools and plant and test beds required for tests of piles and materials there of inclusive of all labour and incidental charges.

All on for carriage expenses including all leads lifts, loading unloading and stacking to the satisfaction of the Executive Engineer in charge of the work.

Include for periodically may be review of materials and all item to whom samples of materials used on the work will be sent apart the Executive Engineer discretion periodically for taking purposes. The opinion of the Executive Engineer on the results of the tests as above conducted shall be final and

binding on the contractor.

Allow for all cost of excavation and running the necessary timber steel form of combination of both and pumping water wherever necessary.

Watering the RCC caps and beams for a period of three weeks from the laying of each and other necessary incidental charges.

Allow for providing necessary arrangements to enable observations of pile driving, load test etc.,

Allow for cutting of piles to an even surface to the top of the piles to project 50mm into the caps and also for all cutting wastes or wreckage etc.,

Allow for the cost of binding wire for which no extra rate will be allowed.

Allow in case of cast in situ piles for sealing the bearing of the piling form of its shoe, as also at the joints of the followers and form with gunnies of hemp or pulley or in any suitable and approved manner to prevent the forms at any state of driving the form.

23. The contractor will conduct loading test for any particular pile or piles opted by the Executive Engineer the test load specified above should be put on test cap over the pile unaided by any other support.

24. Concreting for piles shall be done by Tremic method as per clause 7.5 of Bureau of Indian Standard 2911 (Part I / sec.2/2010)

25. The roots of trees etc., if any during the pile driving have to be removed at the cost of contractor.

26. The work should conform to the relevant latest IS codes as and when they are revised.

ADDITIONAL SPECIFICATION FOR CONTRACTOR'S SPECIAL ATTENTION

1. Clean fresh water and river sand shall be used in all cases.
2. Only clean fresh water shall be used on the work. The Contractor shall make his own arrangement for water and shall meet all charges therefore. The special attention of the contractor is drawn to clause 36 of the Preliminary Specification in the T.N.D.S.S. regarding water and lighting.
3. The broken stone for concrete and R.C.C. work should be of granite as passed by the Executive Engineer.
4. All iron work or steel work of every kind except such as is to be embedded in cement concrete shall immediately on arrival at the site be properly scrapped and wire brushed and give a priming coat of approved red lead paint without claim or extra.
5. All fittings and furniture of doors and windows shall be of best quality steel machine made and well happened. The iron holdfasts shall be built up in the walls in cement mortar 1:3 at the time of construction of wall no extra claims shall be due for the same. Wherever holdfasts are to be provided 9" thick walls, these should be fixed with C.C. 1:3:6 using 3/4" size hard broken granite stone jelly proper anchorages and for proper binding. No separate rate for such of concrete filling at hold fasts point will be allowed and this will be measured as masonry along with adjacent masonry.
6. The teakwood shall be best Indian teakwood only and shall be subject to inspection and approved by the Executive Engineer before use on the work. Country wood where specified shall be of best Karimarudu and Mongu for scantling and Aiyini for planks.
7. Holes and chases for electric wiring, water supply and drainage etc., shall be provided as directed during progress of work without any claim for extra.
8. The work shall be carried out with the least hindrance to the adjoining buildings and officers and the contractor will be responsible for any damages, caused to the existing fixtures, electric fitting etc., in the course of execution and the contractors shall make good any such damages without any claim the extra.
9. In the case of 'T' beams and 'L' beams, the quantities given in the schedule is the quantity of rib portion only. The top flange portion will be always measured with the general slab portion and paid for at the slab rate only. For all R.C.C. work the rate shall include the treatment of bearing as per plate W.No.2 of 1946 as per M.D.S.S. (Page 52 of 952 edition.)
10. Plastering all external corners, edges of beams, edges of doors and windows, openings etc., shall be finished sharp using richer mortar if necessary and also finished truly vertical or horizontal as the case may be the rate of plastering shall include the cost of finishing as above and no separate rate for finishing the corners, edges of beams, etc., will be paid.
11. Fixing iron bars to windows: The methods of measurements for this item of work shall be area of the window frames.
12. If rates are not separately called for similar items of work in different floors the contractor should note one rate applicable for all the floors indicating in the detailed plans. Any claim for extra rates for such items floor-wise will not be entertained under any circumstances.
13. The revised preliminary specification of the T.N.D.S.S. are applicable of the contractor as per G.O.2659 P.W.D. dated 23- 12-79.

ADDITIONAL SPECIFICATION FOR CONTRACTOR'S SPECIAL ATTENTION

1. The planks for forms and centering for R.C.C. works shall be of well-seasoned timber approved by the Executive Engineer according to Clause (10) of M.D.S.S. No.30. They must be made smooth and perfectly level at top so as to give smooth and even finish to the R.C. Ceilings. Alternatively the contractor may use steel sheets over wooden form provided the required finish to the under-side of the slabs is obtained. Mango planks shall not be used under any circumstances. Centering and forming shall be provided to the extent and as ordered by the Executive Engineer during the execution.
2. All cement concrete for R.C.C. work shall be machine mixed and vibrated except in works where ready mix concrete is used or as otherwise specified.
3. All lime mortar shall be ground in a mortar mill as per M.D.S.S.
4. M. S. Steel rods should be cut and placed as reinforcements with proper care according to the available rods at site so as to ensure the minimum possible wastage.
5. The cut bits shall be to the account of the contractors themselves and the same will not be taken back.
6. If at any time subsequent to the execution of this agreement, department, materials other than those specified in the agreement are supplied to the contractor for use on the work, they will be charged at the market value prevailing at the time of supply or stock issue rates whichever is higher. The contractor will be informed in writing of this charge and he should intimate in writing the rate which i.e., demand for finishing the work in view of the fact that he is to use department materials. No centage or incidental charges will be borne by the Government in connection with the supply of the materials.

ADDITIONAL SPECIFICATION FOR CONTRACTOR'S SPECIAL ATTENTION

1. Royalty or charges due for use of private quarries and private land shall be paid by the contractor.
2. The contractor shall form his own approach road to the work site for which no extra will be due to him. On completion of the work, the contractor shall not be permitted to remove the materials laid for formation of road. If the contractor is allowed to use the existing roads, he shall maintain them in good condition at his own cost throughout the period of the contract.
3. The contractor's special attention is invited to clauses 35, 36 of Appendix of the P.S. to T.N.D.S.S. and he is requested to provide at his own expense sheds, latrines and urinals for his workmen.
4. If night work is required to fulfil the agreed rates for progress, all arrangements shall be made by the contractor inclusive of lighting without any claim for extra rate.
5. The contractor shall not employ the labour below the age of 12 years and shall also note that he must offer employment to ex-serviceman, ex-toddy tappers and unemployed agricultural labourers as far as possible.
6. Payment will be made on detailed measurement. Any of the items in the schedule may be omitted for radically altered, no variation in the rate shall become payable to the contractor on account of such omissions or variations in quantity.
7. Reference to T.N.D.S.S. No. in the schedule quantities referred to reprint 1952 and addenda and corrigenda issued thereafter.
8. The contractor shall abide by the contract labour regulation formed by the Tamil Nadu Government.
9. The contractor shall at his own expense provide or arrange for provision of foot wear for any labour doing cement mixing work and all other similar types of works involving the use of tar, mortar, etc., to the satisfaction of the Engineering chief and on his failure to do so Government shall be entitled to provide the same and recover the cost from the contractor.
10. When there are complaints of non-payment of wages to the labour, bills of the contractor, may be withheld pending a clearance certificate from the labour department.

ADDITIONAL SPECIFICATION FOR CONTRACTOR'S SPECIAL ATTENTION FOR LIME

1. The lime shall be burnt from shells, lime stone or kanker as specified and shall be carefully free from earth impurities
2. The process of burning shall be carried out in such kilns and, with such fuel of the Executive Engineer may approve.
3. In all cases, the lime shall be delivered at the site of the mortar mill quite fresh, i.e., within seven days of the date on which it was drawn fresh from the kiln. In case where compliance herewith is not possible due to seasonal closure of kilns, written permission of the Executive Engineer is necessary before stored slacked lime can be used.
4. The lime shall be slacked, if so required in the presence of a departmental representative before being put into the mill. All impurities, ashes, or pieces improperly or carelessly burnt shall be screened or picked out before slacking and removed at once from the work.
5. The lime shall then be screened through sieve of such size as the Executive Engineer may direct and all stuff that will not pass through the sieve shall be rejected. In the absence of separate orders under this clause a wire screen of 94 meshes to the square inch shall be used, except for plastering second and third coats or for any fine work defined accordingly by specification in which case the lime is to pass through a sieve of 324 meshes to the square inch.
6. Lime which has perished or which has been damaged by damp, rain or inter mixture of dirt, or which has become partially air-locked, shall on no account be used on the works but shall be removed at once from the site. Lime which given a residue of more than 10 percent by weight when tested hydrochloric acid shall be rejected.
7. Lime is to be obtained from the source defined in the Descriptive Specification sheet.
8. The Lime at work site is to be protected from weather action by being kept in a weather proof shed with impervious floor and sides.
9. When time permits, the following test is to be made for stone limes :

The lime to be tested shall be passed through a sieve having 64 meshes per square inch. Briquettes shall be made of 1 lime 2 sand adding sufficient water to the lime till a stiff paste is formed, this stiff paste is to be well pressed down into the mould, which is to rest on a sheet of glass. The upper surface of the mortar in the mould shall be struck off level with a trowel. The mould shall then be laid aside till the briquette attains initial set. After this period, the briquette (still in the mould) shall be placed in wet sand for two days to allow it to get gradually. It shall then be taken out of its mould, placed in water for 25 days taken out and allowed to dry for 24 hours and then finally tested. The briquette, which is to have cross sectional area of one square inch, should take a minimum tensile strain of 20 lb. If less than this the Executive Engineer shall have the right to reject the lime, and the contractor shall then remove the rejected materials at once from the work site.

NOTE: The two general classes of lime are :

(a) Fat limes : and (b) Hydraulic limes. Shell lime comes under class (a) and is largely used for plaster and whitewash limes from kankar and limestone come under class (b) and should always be used for masonry work unless written permission of the Executive Engineer has been given to the use of shell lime.

Non hydraulic lime mortar should not be used in well locations. Works which are likely to be exposed to the action of water within a month from date of completion should be constructed with a cement mortar or a surki mortar if the latter is found to be sufficiently hydraulic.

6. Vide instruction in note 2 under 'Materials' which shall apply.

DESCRIPTIVE SPECIFICATION SHEET

Sl. No.	Materials	Sources from where item is to be obtained	Approximate Lead
1.	M-Sand for mortar		
2.	M-Sand for Filling		
3.	Hard broken stone of different sizes Rough Stone and Bond Stone		
4.	Brick, Brick jelly flat titles, square Tiles, pressed titles etc.,		
6.	Gravel		
7.	Lime		

GENERAL SPECIFICATIONS

PART-II

ELECTRICAL WORKS

1.1 General.

1. The work shall be carried out in accordance with the General specification for Electrical works and the code of practice for electrical wiring installing I.S.8732/1963 and I.S.3045/1965 and as amended up to date. All installation shall comply with the requirement of Indian Electricity Rules 1956 and Act and I.S. code amendment up to date.
2. Approval of the Engineer – in – charge shall be taken well in advance for all materials and brand of materials to be used on works by the contractor based on the description of the Executive Engineer – in – charge and this decision will be final.
3. Bad workmanship is liable to be rejected in total.
4. The contractor shall supply on completion of work, completed plan along with insulation, polarity and earth test reports before the installation is to be handed over to the Executive – in – charge in good condition in triplicate. The tests should be carried out in the presence of Engineer – in – charge at contractor's cost.
5. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of Engineer – in – charge.
6. The Contractor shall make his own arrangements at his own cost for all general T & P and special T & P required on the job.
7. The Contractor shall make his own arrangements for storage of materials and watch and ward at his own cost till installation (completed works) is handed over to the Department after obtaining the service connection from Electricity Board and testing the line. Any loss and tampering of materials, for which the payment was made by the department, shall be made good by the Contractor at his own cost.
8. Issue of the materials to the Contractor wherever stipulated shall be regulated to the needs from time to time depending upon the progress.
9. Materials stipulated for issue shall be taken over to the site of works and the safe custody till completion of the job is the responsibility of the contractor.
10. All debris due to electrical works shall be removed from site by the contractor as soon as the work is completed.
11. Electrical works shall be progressed by the contractor side by side with the progress of the building work, carrying of conduits for recessed portion shall be planned together with the building progress so that there is no hindrance to the building progress at any stage.
12. The internal Electrical lines shall be ordinarily carried out according to the drawing supplied with the schedule of work subject to change made by the Executive Engineer-in-charge.
13. The wiring routes shall be marked at site first and get approval from the Executive Engineer – in – charge before commencement of actual work. The work must be carried out as directed by the

Executive Engineer – in – charge.

14. In place, where electrical conduit is required to place through wall / RCC column / beam etc., the conduit shall be laid during the execution of work in consultation with the Engineer – in – charge so as to avoid the need for cutting the structure at a later stage.
15. The teak wood materials such as fillets specials T.W.boxes and all materials shall be got approved from the Engineer – in – charge before use to ensure the quality of materials.
16. In the case of recessed conduit works, the M.S. Boxes shall also be recessed and covered with 1/8" (3mm) hylem bake lite sheet. The thickness of M.S. Box sheets shall not be less than 3mm thick.

PROVISION OF FITTINGS

17. All switch boards shall be placed such that the bottom is normally 1.22 meters above floor level or such height as decided by the Engineer – in – charge.
18. All fittings shall be provided at 2.6 meter from the floor level or such height as decided by the Engineer – in – charge.
19. The convenient 5/15 amps plug socket shall be 23 cm above the floor level or such height as decided by the Engineer – in – charge.
20. Wiring shall run normally at 2.6 meters from the floor level or such height as decided by the Engineer – in – charge.
21. The materials issued if any by the department to the contractor the cost will be recovered at the stores issue rates. If the contractor fails to return the surplus materials after completion of work, the cost will be recovered at double the stores issue rate or market rate whichever is higher.
22. Tools and Plants generals and special as required on the work is to be arranged by the contractor at his own cost.
23. Brass tinned link / joint clips of 0.32mm (30 gauge) thick up to 40mm length and 0.40mm (28 gauge) thick above 40mm length and of 8 mm width shall be used on the work.
24. Brass hinges brass hooks and eyes, single plank teak wood board 60mm minimum depth in case of open wiring and minimum depth of 100mm in the case of concealed wiring and not less than 6mm thickness shall be used on the works.

FIXING OF WOODEN BATTERNS

25. The screws shall be used for fixing the wooden batten and accessories at an interval not exceeding 50cm. The thickness of battens shall not be less than 10mm.
26. The clips are provided on the wooden batten with screw / pins and spaced at an interval of 15cm both in the case of horizontal and vertical run.
27. The round block shall not be less than 75mm and 40mm deep and fixed by means of 2 Nos. of screws.
28. Piona type switches, sockets outlets of approved make wherever needed shall be used for recessed boards after getting the approval of Engineer – in – charge.
29. Only brass screws shall be used for fittings, switches, plug and sockets main boards and distribution boards and teak wood accessories etc., required for wiring.
30. All conduit pipe shall be of approved gauge (not less than 16 SWG/14 SWG) solid drawn or lap welded finished with galvanized stone enameled finish. The saddles used shall not be less than 24 gauge up to 25mm dia pipes and not less than 20 gauge for longer dia pipes.
31. The main earthing lead shall not be less than 8 SWG copper (4.06 mm) in case of copper wire

earthing of 6 SWG G.I. Wire (4.98 mm) in case of G.I. wire earthing separate earthing shall be provided for all mountings of main boards, distribution boards, 5/15 amps C.S.plugs sockets with not less than 14 SWG of copper (2.03mm).

32. Earthing shall conform to the relevant I.S.code 303 / 1966. The G.I. pipes earth electrode system is adopted. G.I. pipes shall be of medium class 38 / 40mm dia 3.75 meters long. The electrode shall be buried in the ground vertically with its top not less than 20cm below ground level. Normally an earth electrode shall provide 1.5 meters away from any building. In case of providing twin earthing the distance between the earth pits shall be 10'0" alternative layers of charcoal or coke and salt of minimum 15cm thick are to be provided from the bottom of earth pit up to 1 meters below ground level and the masonry work is to be carried out in brick with cement mortar 1:4 (One of cement and four of sand) above the last layer and the top is to be covered by suitable cast iron frame and cover.
33. The staircase light point wiring must be done by looping or piece wire system and switch must control phase or line wire only.
34. Looping in system is to be adopted for wiring normally the looping of neutral to light fan plug points etc., shall be restricted to 3 points for a single wire from the switch board.
35. The wooden batten and specials shall not be butt jointed and joints should be lap jointed.
36. The wiring must be done using bend and corners wherever necessary sharp banding or cabling must be avoided.
37. The lighting circuit shall not have more than 10 points or a load of 800 watts whichever is less. In exceptional cases the lighting circuit shall not have more than 8 points.
38. Power wiring shall be kept separate and distinct from the lighting wiring.
39. The contractor should be present at the premises at the time of effecting service connection by the Electricity Board authority and afford all facility for testing and commissioning the installations.
40. The tenement main switches and the main switches at the Electricity Board Service connection should be numbered in paint for easy identification and the damager boards should be provided wherever necessary according to the Indian electricity rules and indications.
41. The Contractor should provide sufficient leads for connecting the main switches to meters and cuts provided by the Electricity Board at his own cost.
42. Looping of neutral and connection wires in the switch boards must be carried out through mechanical connectors and proper insulation shall be provided inside the switch boards wherever necessary to avoid short circuiting the system.
43. The scaffolding and the shed required for the Electrical installation works should be put up by the contractor at his own cost.
44. The run off mains relates to the mains run from the buss bar to distribution board or buss bar main switches as the position indicated in the electrical layout. The point wiring shall include mains taken from distribution board or main switch to board. The main for this shall not be measured and paid.
45. The run off mains relates to the mains run from the main switches provided inside the apartments to the Electricity Board authorities. The earthing for the main switches provided in the service connection board should be properly interconnected and connected to the main earthing system.
46. Each circuit has to be taken from the D.B. by separate independent conductor / separate group of wires from D.B. and they could be distinctly visible. The wiring must be one if there is no D.B. with distributed circuits as directed by the field staff.

47. For temporary supply if any required by the contractor himself should apply to M.E.S. and obtain the supply at his own cost.
48. PVC pipes and specials M.S. Boxes etc., if available with the department the same may be supplied for works at recovery.
49. The contractor should prepare necessary electrical systematic layout drawing at this own cost and get approval from the Chief Electrical Inspection to Government, Madras -2 and the permission to enlarge the same from the CEIG (Madras- 2).
50. The Contractor shall use only the brand of materials that are approved by the Engineer – in – charges.
51. The Electrical installation to be carried out as per the specification and it confirmed to Indian electricity rule.
52. The Electrical contractors should hold either 'A' grade license (or) 'B' grade license issued by the Electrical wireman and supervisor contractor licensing Board.

Point wiring.

Point wiring shall include all works necessary in complete wiring of a switch circuit of any length from the tapping point on the distribution circuit to the following, via the switch:-

- a) Ceiling rose or connector (in the case of ceiling / Exhaust fan point).
- b) Ceiling rose (in the case of pendant points).
- c) Back plate (in case of staff pendants, fluorescent fittings with down rods, etc..)
- d) Socket outlet (in case of socket outlet points).
- e) Lamp holder (in the case of wall brackets, batten points, bulkhead and similar other fittings).
- f) Call bell / buzzer (in the case the words via the switch should be read as via the ceiling rose / socket outlet or bell push where no ceiling rose / socket outlet is provided).

The following shall be deemed to be included in the point wiring:-

- a) Switch.
- b) Ceiling rose or connector as required
- c) Any special and suitable round block for neatly housing the connector and covering the fan hook in case of fanpoint.
- d) Wooden box, bushed conduit, or porcelain tubing where cables pass through walls, etc.,
- e) Conduit or metallic covering up to 1.5 metre from floor.
- f) Earth wire from three pin socket outlet point / fan regulator fan and lighting fitting to the common earth including connections, to earth dolly, except the earth wire from the first tapping point of live wire to the sub-distribution board.
- g) Metal blocks, boards and boxes, sunk or surface type including those required for mounting fan regulator but, excluding those under the main and distribution switch gear.
- h) All fixing accessories such as clips, nails, screws, Phil plugs, rawl plugs, wooden wooden plugs, etc., as required.
- i) In case of joint box system of wiring, if specified joint boxes with necessary connections as required
- j) Connections, to ceiling rose, connector, socket outlet, lamp holder, switch, fan regulator, etc.,
- k) Looping in the same switch board and inter-connections between points on the same circuit.
- l) Length per point:- The term length per point in point wiring in the case of fan and light point shall mean the distance between the switch and ceiling rose / connector or back plate / lamp holder depending

upon the fitting, measured along the run of wiring irrespective of the number of wires in the run. In the case of socket outlet point, the length shall mean the distance between the socket outlet and the tapping point of live wire on the nearest switch board. Any junction box provided for extending the wiring beyond the point referred to shall not be treated as the nearest tapping point. Separate measurements may be made where the switches and socket outlet points are located on the same board.

In the case of call bell / buzzer points, the length shall mean the distance between the call bell and the ceiling rose / socket outlet or bell push. (Where ceiling rose / socket outlet is not used). The connection between bell push and socket outlet / ceiling rose if wired by flexible cable shall not be treated as part of call bell point wiring. Where the flexible cable is liable to mechanical damage, the same shall be suitably protected by PVC sleeve or conduit as directed by Engineer in charge.

Measurement of point wiring.

Wiring points shall be classified as follows:-

- (a) Short points not exceeding 3m in length.
- (b) Medium points exceeding 3m but not exceeding 6m in length.
- (c) Long points exceeding 6m but not exceeding 10m in length.
- (d) Special points of length exceeding 10m in length as required.

In the case of point with more than one light point controlled by the same switch, such points shall be measured in parts, i.e., from the switch to the first point as one point and classified according to Clause 2.1.2.1. For the subsequent points, the distance from fitting to fitting shall be measured along the run of wiring, treated as one point and classified according to Clause 2.1.2.1.

A light point controlled by two numbers of two way switches shall be measured as two points from the fitting to the switches on either side and classified according to Clause 2.1.2.1. Any extra light point in the same switch circuit shall be measured according to Clause 2.1.2.2. i.e., first as two points from switch on either side to the nearest fitting or classified according to Clause 2.1.2.1. The extra light point is then measured from fitting to fitting treated as one point and classified according to 2.1.2.1.

In the case of call bell / buzzer points with a single call bell / buzzer controlled by more than one place with a ceiling rose / socket outlet or bell push where ceiling rose / socket outlet is not provided, the points shall be measured in parts, i.e., from the call bell / buzzers to one of the nearest ceiling rose / socket outlet or bell push, treated as one point and classified according to Clause 2.1.2.1.; for the other ceiling rose / socket outlet or bell push to the next ceiling rose / socket outlet or bell push shall be measured along the run of wiring treated as one point and classified according to Clause 2.1.2.1.

When more than one call bell / buzzer points are controlled by the same ceiling rose / socket outlet or bell push, the points shall be measured according to Clause 2.1.2.2.

Circuit wiring.

1.1.3.1 Circuit wiring shall mean the length of wiring from the distribution board up to the tapping point measured along the run of wiring. Such wiring shall be measured on linear basis.

Sub-main wiring.

Sub-main wiring shall mean the length of wiring from one main / distribution switch gear to another main / distribution switch gear, measured along the run of wiring. Such wiring shall be measured on linear basis.

Measurement of circuit / Sub-main wiring.

The length of sub-main / circuit wiring or any other type of wiring on linear basis shall include all length from end to end of wood batten or conduit as the case may be exclusive of inter-connections inside the switch board, etc. The increase on account of diversion or slackness shall not be included in the measurement. The earth wire from the distribution or Sub- distribution board up to the tapping point shall be measured separately.

The length of circuit wiring with two wires shall be measured from the distribution board to the switch in the circuit irrespective of whether the neutral conductor is taken to switch box or not.

When wires of different circuits are grouped in a single conduit / wood batten the same shall be measured on linear basis depending on the actual number and sizes of wires run in conduit / wood batten.

When circuit wires and wires of point wiring are run in the same conduit / wood batten, circuit wiring shall be measured on linear basis depending on the actual number and sizes of wires run in the existing conduit / wood batten.

Different types of wiring.

1.1.5.1 Except as discussed previously for point wiring, circuit wiring and sub-main wiring; other different types of wiring shall be measured separately on linear basis along the run of wiring depending on the actual number and sizes of wires run.

Layout of wiring.

Installations with connected loads as under must be wired for supply specified.

Less than 4,000 watts – Single phase.

More than 4000 watts – Three phase with the three circuits kept separate and maintained balanced as far as possible.

Motors and apparatus requiring more than 2,500 watts each shall be wired for 400 volts 3 phase supply.

The wiring shall be carried out as may be specified in the Tender schedule or specified in the special specification. 'Power' and 'Heating' wiring shall be kept separate and distinct from 'Lighting' and 'Fan' wiring.

All wiring shall be done on the distribution system with main and branch distribution boards at convenient physical and electrical centres and without fuses at isolated places. All conductors shall run, as far as possible, along the walls and ceiling so as to be easily accessible and capable of being thoroughly inspected. In no case open wiring shall be run above false ceiling without the approval of Engineer in-charge. The concealed wiring when run along the walls should be as near the ceiling as possible. In all type of wiring due consideration shall be given for neatness, good appearance and safety.

The balancing of circuits in three wire or poly-phase installations shall be arranged before hand to the satisfaction of the Engineer in charge. Circuits on opposite pole of a three wire D.C. system or an different phases of a poly phase system shall be kept apart at a minimum distance of 2 metres unless, they are enclosed in earthed metal casing suitably marked to indicated the rise of dangerous shock due to the voltage between the conductors contained in them. In large or important rooms, light and socket outlet points shall be distributed over more than one circuit, as directed by the Engineerin charge.

Medium pressure wiring and associated apparatus shall comply in all respect, with requirement of rules 50, 51 and 61 of IE rule 1956 as amended: (See Appendix 'A').

All current consuming devices shall be suitable for the pressure and frequency of the supply to which these are to be connected.

Drawings.

1.1.7.1 All wiring diagram shall indicate clearly in plan, the main switch board, the distribution fuse board, the run of various mains and sub-mains and the position of all points with their classification and their controls. All circuit shall be indicated and numbered in the wiring diagram and all points shall be given the same number as the circuits to which they are electrically connected. Distribution boards shall also be marked to indicate the circuit numbers controlled by them.

Cables.

All cables shall conform to relevant Indian Standards.

The smallest aluminium conductor for the final circuit shall have a nominal cross sectional area of not less than 1.5. Square mm (1/1.40 mm). The minimum size of aluminium conductor for power wiring shall be 4 square mm (1/2.24 mm).

Flexible cables.

Conductor of flexible cable shall be copper. The minimum cross sectional are of conductor of flexible cable shall be 0.0006 square inch (14/0.0076 inch or 14/0.193 mm).

Unless the flexible cables and conduits are protected by armour or tough rubber or PVC sheet they shall not be

used in workshops and other places where they are liable to mechanical damage.

Three core flexible cables shall be used for connecting single-phase appliances.

Rolling of lamps, fans, socket outlets points and exhaust fans.

Incandescent lamps in residential and non-residential building shall be rated at 60 watts and 100 watts respectively.

Table fans and ceiling fans shall be rated at 60 watts. Exhaust fans shall be rated according to their capacity.

Five amps sockets outlet points and 15 amps socket outlet points shall be rated at 100 watts and 1000 watts respectively unless the actual values of load are known or specified.

Joints and Looping back.

Where the looping back system of wiring is specified the wiring shall be done without any junction or connection boxes on the line.

Where the joint box system is specified, all joints in conductors shall be made by means of approved mechanical connection in suitable and approved joint boxes. In non-residential buildings, neutral conductor and earth continuity wire shall be brought to each switch board situated in rooms and halls. These shall be terminated inside the switch boards with suitable connectors and the switch board shall be of adequate size to accommodate one number 5 amps socket outlet and central switch in future. These items shall be listed separately in the schedule of work and paid accordingly.

In any system of wiring, looping back or joints box system, no bare or twist joints shall be made. In through run of cables, if the length of the final circuit sub-main is more than the length of the standard coil, joints shall be made by means of approved mechanical Connectors only in suitable and approved junction boxes.

Structural Alteration to buildings.

1.1.12.1 No alteration which shall affect the structure of building shall be done unless sanction of the competent authority has first been obtained and request for the same shall be made through the Engineer-in-charge. All chases, ducts, holes, etc., required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings. For new buildings, these chases, ducts, holes buildings. For new buildings, these chases, ducts, holes etc., shall be provided when the building is in progress.

Convenience of occupants of the building.

1.1.13.1 When the building is occupied and major portion of the work is required to be done under that condition, the work shall be carried out in such a way as not to come any inconvenience to the occupants. In such cases, it may be necessary to work before and after office hours as required.

Commissioning on completion.

Before the workman leaves the work finally, he must make sure that the installation is in commission.

Good workmanship is an essential requirement for compliance with the clauses in this specification. The work shall be carried out under the direct supervision of a first class licensed foreman or of a person holding a certificate of competency issued by the State Government for the type of work involved, employed by the contractor who shall rectify then, the there, the defect pointed out by the Engineer-in-charge during the progress of work.

Provision for maximum load.

1.1.15.1 All conductors, switches and accessories shall be of such size as to be capable of carrying without the respective ratings being exceeded the maximum current which will normally flow through them.

Addition to an installation.

1.1.16.1 An addition temporary or permanent shall not be made to the authorized load of an existing installation until it has been definitely ascertained that the current carrying capacity and the condition of the existing accessories, conductors, switches, etc., affected including those of the Supply authorities are adequate for the increased load.

Design and construction.

1.1.17.1 All materials supplied shall be new and conforming to relevant Indian Standard Specification wherever they exist. Materials having I.S.S. certification marks will be preferred.

Special risks.

1.1.18.1 Special forms of construction such as flame proof enclosures shall be adopted where there is risk of explosion and wherever indicated in the Schedule of Work or Special Specification

SPECIFICATION FOR PANEL BOARD AND DISTRIBUTION BOARD

This specification covers the requirements of design, manufacture, assembly, testing and delivery of Floor mounted panel/ Distribution boards with ACB / MCCB incomings and MCCB outgoing.

ELECTRICAL SUPPLY PARTICULARS

- System Voltage (Nominal) :440 V AC
- Number of phases 3
- Frequency :50 c/s
- Neutral Earthing :Solidly Earthed
- Fault Level :Not exceeding 31 MVA at 415 V
- Voltage variation limits on L.T. Side :± 10%
- Frequency variation limits :± 3%
- Control supply :240 V, 1 Phase, A.C. / 24 V D.C

STANDARDS:

The design of the switchboard and the components thereon shall conform to the requirements of following specifications.

- a) IS : 13947 / 1 & 2 / 1993 :Air circuit Breakers and MCCBs
- b) IS : 4064 :Heavy duty switches
- c) IS : 13947 – 4 – 1 :Air break contractor
- d) IS : 4237 :General requirements for switchgear
- e) IS : 1248 :Electrical indicating instruments
- f) IS : 2147 :Degree of protection provided by enclosure for Switchgear
- g) IS : 2705 :Current transformers
- h) IS : 3156 :Potential transformers
- i) IS : 375 :Marketing and arrangement of bus bars

CONSTRUCTIONAL FEATURES

- Type of Construction : Cubicle, compartmentalized, totally enclosed, floor mounting, free standing, flush front, single front, single bus, suitable for Electrical Horizontal draw out ACBs and non/draw out MCCBs
- Thickness of CRCA sheet : a) 3015 mm for frame and cable gland.
b) 2mm for body / door / equipment mounting frames
- Steel Plate c) 1.6 mm for barriers
- Degree of protection :Dust and vermin proof – IP 51.
- Base frame Fabricated from 75 x 40 mm ISMC

HEIGHTS:

- a) Heights of switch board from base : Not more than 2.1 metre
: Not less than 400 mm
- b) Minimum operating height :
:
- Type of doors / covers for :
 - i. Hinged doors with concealed hinges switch gear compartments and cable alleys.
 - ii. Bolted covers for bus bar compartments.
 - iii. Doors shall be provided with joint less neoprene gaskets.
- :
 - i. Top side unless otherwise specified
 - ii. Separate provision shall be made for control cable entry.
 - iii. The size of cable alley shall be adequate to comfortably terminate the total number of power and 68

- Position of cable entry

- No. of outgoing feeders per : i. Upto 4 Nos. 160 / 250A / 400A MCCBs
ii. Upto 6 Nos. 63 / 100 / 125A MCCBs
- Surface treatment : By seven tank process
- Type of paint finish : Powder coated
- Thickness of paint : Not less than 50 microns
- Maintenance of components : From the front side only for switchgear
- Type of name plates : Anodised aluminium with engravings for panel, all incoming and outgoing

- Safety features :
 - a) All live parts / terminals to be totally shrouded in Switch gear / cable / meeting compartments
 - b) Bus bars to be sleeved and bus bar joints to be provided with insulating shrouds.
 - c) Switch operating handle shall be interlocked with door.
 - d) Pad locking provision in OFF position for all MCCBs.
 - e) Pad locking provision on hinged doors.
 - f) Finger touch proof wiring to be provided.
 - g) Detachable type neutral link shall be provided externally nearer to each MCCB either 3 pole or 4 pole. In case 4 pole MCCB this link shall be kept open.

OTHER FEATURES :

Shipping section length to be limited to 2.5 m.

Lifting lugs to be provided.

All hardware should be high tensile zinc passivated type.

Spring washers to be provided at all bus bar and equipment fixing joints.

Endless Neoprene gaskets to be provided on all doors and covers.

Danger boards to be provided on live part covers.

Continuous earth bus of G.I / Copper of adequate capacity.

All doors having components mounted on them shall be earthed.

BUS BARS:

- Material of main bus bar : Electrolytic grade Aluminium
- Continuous current rating : As specified elsewhere
Current density shall not exceed 0.7 Amps / Sqmm
- Short time rating : 50kA at 415 V for 1 second
- Temperature rise : Not more than 40° C cover 45 ° ambient.
- Type of bus bar supports : SMC
- Protection against inadvertent contact : Heat shrinkable PVC sleeves for lengths.

- Bus bar clearance : Not less than 50mm clear for phase bus bars. Not less than 25mm clear for neutral bus.

- Position of Main bus bars : Middle.

EARTHING

All cubicle shall be connected to a common copper earth bus bar of specified size running throughout the length of the switchboard. All doors and movable parts shall be connected to the earth bus with flexible connections.

DRAWINGS AND DOCUMENTATION

- The manufacturer shall develop his own general arrangement and schematic drawings showing the main equipment, auxiliary devices and accessories. WIRING DRAWINGS for main and control circuits giving ferrule and terminal numbers shall also be indicated.
- Manufacturer shall submit for approval the single line general arrangement drawings including component list, foundation drawings and control wiring. The approval of general arrangement drawing should be obtained before the fabrication of cubicle is started. Approval of schematic drawings, single line and control wiring drawings shall be obtained before the manufacturer proceeds with the cubicle wiring.
- The approval of drawings shall not relieve the manufacturer of his responsibility of supplying equipment conforming to the relevant specifications and standards.

- Once manufacturer's schematic diagram have been finally approved, the manufacturer shall prepare wiring connection diagram for each cubicle. These diagrams shall show all wiring inside the cubicle starting from the cubicle terminal strips. These diagrams which will be used for trouble shooting.
- Manufacturer shall submit following documentation at various stages.
G.A drawings with foundation plan
Single Line Diagram
Schematic Wiring Diagram
Test Certificates for Switchgear Items
Test Certificates of other important bought out items
Operation and maintenance instruction manual

GUARANTEE

The MV Panel and distribution board shall be guaranteed for trouble-free operation for a period of 12 months from the date of commissioning. Any defects noticed during this period shall be rectified free of charges at the shortest possible time.

TESTS AND INSPECTION

During fabrication, the panel shall be subject to inspection by Executive Engineer. Manufacturer shall finish all necessary information concerning this unit supply to the inspectors. CRCA sheet and electrolytic copper bus bar shall be offered for pre-inspection before Fabrication and Assembly.

- Tests shall be carried out at manufacturer's works. All routine tests as specified by the applicable standard code shall be conducted.
- In addition, specific tests shall be conducted to check mechanical and electrical operation and switchboard wiring.
- Acceptance tests for these panels and bus duct shall be as follows:
 - a) A general visual check covering measurement of overall dimensions, location, number and type of devices, terminal arrangement connection to terminals, wiring, bus bar supports etc.
 - b) Manual and electrical operation of Switchgear items under the worst conditions of supply voltage and by stimulating the conditions.
 - c) Continuity test on wiring.
 - d) Insulation resistance of the main and auxiliary circuits before and after high voltage test.
 - e) High voltage test at 2.5 KV.
 - f) For equipment purchased from other sub-suppliers, test reports of test carried out at their works shall be submitted.

DESPATCH & ERECTION

- The contractor shall assemble the panel and dismantle for despatch, install the meters / relays at site and connect the same to the respective terminals.
- The assembled panels shall be installed and grouted at the locations indicated. Necessary bus bar connection to new switch board shall be carried out.
- The installation shall ensure that minimum clearances 1 m at the front and 750mm at the back is provided as per statutory requirements. The side clearance shall not be less than 750mm.
- The panels shall be aligned, levelled and grouted securely so that they can withstand short circuit stresses without any displacement.
- The bolted joints in the bus bar connections shall be tightened, and bus bar clearance should be checked.
- The incoming and outgoing cable sizes shall be stencilling on the rear side. All tests as specified elsewhere shall be conducted.

COMMISSIONING CHECK LIST

GENERAL SITE INSPECTION

SITE INSPECTION AND TESTING

The inspection, testing and commissioning procedure shall generally be as follows:

VISUAL INSPECTION

This shall be carried out by the site engineer on all items to ensure that the equipment meets the dimensional accuracy and quality requirements laid down in the specification and to ensure that the equipment is not visibly damaged during transportation to the site.

All tests as specified shall be conducted and test results shall be recorded. In addition, following tests shall also be conducted.

EARTHING

Measure resistance of each earth pit/rod by isolating the same from station grid as well as from other earth pit/rod and then measure resistance of earth grid. Check continuity of grid conductors and wires. Soil resistivity tests. Earth loop impedance.

INSULATION RESISTANCE

Insulation resistance tests on all L.V cables, wiring and switchgear.

FUNCTIONAL CHECKING

Polarity checks.

Checks on controls and interlocks.

The testing shall be witnessed by the site engineer and the Railways representatives.

Check list of all defects, balance work, malfunctioning of devices, etc. shall be tabulated. Such work shall be attended before the final commissioning is carried out.

All testing instruments required to carry out the work shall be arranged by the contractor.

After the tests are successfully completed, and the installation is inspected and approved by statutory authorities, the equipment can be energized.

SPECIFICATION FOR MINIATURE CIRCUIT BREAKER (MCB)

- MCB shall conform to IS : 8828 / 1996 IEC 898 / 1995 or latest and ISI marked on the MCB.
- MCB shall be with trip free mechanism. MCB shall have touch proof terminals with IP – 20 degree protection. Incoming terminal shall be suitable for both cable connection and bus bar.
- MCB housing shall be made of fire retardant high strength thermo set material and suitable for 35mm Din Rail clip mounting.
- MCB shall possess B curve (lighting circuits) / C curve (motor circuits) characteristics as required.
- MCB shall be rated to 10 KA breaking capacity.
- The watt loss in the MCB shall be less than the maximum allowable as per IS : 8828 or IEC : 898.
- The MCB should meet the requirements of current limiting class 3 and should be marked with symbol on the MCB. Isolation with positive break indicator.
- A copy of type test certificates from the original manufacturer should be submitted for acceptance.

SPECIFICATIONS FOR MCB DISTRIBUTION BOARDS

- MCB Distribution Boards shall be suitable for AC three phase, 415 V with TPN MCB / MCCB incoming and SPN / TPN MCBs outgoing and of wall / frame mounting type.

- The distribution board shall be fabricated with 1.6, thick CRCA sheet steel pre-treated and powder coat painted.
- The distribution board shall be of single door/double door, horizontal / vertical type as approved.
- The distribution board shall conform to IS : 13032 suitable for surface/flush mounting. The bus bars shall be of electrolytic copper of current rating not less than 120 Amps. The connection from bus bars to main MCB / MCCB & neutral bar shall be through PVC insulated multi standard cable of required size.
- The board shall be provided with necessary neutral bar, earth bar and ding channel for MCB fixing.
- The board shall be with IP40 protection. The distribution board shall be provided with sufficient space/separate adopter box for PVC insulated & sheathed aluminium incoming cable entry with top / bottom gland plate. The board shall also be provided with L shaped adopter box or cable boxes as required at the top to take wires coming through concealed pipes from the wall. The adopter boxes shall also fabricated with 1.6 mm thick CRCA sheet steel, surface treated with seven tank process and powder coat painted to the required colour.
- The distribution board shall be with 1.2mm thick CRCA sheet steel pre-treated powder coat painted in readymade of one of the approved makes is utilized. If fabricated, the DB shall be with 1.6 mm thick CRCA sheet steel, surface treated with seven tank process and powder coat painted to the required colour.
- The DB adopter boxes and cable gland boxes shall be to the same colour.
- In case of fabricated DB, bus bar centre electrolytic copper flat type of the centre with connection to MCBs and MCCB by PVC insulated copper cable / conductor will be provided.

SPECIFICATION FOR FR PVC WIRING CABLES

Description	: Single core flexible FR PVC insulated, unsheathed multi stranded Copper Wiring cables for working voltages upto and including 1100V AC conforming to IS: 28694 / 1990
Conductor	: Bright annealed bare electrolytic copper multi stranded (not more than 0.3mm dia) conductor as per IS: 8130-1984 IEC 228.
Insulation	: Dielectric grade PVC compound conforming to IS: 5831 – 1984 with Additional fire retardant properties (FR) as per IFC 227 for working voltages upto and including 1100V with ISI mark.

SPECIFICATIONS FOR STATUTORY ITEM SETS

Each set of statutory items shall comprise the following.

1	11 KV electrical grade 12mm thick rubber mat made of die pressed and formed super quality rubber with corrugations of uniform pattern for anti skidding conforming to IS 5424 / 1969 supplied with Test Certificates 2m x 1m size.	Nos
2	Portable fire extinguisher DCP type 5kg capacity confirming to IS 3224 / latest with ISI marking fixed on suitable clamps on the walls.	Nos
3	Fire buckets 15 litre capacity GI as per IS 2546 latest 4 Nos. with self supporting stand made of MS channel / angle iron of suitable size with red – oxide and enamel painting red colour duty filling up sand in the buckets.	No
4	First Aid Box fabricated by 1.2mm thick sheet enamel painted white inside with red outside with cross on white. The box shall have compartment as required and lock and key and fitted on the wall. The first air kit shall be filled up with its full compliment of tablets, antiseptic creams, solution, band aid etc as per relevant IS and suitable for electrical shock and electrical fire victims.	No
5	Laminated shock treatment instructions board in frame	No
6	Laminated circuit diagram for HT/LT circuits for substations and switch rooms in frames.	No
7	Hand gloves electrical grade/.	2 pairs
8	Earthing pole with fibre glass handling rods.	2Nos

SPECIFICATIONS FOR PVC PIPES & ACCESSORIES

PVC conduct pipe

The conduit pipe shall be of rigid PVC pipe given OD, heavy duty suitable for electrical wiring purpose with plain ends and shall confirm to IS: 9537 (Part I) latest and IS 9537 (Part 3) latest. Only ISI marked PVC pipes should be used. Each standard length of pipe (not less than 3 mts) shall be marked with manufacturer's Name / Trade Name, Heavy and ISI marking.

PVC bends and couplings

PVC bends and couplings shall be of rigid slip type, suitable for electrical wiring purpose, with wall thickness confirming to IS3419 / 1976 and suitable for OD of PVC pipe used.

PVC junction boxes

PVC junction boxes shall be with wall thickness as per IS 3419 / 1976 and suitable for electrical wiring purpose. The junction boxes shall be suitable for OD of PVC pipe used. Junction boxes shall be of single way / two way / three way / four way required as per wiring arrangement. Junction boxes shall be provided with PVC cover at the bottom with metal inserts for fixing cover screws.

QUALITY ACTION PLAN

Introduction

Tamil Nadu Urban Habitat Development Board, (TNUHDB) with the assistance of ADB, has undertaken implementation of “Inclusive, Resilient and Sustainable Housing for Urban Poor Sector” Project in Tamil Nadu.

Methodology and tools for Quality Management (Quality Control and System)

The operational methodology and tools used to review the fulfillment of the requirement of standards through inspection, tests etc comes under the preview of control.

And the system to provide confidence of achievement of the requirements of Quality is *Quality Assurance Programme*.

Quality Control and System for Contractors

The Project packages will be implemented through Contractors after inviting bids under Open Competitive Bidding (OCB) and after entering into a contract with successful bidder whose tender has been accepted. Each Contractor shall be responsible for implementation of QA Plan within their contract work on the lines of provisions under the contract agreement.

- ❑ Name of his authorized representative with power of attorney to make correspondence and receive letters from the Employer and the Engineer.
- ❑ Kick off meeting with Contractor / Consultant within one month of award of job.
- ❑ Name and designation of authorized representative at site of work, site Organ gram and mobilization.
- ❑ Resource planning and mobilization plan to be submitted to engineer / Employer
- ❑ Name of authorized person for implementation of QA-Plan
- ❑ Location and address of site office with telephone/fax numbers and e-mail address
- ❑ Their own QA-Plan and Safety Assurance Plan
- ❑ The work plan of contract work on CPM/PERT net work, resource planning
- ❑ List of available Machinery & Equipments at site
- ❑ Basic Testing arrangements available at site for Quality control and his independent setup to ensure the same

The Contractor shall also submit following to the 'Employer' & 'Engineer'

- Detailed construction methodology including mechanical equipment proposed to be used sequence of various activities and schedule from start to end of the contract
- Submit samples of cement, steel, gravel, crushed stone, bricks, sand according to provisions of contract and notify all sources of material for works.
- While preparing PERT network/Bar chart / Planning by the Contractors, the following points are to be checked/reviewed:
 - Over all schedule and time of completion
 - Resource requirement
 - Complexity of execution
 - Schedule shall give the date of milestones with completion of, amongst other all key civil and all Electrical / Mechanical works.

The responsibilities of respective Authorities for specific tasks are drawn up below

General Responsibility

Contractors are responsible for providing:

- all necessary plant, labor, equipment and construction materials to be used in the works;
- all plant, equipment, materials and labor for temporary and auxiliary works;
- all equipment and components to be installed or incorporated in the works;
- Transportation and storage facilities for all materials and equipment.
- office and accommodation for staff and labor;
- sanitation facilities at the site; and
- all necessary staff and basic equipment for testing and quality control.

Quality assurance / quality control duties

The contractor's QA/QC duties are summarized in Table 1.1. Other duties shall be performed as stipulated in the contract documents or directed by the Engineer.

Table 1.1 : List of Contractor's QA/QC Duties

Activity/Item	Contractor's QA/QC Duties
Designs for item-rate contracts	<ul style="list-style-type: none"> • Maintain design register at site with approved design and drawings • Use only approved drawings for construction
Test laboratory and equipment	<ul style="list-style-type: none"> • Intimate PMU and PIU the details, date of completion with requisite manufacturer's and calibration certificates • Maintain the equipment in good condition and calibrate as necessary
Material receipts	<ul style="list-style-type: none"> • Enter receipts in material register • Intimate PIU in writing
Materials testing	<ul style="list-style-type: none"> • Prepare mix designs as required by contract and submit test results to PIU • Take test samples in presence of PIU when requested • Perform materials tests • Submit test reports to PIU with monthly reports • Maintain test log
Rejected materials	<ul style="list-style-type: none"> • Enter in material register at site • Intimate PIU in writing the proposed date of removal from site and confirm after removal
Construction equipment	<ul style="list-style-type: none"> • Intimate PIU the details, date of mobilization along with requisite insurance certificate, Calibration certificate for sensors in the equipment. • Maintain equipment in good working condition
Construction	<ul style="list-style-type: none"> • Intimate PIU in advance when critical works, such as concreting, paving, laying and jointing of storm water drain, water supply, sewer networks and STP works, etc., would be undertaken, along with the test certificates of the materials proposed to be used in these works. No activity shall start unless the material test certificates & Equipments are verified and approved by the Engineer. • Provide necessary QA/QC
Daily work progress	<ul style="list-style-type: none"> • Maintain in daily log
Testing of works in	<ul style="list-style-type: none"> • Perform tests as per contract requirements
Progress	<ul style="list-style-type: none"> • Submit test reports to PIU • Maintain test log

Rejected work items	<ul style="list-style-type: none"> • Intimate PIU in writing the proposed date of removal from site and confirm after removal, or (if so agreed by PIU) • Rectify defective work and invite PIU for re-inspection.
Instructions from Engineer	<ul style="list-style-type: none"> • Enter change orders, site instructions, letters and minutes of meetings issued by the Engineer in the Instruction Log
Inspection of Engineer	<ul style="list-style-type: none"> • Take instructions in Site Order Book. • Advise PIU of compliance
Progress scheduling and control	<ul style="list-style-type: none"> • Prepare and maintain project schedules and undertake work in accordance with approved schedule
Reporting	<ul style="list-style-type: none"> • Prepare and submit Monthly Progress Reports
Records	<p>Maintain the following records on site:</p> <ul style="list-style-type: none"> • Material Register • Site Order Book • Hindrance Register • Daily Log • Design Register • Test Log • Instruction Log • Equipment Register • Labor Register • Approved Construction Drawings • Test Reports • Site Laboratory Record • Permissions Issued by Departments • Correspondence Record • Copies of Monthly Progress Reports • Any other records as specified in the Contract and/or as instructed by the Engineer

2. CONSTRUCTION QUALITY CONTROL – GENERAL

This section provides an overview of construction quality control activities, including testing and site inspection.

Construction quality control (CQC) is intended to provide a comprehensive, common and consistent framework for quality control across various contract packages. CQC comprises two main elements of quality control:

- Testing
- Supervision and Inspections

Testing control covers the type of tests to be carried out, frequency of testing and stage of testing. Inspection control covers the timing of inspections, what has to be inspected and the inspection procedures.

Testing

Various site tests on materials are required to be carried out by the contractor during construction. A Checklist showing basic testing equipments to be provided in the contractor's site laboratory is presented vide Table herein. Tests should be performed in accordance with the contract documents / IS Code, as instructed by the Engineer. All test samples should be preserved, with proper identification numbers, test log reference, test date, and other applicable information. These samples must be stored on site by the contractor.

In addition to tests performed on site, the contractor is responsible for tests which are performed at approved laboratories such as Government Institutions; Government approved Laboratories. The contractor should get the necessary permission from the Engineer/Employer to test the materials at the specified laboratories.

The Contractor shall provide the necessary equipment and facility for tests and the costs thereof shall be borne by the Contractor.

Testing Equipment	Purpose of test
Sieves	Grain size analysis and classification of soil and aggregates
Compression testing machine	Compressive strength of concrete, etc.
Cylinder and cube moulds	Concrete sampling
Slump test	Workability of concrete
Core drilling equipment	In-situ sampling
Measuring instruments	Measurement of sizes
Leveling instruments	Checking levels wherever required
Any Others, as Specified by the Engineer, if required	As per IS code

Site Inspections / Supervision

Site inspections shall be carried out to ensure that the materials and construction activities conform to the prescribed standards. Site inspections can be divided into day- to-day supervision and periodic quality inspection. The suggestions in respect of these two have been elaborated herein.

Day-to-day supervision

The day-to-day site supervision of all construction activities shall be carried out by the PIU. This includes checking of lines, levels and layouts and on-site checks, execution of work as per the approved drawings, quality of materials and works. Progress monitoring and expediting shall also be carried out by the PIU. The supervisory team of the PIU shall ensure that materials that have been rejected or for which approval from the PIU has not yet been issued are not used in works.

Construction equipment is a major component of quality assurance system. The equipment requirements have been laid out in the Contract documents. It is necessary that the PIU check the adequacy of the equipment used by the contractor for construction as per the prescribed standards and specifications. The equipment used for construction shall be recorded in the daily logs.

Periodic quality inspections

PMU/PIU shall carry out periodic quality inspections during in-process, stage completion, interfacing and final completion, and during all critical activities as per the following examples:

- Leveling
- Excavation
- Adequacy of Formwork
- placing of reinforcing steel
- concrete batching and pouring including sampling and testing
- Curing of concrete
- Brick Work – Jointing, Mortar Thickness, Vertical and Horizontal alignment
- Joineries – Door, Window etc
- Plastering thickness, Mortar Quality
- Painting
- laying of pavement layers
- laying and jointing of pipes
- Storm water drains and appurtenances
- installation of electrical and mechanical arrangements, equipments and Plants
- testing, trial runs and commissioning of electro-mechanical equipment and plants

On completion of one stage of the construction and before proceeding to the next stage (such as from steel binding to concreting for RCC works) the PIU shall inspect and certify the quality of the works completed before granting approval for the next stage of the works to start. The final inspection shall encompass tests on completion and trial runs.

The certification of quality will be based on the documents and the periodic site visits. The PIU representative at site level and at senior level should witness not less than 30% and 10% of the test conducted respectively.

Quality Certification and Acceptance

The PIU's representative at site shall be responsible to certify that the items included in the contractor's Interim Payment Certificate satisfy the required quality of works and are acceptable with regard to the specifications and standards prescribed under the contract before the progress bill is passed for payment.

3. CONTROL OF MATERIALS AND EQUIPMENT COMPONENTS

This section provides an overview of control requirements for materials and equipment components, including site testing, manufacturers certification and third party inspection.

General

Control and approval of construction materials to be incorporated in the works shall be based on the following:

- Test reports for materials tested at site, such as bricks cement, sand, water, aggregates and bitumen; the contractor will perform all tests through approved Laboratories. The designated PIU representative shall witness at least 30% of tests.
- Third party inspection for various items as per contract documents.

Materials to be tested

The materials to be tested include cement, water, aggregates for concrete, bricks and stones, soil for filling, and aggregates and bituminous materials for road works. For aggregates and soil, the contractor shall obtain the approval of the borrow source before extracting material. The list of materials to be tested is given in Table 3.1.

Test procedures are as per the IS Codes. The reports are to be maintained at site, where in 3 copies of report will be prepared, two copies to be submitted with monthly report to PIU and third copy to be retained by contractor at site.

Table 3.1: List of Materials to be Tested

Sl. No.	Material	Test Report Format No.
1	Cement	
2	Steel	
3	Sand	
4	Water for Construction Works	
5	Bricks	
6	Size Stone	
7	Coarse Aggregate for Concrete Work	
8	Lime	
9	Bitumen	
10	Borrow Material	
11	Any other material as directed by the Engineer	

The Material testing and sampling with permissible limits conforming to IS codes as well as testing format to be followed during execution are provided in the **Appendix A**

4 CONTROL OF GENERAL CIVIL AND STRUCTURALWORKS

This section covers the testing of works and the inspection of workmanship for general civil and structural works. The key elements to be inspected in these works are concreting, brickwork and finishes.

Testing of Works

The works to be tested on site include excavation, cement concreting, and brick masonry. All the materials proposed to be used in these works must have been tested by the contractor and approved by the PIU well in advance of these works. The contractor shall submit the concrete pouring report to the PIU as and when concreting is done, and shall obtain the approval of the PIU when a particular stage is completed and before proceeding to the next stage.

It is the responsibility of PIU to check the quality of each and every work and report the quality compliance in the following format which is in **Appendix B**.

Inspection Checklists

Inspection checklists for concreting, and brick masonry work and finishes, and building services are presented in **Appendix C**.

1. The CNC report shall be entered in the Test Report Log by the contractor at the site, using Format in **Appendix D**. The details of input materials will be recorded in the Material Register, using Format in **Appendix D**. The contractor shall maintain all test records properly.
2. Other approvals given to the contractor will be recorded in the daily logs of the contractor which should form part of the contractor's monthly report. A recommended format for Daily Work Record/Site Order Book is illustrated in **Appendix D**.

Similar procedures shall be followed for the transmittal and review of test reports for tests performed at outside laboratories, for manufacturers' certificates, and for third party inspection reports.

SITE ORDER BOOK

The Contractor shall be responsible to maintain a Site Order Book, in duplicate, at the site of the works at all times, and this shall be open for inspection by authorized representatives of PIU/PMU.

The Site Order Book has two primary purposes – to record the day-to-day instructions to the Contractor and the Contractor's compliance with these instructions, and to record the inspection and acceptance of work completion stages along with issuing approvals to the Contractor to proceed with the next stage of construction.

REPORTING

This section of the QA/QC Manual outlines the Project's requirements for reporting progress and suggests formats for reports. The formats however may undergo changes periodically depending on the requirements of the employer.

Types of Progress Reports

All the progress reports should be submitted to PMU for periodical inspection and review of work. The Project provides for three main levels of reporting, as follows:

- i) Contractor's Monthly Progress Reports and
- ii) Quarterly Progress Reports.

Reporting Schedule and Distribution

Contractor's Monthly Progress Report

Contractor's Monthly Progress Report shall be submitted to the PIU by the 5th of the month (original plus two copies). The reporting period would be upto the end of previous month.

Monthly Contract Reports

The PIU shall prepare a Monthly Progress Report for each Contract, consisting of :

- i. a "Statement of Exceptions" commentary on the Contractor's report, and
- ii. a discussion on the major problems and actions taken or proposed to be taken. This shall be distributed, together with a copy of the Contractor's Report, by the 10th of the month to PMU

Quarterly Progress Reports

Based on the monthly progress reports, PIU shall assist contractor in preparing and issuing Quarterly Progress Reports by the 20th of the month following the end of the Quarter for submission to Asian Development Bank through PMU.

Report Formats

Suggested formats for Contractor's Report and PIU's Report on each Contract are presented in Appendix D.

APPENDIX A

**THE MATERIAL TESTING AND SAMPLING WITH PERMISSIBLE LIMITS CONFORMING TO IS
CODES AS WELL AS TESTING FORMAT**

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
1	Cement						
1a	Cement (43 Grade OPC)	One Test for every 300 Tonnes of Single Brand - (Test to be done, if there is change in Brand)	a) Initial setting time	Not less than 30 minutes.	IS 8112-2013	4031(5)-1988 (Reaffirmed 2019)	
b) Final setting time			Not more than 600 minutes				
c) Fineness of cement			Not less than 225m ² /kg	4031(2)-1999 (Reaffirmed 2013)			
(i) By Blaine air Permeability Method							
d) Soundness of Cement							
(i) By Le-Chatelier Method			Expansion not more than 10mm	or		4031(3)-1988 (Reaffirmed 2019)	
(ii) By Auto Clave Test			Not more than 0.8%				
e) Compressive Strength of C.M (1:3) cube			Not Less than 23 MPa (or) 230 kg/cm ²	4031(6)-1988 (Reaffirmed 2019)			
(i) 3 days (72+/-1hr)							
(ii) 7 days (168+/-2hr)						Not Less than 33 MPa (or)330 kg/cm ²	
(iii) 28 days (672+/-4hr)						Not Less than 43 MPa (or)430 kg/cm ²	
1b			Cement (53 Grade OPC)	One Test for every 300Tonnes of Single Brand - (Test to be done, if there		a) Initial setting time	Not less than 30 minutes.	IS 12269-2013	4031(5)-1988 (Reaffirmed 2019)
b) Final setting time	Not more than 600 minutes						
c) Fineness of cement					Not less than 225m ² /kg	4031(2)-1999 (Reaffirmed 2013)	
(i) By Blaine air Permeability Method							

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
		is change in Brand)	d) Soundness of Cement				4031(3)-1988 (Reaffirmed 2019)
			(i) By Le-Chatelier Method	Expansion not more than 10mm			
			or				
			(ii) By Auto Clave Test	Not more than 0.8%			
			e) Compressive Strength of C.M (1:3) cube				4031(6)-1988 (Reaffirmed 2019)
			(i) 3 days (72+/-1hr)	Not Less than 27 MPa (or) 270 kg/cm ²			
			(ii) 7 days (168+/-2hr)	Not Less than 37 MPa (or) 370 kg/cm ²			
			(iii) 28 days (672+/-4hr)	Not Less than 53 MPa (or) 530 kg/cm ²			
1c	Portland Pozzolana Cement (Flyash based)& (Calcined clay based)		a) Initial setting time	Not less than 30 minutes.	1489-Part 1-2015(Flyash based) & 1489-Part 2-2015 (Calcined clay based)		4031(5)-1988(Reaffirmed 2019)
			b) Final setting time	Not more than 600 minutes			
			c) Fineness of cement				4031(2)-1999 (Reaffirmed 2013)
			(i) By Blaine air Permeability Method	Not less than 300 m ² /kg			
			d) Soundness of Cement				4031(3)-1988 (Reaffirmed 2019)
			(i) By Le-Chatelier Method	Expansion not more than 10mm			
			or				
			(ii) By Auto Clave Test	Not more than 0.8%			
			e) Compressive Strength of C.M (1:3) cube				4031(6)-1988 (Reaffirmed 2019)
			(i) 3 days (72+/-1hr)	Not Less than 16 MPa (or) 160 kg/cm ²			
			(ii) 7 days (168+/-2hr)	Not Less than 22 MPa (or) 220 kg/cm ²			

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
			(iii) 28 days (672+/-4hr)	Not Less than 33 MPa (or) 330 kg/cm ²		
			f) Drying Shrinkage	Not more than 0.15%		4031(10)-1988 (Reaffirmed 2019)
2	Steel					
2a	Mild Steel (Grade - Fe 250)	Dia less than 10 mm - 1 sample for 25 tonnes (Min. 3 rods / sample)	a) Yield Stress	Min. 250 N/mm ²	IS 432(Part 1)-1982: Reaffirmed 2020	IS 1608-2005: Reaffirmed 2017
b) Elongation			Min. 23.0%			
c) Ultimate Tensile Stress			Min. 410 N/mm ²			
2b	High yield Strength Deformed Bars (Fe 415)	(a) Dia less than 10 mm - 1 sample for 25 tonnes (Min. 3 rods / sample). (b) Dia 10 mm to 16mm - 1 sample for 35 tonnes (Min. 3 rods / sample). (c) Dia more than 16 mm-1 sample for 45tonnes	a) 0.20 % Proof Stress / Yield Stress	Min. 415 N/mm ²	IS 1786-2008: (Reaffirmed 2018)	IS 1608(part 1): 2018
b) Elongation			Min.14.50%			

S. No.	Materials to be tested	Sampling (Min. 3 rods / sample)	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
			c) Tensile Strength	10% More than the Actual 0.2% Proof Stress, But not Less than 485 N/mm ²		
2c	High yield Strength Deformed Bars (Fe 500)	(a) Dia less than 10 mm - 1 sample for 25 tonnes (Min. 3 rods / sample). (b) Dia 10 mm to 16mm - 1 sample for 35 tonnes (Min. 3 rods / sample). (c) Dia more than 16 mm - 1 sample for 45 tonnes (Min. 3 rods / sample)	a) 0.20 % Proof Stress / Yield Stress	Min. 500 N/mm ²	IS 1786-2008: (Reaffirmed 2018)	IS 1608(part 1): 2018
			b) Elongation	Min. 12.0%		
			c) Tensile Strength	8% More than the Actual 0.2% Proof Stress, But not Less than 545 N/mm ²		
2d	High yield Strength Deformed	(a) Dia less than 10 mm - 1	a) 0.20 % Proof Stress / Yield Stress	Min.500 N/mm ²		
			b) Elongation	Min.16.0%		

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
	Bars (Fe 500D)	sample for 25 tonnes (Min. 3 rods / sample). (b) Dia 10 mm to 16mm - 1 sample for 35 tonnes (Min. 3 rods / sample). (c) Dia more than 16 mm - 1 sample for 45tonnes (Min. 3 rods / sample)	c) Tensile Strength	10% More than the Actual 0.2% Proof Stress, But not Less than 565N/mm ²		
2e	High yield Strength Deformed	(a) Dia less than 10 mm - 1	a) 0.20 % Proof Stress / Yield Stress	Min. 550 N/mm ²		
			b) Elongation	Min. 10.0%		

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
	Bars (Fe 550)	sample for 25 tonnes (Min. 3 rods / sample). (b) Dia 10 mm to 16mm - 1 sample for 35 tonnes (Min. 3 rods / sample). (c) Dia more than 16 mm - 1 sample for 45 tonnes (Min. 3 rods / sample)	c) Tensile Strength	6% More than the Actual 0.2% Proof Stress, But not Less than 585 N/mm ²		
2f	High yield Strength Deformed Bars	(a) Dia less than 10 mm - 1 sample for 25	a) 0.20 % Proof Stress / Yield Stress	Min. 550 N/mm ²	IS 1786-2008: (Reaffirmed 2018)	IS 1608(part 1): 2018
			b) Elongation	Min. 14.50%		

S. No.	Materials to be tested (Fe 550D)	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
		tonnes (Min. 3 rods / sample). (b) Dia 10 mm to 16mm - 1 sample for 35 tonnes (Min. 3 rods / sample). (c) Dia more than 16 mm - 1 sample for 45tonnes (Min. 3 rods / sample)	c) Tensile Strength	8% More than the Actual 0.2% Proof Stress, But not Less than 600 N/mm ²		
3	Aggregate					
3a	Coarse Aggregate					
	Coarse Aggregate	As per IS 2430-1986 (Reaffirmed 2005)	a) Deleterious Material	Not more than 5% by mass for Natural Aggregate. Not more than 2% by mass for Manufactured / Crushed aggregate.	383-2016	2386(2)-1963 (Reaffirmed 2021)
			b) Combined Flakiness and Elongation Index	Not more than 40% for Natural / Crushed aggregate		2386(1)-1963 (Reaffirmed 2021)
			c) Aggregate Crushing Value/ Ten Percent Fines			2386(4)-1963 (Reaffirmed)

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
			i) Concrete for wearing surfaces	Not more than 30% for Natural / Crushed aggregate		2021)
			ii) Concrete other than for wearing surfaces	Not more than 30% for Natural / Crushed aggregate		
			d) Aggregate Impact Value			
			i) Concrete for wearing surfaces	Not more than 30% for Natural / Crushed aggregate		2386(4)-1963 (Reaffirmed 2021)
			ii) Concrete other than for wearing surfaces	Not more than 45% for Natural / Crushed aggregate		
			e) Aggregate Abrasion Value (Los Angeles machine)			
			i) Concrete for wearing surfaces	Not more than 30% for Natural / Crushed aggregate		2386(4)-1963 (Reaffirmed 2021)
			ii) Concrete other than for wearing surfaces	Not more than 50% for Natural / Crushed aggregate		
			f) Grading of Aggregate	As confirmed as per table 7 of IS 383:2016.	383-2016	2386(1)-1963 (Reaffirmed 2021)
			g) Specific Gravity	Testing shall be in accordance with IS code		2386(3)-1963 (Reaffirmed 2021)
			h) Water absorption			
			i) Bulk Density			
			j) Fineness Modulus			
	Coarse Aggregate	As per IS 2430-1986 (Reaffirmed 2005)				

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
3b	Fine Aggregate					
3ba	Fine Aggregate for Concrete	As per IS 2430-1986 (Reaffirmed 2005)	a) Deleterious Material	Not more than 5% by mass for Natural Aggregate. Not more than 2% by mass for Manufactured / Crushed aggregate.	383-2016	2386(2)-1963 (Reaffirmed 2021)
b) Sieve analysis			As confirmed as per table 9 of IS 383:2016.	2386(1)-1963(Reaffirmed 2021)		
c) Bulk Density			Testing shall be in accordance with IS code	2386(3)-1963 (Reaffirmed 2021)		
d) Specific Gravity						
e) Water absorption						
f) Fineness Modulus					2386(1)-1963 (Reaffirmed 2021)	
3bb	Fine Aggregate for Masonry Mortar	As per IS 2430-1986 (Reaffirmed 2005)	a) Sieve analysis	As confirmed as per table 1 of IS 2116:1980 (Reaffirmed 2017).	2116-1980 (Reaffirmed 2017)	2386(1)-1963 (Reaffirmed 2021)
b) Deleterious Material			Not more than 5% by mass	2386(2)-1963 (Reaffirmed 2021)		
c) Bulk Density			Testing shall be in accordance with IS code	2386(3)-1963 (Reaffirmed 2021)		
d) Specific Gravity						
e) Fineness Modulus					2386(1)-1963 (Reaffirmed 2021)	
3bc	Fine Aggregate for Plaster	Each load	a) Sieve analysis	As confirmed as per table 1 of IS 1542:1992 (Reaffirmed 2019).	1542-1992 (Reaffirmed 2019)	2386(1)-1963 (Reaffirmed 2021)

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
			b) Deleterious Material	Not more than 5% by mass		2386(2)-1963 (Reaffirmed 2021)	
			c) Bulk Density	Testing shall be in accordance with IS code		2386(3)-1963 (Reaffirmed 2021)	
			d) Specific Gravity				
			e) Fineness Modulus	Not less than 1.4 in case of crushed stone/crushed gravel sand. Not less than 1.5 in case of naturally occurring sand		1542-1992 (Reaffirmed 2019)	2386(1)-1963 (Reaffirmed 2021)
			f) Average compressive strength of C:S (1:6) cubes	Not less than 3 N/mm ² at 28 days			
4	Masonry Mortar		Compressive strength at 28days		2250-1981-Code of practice for Preparation and Use, (Reaffirmed 2020)		
			Grade	Proportion			
				Cement		Sand	
			MM 0.7	1		8	0.7-1.5N/mm ²
			MM 1.5	1		7	1.5-2N/mm ²
			MM 3.0	1		6	3-5N/mm ²
			MM 5.0	1		5	5-7.5N/mm ²
	MM7.5	1	4	7.5N/mm ² and above			
		or					
		1	3				
5	Bricks						
5a	Burnt Clay	As per	(i) Compressive strength		1077 : 1992	3495(1)-2019	

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
	Bricks	IS 5454-1978 (Reaffirmed 2010) No. of Bricks for a Lot of 2001 to 10000 is 5, for a lot of 10001 to 35000 is 10 and for a lot size of 35001 to 50000 is 15	Class Designation	Average wet compressive strength not less than(N/mm ²)	(Reaffirmed 2016)		
			35	35			
			30	30			
			25	25			
			20	20			
			17.5	17.5			
			15	15			
			12.5	12.5			
			10	10			
			7.5	7.5			
			5	5			
			3.5	3.5			
			(ii) Efflorescence	Rating not more than 'moderate' up to class 12.5 and 'slight' for higher classes.			3495(3)-2019
			(iii) Water absorption	Not more than 20% by mass up to class 12.5and 15% by mass for higher classes			3495(2)-2019
5b	Pulverized Fuel-Ash lime bricks(Flyash bricks)	As per IS 5454-1978 (Reaffirmed 2010) No. of Bricks for a Lot of 2001 to 10000 is 5,	(i) Compressive strength		12894-2002 (Reaffirmed 2017)	3495(1)-2019	
Class Designation			Average wet compressive strength not less than (N/mm ²)				
30			30				
25			25				
20			20				
17.5			17.5				

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits		Conforming to BIS codes		
						Specifications	Test	
		for a lot of 10001 to 35000 is 10 and for a lot size of 35001 to 50000 is 15	15	15				
			12.5	12.5				
			10	10				
			7.5	7.5				
			5	5				
			3.5	3.5				
			(ii) Drying shrinkage	Average of three units shall not exceed 0.15%		4139-1989 (Reaffirmed 2019)		
			(iii) Efflorescence	Rating not more than 'moderate' up to class 12.5 and 'slight' for higher classes.		3495(3)-2019		
(iv) Water absorption	Not more than 20% by mass up to class 12.5 and 15% by mass for higher classes		3495(2)-2019					
5c	Autoclaved Cellular (Aerated) Concrete Blocks	In any consignment, all the blocks of same size and from the same batch of manufacture shall be grouped together into a minimum number of	Compressive strength			2185(part 3) - 1984 (Reaffirmed 2020)	6441(5)-1972 (Reaffirmed 2017)	
			Density in over dry condition kg/m ²	Grade 1(N/mm ²)	Grade 2 (N/mm ²)			Thermal Conductivity (W/m.k)
			451-550	2	1.5			0.21
			551-650	4	3			0.24
			651-750	5	4			0.30
			751-850	6	5			0.37
851-1000	7	6	0.42					

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
		groups of 10000 blocks or less.From each lot a sample of 24 blocks shall be selected at random.	Drying Shrinkage	Shall not be more than 0.05% for Grade I blocks and 0.10% for Grade II blocks		
5d	Sewer Bricks/Lot size- As required by the Field Officers					
	(Intended for the lining of walls, roofs and floors of sewers used for ordinary sanitary domestic sewage)	As required by the Field Officers	(a) Compressive Strength	Average not less than 175 Kgf/cm ² and individual shall not be less than 160 Kgf/cm ²	IS 4885:1998	IS 3495 (Part 1)-1976
			(b) Water Absorption	Average shall not exceed 10% and individual shall not exceed 12%		IS 3495 (Part 2)-1976
			(c) Efflorescence	Rating not more than Slight		IS 3495 (Part 3)-1976
6	Lime					
	As per Appendix A (clause 91) of IS 712-1984		Setting time (Hydrated):		IS 712-1984	
			(a) Initial set ,Min, h	2 (For class A&E)		
			(b) Final set ,Min, h	48 (For class A&E)		
			Fineness (Hydrated)			
			(a) Residue on 2.36mm IS Sieve, percent, Max	Should be Nil (For Class A, B,C,D,E &F)		
	(b) Residue on 300 micron IS Sieve	5% Max (For Class A, B, E &F) and for other classes it should be Nil.	IS 6932 (Part 4) - 1973			

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
			Residue on slaking (Quick)			IS 6932 (Part 3) - 1973	
		(a) Residue on 850 micron IS Sieve	10% Max(For Class B &F) & 5% Max (For Class C&D)				
		(b) Residue on 300 micron IS Sieve	5% Max (For Class C& D) and for other classes it should be Nil.				
		Free moisture content	2% Max (For Class A, B,C,D,E &F)				
		Available Lime as Cao	75% Minimum (on dry basis- For Quick/Class-C) & 75% Minimum(on ignited basis-For Hydrated/Class-C)				
7	Hardened Concrete						
	Cube Test	1 to 5 m ³ - 1 set	Compressive Strength of 150mm Cube		456 -2000 (Reaffirmed 2021)	516-1959 (Reaffirmed 2018)	
		6 to 15 m ³ - 2 sets	<u>M15 Concrete</u>				
		16 to 30 m ³ - 3 sets	28 days	Not less than 15 N/mm ²			
		31 to 50 m ³ - 4 sets	<u>M20 Concrete</u>				
		>50 m ³ - 4 plus one for each addl. 50 m ³	28 days	Not less than 20 N/mm ²			
			<u>M25 Concrete</u>				
			28 days	Not less than 25 N/mm ²			
			<u>M30 Concrete</u>				
			28 days	Not less than 30 N/mm ²			
			<u>M35 Concrete</u>				
		28 days	Not less than 35 N/mm ²				

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
					<p>for M15 and above, Mean of 4 Non Overlapping consecutive test shall not be less than $f_{ck} + 0.825 \times S_{DN} / \text{mm}^2$ or $f_{ck} + 3N / \text{mm}^2$ whichever is greater. Individual test result cannot be less than $f_{ck} - 3N / \text{mm}^2$</p> <p>When number of samples to be taken is less than 4, the mean of test results shall be $f_{ck} + 4N / \text{mm}^2$ minimum and the individual test result shall not be less than $f_{ck} - 2N / \text{mm}^2$ (Refer Table -11 of IS 456 - 2000)</p>	
8	Fresh Concrete					
	Slump Test	Type of work	Degree of workability	Slump (mm)		
	Slump Test at site for all reinforced concrete at regular intervals (Slump in mm)	Blinding concrete, Shallow sections, Pavements using pavers	Very Low	Compacting factor value of 0.75 to 0.80 (for very low category workability by Compacting factor will be more appropriate)	456 -2000 (Reaffirmed 2021)	1199-1959 (Reaffirmed 2018)
		Mass concrete , lightly reinforced sections in slab, beam, walls and columns	Low	25 to 75		

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
		Heavily reinforced sections in slab, beams, walls, columns, slip form work, pumped concrete	Medium	50 to 100			
		Trench fill, In-situ pilling, Tremie concrete	High	100 to 150			
9	Water Test						
	Water Test	Lab Test: <u>Local Source:-</u> Once in three months <u>Out Sources :</u> Once in a month	a) To neutralize 100 ml. of water using Phenolphthalein as an Indicator (Acidity)	Not more than 5 ml (or 50 mg/l) of 0.02 normal NaOH	IS 456 : 2000 (Reaffirmed 2021)	3025(22)-1986, (Reaffirmed 2019)	
b) To neutralize 100 ml. of water using Mixed indicator (Alkalinity)			Not more than 25 ml (or 250 mg/l) of 0.02 normal H ₂ SO ₄	3025(23)-1986 (Reaffirmed 2019)			
c) Solids							
(i) Organic			200mg/l	3025(18)-1988 (Reaffirmed 2017)			
ii) Inorganic			3000mg/l				
ii) Sulphates (as So ₄)			400 mg/l	3025(24)-1986 (Reaffirmed 2019)			

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
			iii) Chlorides (as Cl)	2000 mg/l for concrete not containing embedded Steel and 500 mg/l for reinforced concrete work		3025(32)-1988 (Reaffirmed 2019)
			iv) Suspended Matter	2000 mg/l		3025(17)-1983 (Reaffirmed 2017)
			d) pH value	Not less than 6		3025(11)-1983 (Reaffirmed 2017)
	Water Test	Field Test : (Using pH meter) <u>Local source</u> - Once in fortnight <u>Out Source-</u> (Lorry Load) - For Each Load	a) pH value	Not less than 6	IS 456 : 2000 (Reaffirmed 2021)	3025(11)-1983 (Reaffirmed 2017)
10	Hydraulic Pressed Tiles	6 Tiles shall be selected at	a) Water absorption	Shall not exceed 15%	2690-1993	2690-1993(Reaffirmed 2016)

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
11	Flooring Ceramic tiles	random for every 1000 tiles. The Number of tiles taken from a lot for tests shall not be less than 15 in any one lot.	b) Flexural strength	Shall not be less than 20 Kg/cm ²	IS 13630 part 15 IS 15622;2017	IS 13630 part 15 IS 15622;2017
			(a) Water absorption (Floors/walls)	% varies.It depends on shaping & Group category-Refer Code for acceptance criteria.		
			(b) Modulus of Rupture(Floors/Walls)	Min 20N/mm ² Varies- As specified by Manufacturer)		
			(c)Crazing Resistance (Floors/Walls)	No Crazing		
12	UPVC pipes for soil and waste discharge system inside buildings including ventilation and rain water system/Min one sample for each work/Each Dia					
	(Type A: For use in ventilation pipe work and Rain water applications) Type B: For	As per Annex B of IS 13592:2013	(a) Reversion test (Immersion method- Sample Length of pipe 300mm Long	Shall not alter in length by more than 5%	IS 13592;2013 IS 14735;1999	IS 12235 (Part 5) :1986
			(b) Resistance of Sulphuric Acid	Mass of specimen shall neither increase by more than 0.32g nor decrease by more than 0.13g		IS 12235 (Part 7) :1986

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes		
					Specifications	Test	
	use in Soil and waste Discharge System)		© Axial Shrinkage (For Type B pipes only)	Shall not exceed 2%			
			(d) Impact strength @ 0 Degree C	Shall not fracture or crack through its complete wall thickness			IS 12235 (Part 9) :1986
			(Or) Alternatively				
			(i) Maximum Tensile Strength	Shall not be less than 45 Mpa			IS 8543 (Part 4/sec1) :1984
			(ii) Elongation at break	Shall not be less than 80%			
			13	UPVC pipes for potable Water supplies/Min one sample for each work/Each Dia			
	UPVC pipes for portable water supplies	As per Annex D (clause 12) of IS 49852:2000	(a) Internal Hydrostatic Pressure maintained at ksc 1 hour @ 27 degree Celcius	Shall not alter in length by more than 5%	IS4985:2000	IS 12235 (Part 5) :1986	
			(a) Reversion test (Immersion method- Sample Length of pipe 200+/- 20mm Long	Shall not alter in length by more than 5%			
			© Density	Shall be between 1.40 to 1.46		IS 13360 (Part 3 / Sec-1) :1995	
			(d) Sulphated Ash content	Shall not exceed 11%			
14	Electrical cables						
	PVC Insulated	Min. one Test for Each	Conductor Resistance at 20° C		IS694 :1990		

S. No.	Materials to be tested	Sampling	Name of Tests	Permissible limits	Conforming to BIS codes	
					Specifications	Test
	Cables	Brand, Each Work	For 1.5 Sq.mm cable	Max. allowable Limit Ohm / Km	12.10	
			For 2.5 Sq.mm cable	Max. allowable Limit 7.40 Ohm / Km		
			For 4.0 Sq.mm cable	Max. allowable Limit 4.95 Ohm / Km		
			Visual inspection, Insulation resistance test, High Voltage test, Shrinkage test, thickness of Insulation and Sheath Tensile Strength, Heat Shock	Testing shall be in accordance with IS code		
15	Wood					
		Minimum one sample for each work	Moisture Content	Not more than 8% to 20%(This % varies according to different zone/different use)	IS 287:1993	
			Field Test-Visual Observation	Free from Rotten,unsound knots (or) knots incluster	IS 3629:1986	
16	Wooden Flush Door Shutter (Solid core type)/					
		Minimum one sample for each work	General	There shall be No Delamination		
			Knife Test	Testing shall be in accordance with IS code	IS 2202 (Part I) 1980	
			Glue Adhesion Test			
17	UPVC Profile of each size should be tested in accordance with relevant IS codes.					
18	Reflected ceramic cooling tiles should be sampled and tested in accordance with relevant IS code.					

TESTING FORMAT FOR MATERIALS

Description of material : Cement (Grade)

Last Test done on :

Test done at :

Date of receipt of material :

Quantity received :

Date of sampling :

Date of Test :

Date of receipt of test results :

Whether the results confirm to IS Specification : Yes / No

If not, corrective action taken :

TESTING FORMAT FOR MATERIALS

Description of material : Steel (6mm / 8mm / 10mm etc.,)

Last Test done on :

Test done at :

Date of receipt of material :

Quantity received :

Date of sampling :

Date of Test :

Date of receipt of test results :

Whether the results confirm to IS Specification : Yes / No

If not, corrective action taken :

A

TESTING FORMAT FOR MATERIALS

Description of material	:	Bricks (Brand Name)
Last Test done on	:	
Test done at	:	
Date of receipt of material	:	
Quantity received	:	
Date of sampling	:	
Date of Test	:	
Date of receipt of test results	:	
Whether the results confirm to IS Specification	:	Yes / No
If not, corrective action taken	:	

TESTING FORMAT FOR MATERIALS

Description of material : Pressed Tiles (Brand Name)

Last Test done on :

Test done at :

Date of receipt of material :

Quantity received :

Date of sampling :

Date of Test :

Date of receipt of test results :

Whether the results confirm to IS Specification : Yes / No

If not, corrective action taken :

TESTING FORMAT FOR WATER

Source of Water	:	
Last test done on	:	
Test done at	:	
Date of sample	:	
Date of Test	:	
Date of receipt of test results	:	
Whether the results confirm to IS Specification	:	Yes / No
If not, corrective action taken	:	

APPENDIX B

REPORTING FORMAT FOR QUALITY COMPLIANCES

FIELD ENGINEERS' REPORTING FORMAT FOR QUALITY COMPLIANCE

**A. CIVIL WORKS
DIVISION**

Name of the Scheme : _____
 Group No. : _____
 Estimate No. & Date : _____
 Date of handing over : _____
 Probable Date of completion : _____

Name of the Contractor : _____
 No. of Blocks : _____
 No. of Tenements : _____
 Agreement No. & Date : _____
 Agreement Period : _____

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
1	Marking	(1.1) Check marking as per the drawing and ensure correctness of marking (1.2) Ensure fixing of bench mark indicating MFL, plinth level, formation level etc., with reference to adjoining buildings.						
2	Materials (to be filled in form No.2.1.1 & 2.1.2)	(2.1) Whether the materials used are in compliance with the recommendations of BIS.	(circular No.4 & appended material testing format)					
		a) Cement : Consignment No.1	Form No.2.1.1					
		Consignment No.2						
		Consignment No.3						
		Consignment No.4						
		Consignment No.5						
		b) Steel : Consignment No.1						
		Consignment No.2						
		Consignment No.3						
		Consignment No.4						
		Consignment No.5						

* Put 'Yes' / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations			
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
		c) Bricks : Consignment No.1	Form No.2.1.1				
		Consignment No.2					
		Consignment No.3					
		Consignment No.4					
		Consignment No.5					
		Consignment No.6					
		Consignment No.7					
		Consignment No.8					
		Consignment No.9					
		Consignment No.10					
		d) Pressed tiles : Consignment No.1	Form No.2.1.1				
		Consignment No.2					
		e) Water : Sample No.1	Form No.2.1.2				
		Sample No.2					
		Sample No.3					
		Sample No.4					
		Sample No.5					
		Sample No.6					
		Sample No.7					
		Sample No.8					
		Sample No.9					
		Sample No.10					
		Sample No.11					
		Sample No.12					
3	Earthwork Excavation	(3.1) Check for width, depth and alignment as per drawing (3.2) Check bottom level with reference to Bench Mark. (3.3) Any deviation in soil profile met with during earth work in contrast to the soil investigation report.					

* Put 'Yes / No / NA' (Not applicable)

SI. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
4	Pile Foundation (Driven cast-in-situ)	(4.1) Check marking of pile location.						
		(4.2) Whether pile shoe is as per specifications						
		(4.3) Whether recommended 'set criteria' met with						
		(4.4) Check depth of pile termination.						
		(4.5) Check reinforcement cage as per approved design.						
		(4.6) Whether cover blocks are tied to reinforcement cage.						
		(4.7) Check grade of concrete, minimum cement content and water - cement ratio.						
		(4.8) Casting of concrete cubes.						
		(4.9) Ensure cube test on 28th Day.						
		(4.10) Pile load test done.						
5	Plain Cement concrete	(5.1) Ensure proper alignment and level of formwork						
		(5.2) Check for proper mix as per specification						
6 (a)	Brick Masonry in foundation & Basement	(6.1) Ensure proper soaking of bricks						
		(6.2) Check for compliance with centre line						
		(6.3) Check for plumb						
		(6.4) Check for bond without vertical joints						
		(6.5) Check for height of brick work						
		(6.6) Ensure proper curing						

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(b)	Brick Masonry in Ground floor	(6.1) Ensure proper soaking of bricks						
		(6.2) Check for compliance with centre line						
		(6.3) Check for plumb						
		(6.4) Check for bond without vertical joints						
		(6.5) Check for height of brick work						
		(6.6) Ensure proper curing						
(c)	Brick Masonry in First Floor	(6.1) Ensure proper soaking of bricks						
		(6.2) Check for compliance with centre line						
		(6.3) Check for plumb						
		(6.4) Check for bond without vertical joints						
		(6.5) Check for height of brick work						
		(6.6) Ensure proper curing						
(d)	Brick Masonry in Second Floor	(6.1) Ensure proper soaking of bricks						
		(6.2) Check for compliance with centre line						
		(6.3) Check for plumb						
		(6.4) Check for bond without vertical joints						
		(6.5) Check for height of brick work						
		(6.6) Ensure proper curing						

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(e)	Brick Masonry in Terrace / Parapet Wall	(6.1) Ensure proper soaking of bricks						
		(6.2) Check for compliance with centre line						
		(6.3) Check for plumb						
		(6.4) Check for bond without vertical joints						
		(6.5) Check for height of brick work						
		(6.6) Ensure proper curing						
7 (a)	Form work for Raft slab / Raft Beam	(7.1) Check for plain surface						
		(7.2) Check for proper alignment						
		(7.3) Check for proper cross bracings.						
(b)	Form work for Grade Beam	(7.1) Check for plain surface						
		(7.2) Check for level of bottom surface						
		(7.3) Check for proper alignment						
		(7.4) Check for proper cross bracings.						
(c)	Form work for Plinth Beam	(7.1) Check for plain surface						
		(7.2) Check for level of bottom surface						
		(7.3) Check for proper alignment						
		(7.4) Check for proper cross bracings.						

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(d)	Form work for Columns	(7.1) Check for plain surface						
		(7.2) Check for verticality						
		(7.3) Check for proper alignment						
		(7.4) Check for cross bracings.						
(e)	Form work for Lintel & Sunshade	(7.1) Check for plain surface						
		(7.2) Check for level of bottom surface						
		(7.3) Check for proper alignment						
		(7.4) Check for proper dia of props and cross bracings.						
(f)	Form work for Floor / Roof slab & Beam	(7.1) Check for plain surface						
		(7.2) Check for level of bottom surface						
		(7.3) Check for proper alignment						
		(7.4) Check for proper dia of props and cross bracings.						
		(7.5) Ensure plain cement concrete flooring is done in Ground Floor.						

* Put 'Yes' / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations			
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
8 (a)	Reinforcement for Raft slab / Raft beam	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.	(circular No.3 dt : 29.04.09)				
		(8.2) Check for crank points and extension of rods from crank points.					
		(8.3) Check for proper cover.					
		(8.4) Check for ductile detailing for Zone III areas					
(b)	Reinforcement for Grade Beam	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.	(circular No.3 dt : 29.04.09)				
		(8.2) Check for crank points and extension of rods from crank points.					
		(8.3) Check for proper cover.					
		(8.4) Check for ductile detailing for Zone III areas					
(c)	Reinforcement for Plinth Beam	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.	(circular No.2 dt : 16.04.09)				
		(8.2) Check for crank points and extension of rods from crank points.					
		(8.3) Check for proper cover.					
		(8.4) Check for ductile detailing for Zone III areas					

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations			
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(d)	Reinforcement for Columns	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.					
		(8.2) Ensure staggered lapping of bars midway between floor slabs.					
		(8.3) Check for recommended lap length and anchorage in footings.					
		(8.4) Check for proper cover.					
		(8.5) Check for ductile detailing for Zone III areas	(circular No.2 dt : 16.04.09)				
(e)	Reinforcement for Lintel / Sunshade	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.					
		(8.2) Check for proper cover.					
(f)	Reinforcement for Floor / Roof Slab & Beam	(8.1) Check for dia of rods and proper placement of reinforcement as per approved drawing.					
		(8.2) Check for crank points and extension of rods from crank points.	(circular No.3 dt : 29.04.09)				
		(8.3) Check for proper cover.					
		(8.4) Check for ductile detailing for Zone III areas	(circular No.2 dt : 16.04.09)				
9 (a)	Reinforced cement concrete for Raft Slab / Raft Beam	(9.1) Check for proper mix of concrete					
		(9.2) Check for proper vibration and design dimensions					
		(9.3) Check for finished level of concrete.					
		(9.4) Check for curing.					
		(9.5) Casting of concrete cubes					
		(9.6) Ensure cube test on 28th Day					

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(b)	Reinforced cement concrete for Grade Beam	(9.1) Check for proper mix of concrete						
		(9.2) Check for proper vibration and design dimensions						
		(9.3) Check for finished level of concrete.						
		(9.4) Check for curing.						
		(9.5) Casting of concrete cubes						
		(9.6) Ensure cube test on 28th Day						
(c)	Reinforced cement concrete for Plinth Beam	(9.1) Check for proper mix of concrete						
		(9.2) Check for proper vibration and design dimensions						
		(9.3) Check for finished level of concrete.						
		(9.4) Check for curing.						
		(9.5) Casting of concrete cubes						
		(9.6) Ensure cube test on 28th Day						
(d)	Reinforced cement concrete for Columns	(9.1) Check for proper mix of concrete						
		(9.2) Check for proper vibration and design dimensions						
		(9.3) Check for finished level of concrete.						
		(9.4) Check for curing.						
		(9.5) Casting of concrete cubes						
		(9.6) Ensure cube test on 28th Day						

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
(e)	Reinforced cement concrete for Lintel / Sunshade	(9.1) Check for proper mix of concrete						
		(9.2) Check for proper vibration and design dimensions						
		(9.3) Check for finished level of concrete.						
		(9.4) Check for curing.						
		(9.5) Casting of concrete cubes						
		(9.6) Ensure cube test on 28th Day						
(f)	Reinforced cement concrete for Floor / Roof Slab & Beam	(9.1) Check for proper mix of concrete						
		(9.2) Check for proper vibration and design dimensions						
		(9.3) Check for finished level of concrete.						
		(9.4) Check for curing.						
		(9.5) Casting of concrete cubes						
		(9.6) Ensure cube test on 28th Day						
10	Weathering course & pressed tiles	(10.1) Ensure proper size of Brick jelly.						
		(10.2) Ensure Fresh Lime is supplied and test for Hydraulically pressed tiles carried out.						
		(10.3) Ensure laying of weathering course to proper slope and thickness.						
		(10.4) Ensure proper soaking of pressed tiles.						
		(10.5) Monitor laying of pressed tiles with proper joints and pointing and to required slope.						

* Put 'Yes / No / NA' (Not applicable)

Sl. No	Item	Quality Indicators	Reference	Observations				
				Remarks *	Date	Sign of AE / JE	Sign of AEE	Sign of Inspecting Officer
11	Plastering	(11.1) Ensure fixing of thickness guides for level surface.						
		(11.2) Ensure proper mix of cement mortar						
		(11.3) Ensure verticality and smooth finish						
		(11.4) Check true edge for corners.						
		(11.5) Ensure proper curing.						
12	Cement Painting and painting	(12.1) Ensure proper surface preparation.						
		(12.2) Ensure usage of approved colour and Brand.						
		(12.3) Ensure proper application of paint for even and uniform finish.						

APPENDIX C
INSPECTION CHECKLIST FOR ENABLING WORK (General)

INSPECTION CHECKLIST FOR ENABLING WORK (General)

Items	Remarks
<ul style="list-style-type: none"> <input type="checkbox"/> Ensure site is free from all encumbrances <input type="checkbox"/> Ensure work front availability to the contractor <input type="checkbox"/> Establish survey control points and Bench marks <input type="checkbox"/> Ensure proper/adequate approach and exist routes for man and machineries / material with proper sign boards <input type="checkbox"/> Ensure proper protection/barricading for safety and security precautions are taken at work site to prevent any accident and the area is illuminated during night hours <input type="checkbox"/> Ensure availability of power and water for construction and drinking <input type="checkbox"/> Ensure timely availability of drawings to the contractor <input type="checkbox"/> Identify facility for storage and fabrication yard space for contractor site office <input type="checkbox"/> Coordinate with other departments, Borough Engineer, statutory authorities to ensure that there is no hold up in work due to them (like traffic diversion, power/water/sewer/telephone line diversions. Crossings <input type="checkbox"/> Taking prior approval from employer for the works beyond the scope of contract <input type="checkbox"/> To ensure that all deviations (technical) are recorded in a register and verified by the Engineer's representative. 	

INSPECTION CHECKLIST FOR HEALTH AND SAFETY CONTROL FOR CONTRACTORS

Items	Remarks
<ul style="list-style-type: none"> <input type="checkbox"/> To ensure compliance of safety rule and use of personal protective equipment contractor/sub-contractor personnel <input type="checkbox"/> To ensure safety awareness among contractor/sub-contractor personnel including supervisory staff <input type="checkbox"/> To ensure that sound engineering practices are being followed in the execution of work with due observance of Health and Safety procedure as per Safety Manual prepared by the contractor. 	

INSPECTION CHECKLIST FOR CONCRETING WORKS

Items	Remarks
<p><u>Proportioning, Batching and Mixing of Concrete</u></p> <ul style="list-style-type: none"> ❑ The materials and proportion of concrete materials as established by the preliminary test for mix design should be rigidly followed. ❑ Concrete should be produced only by weigh batching the aggregates. The accuracy of the weigh batcher should be periodically checked and the needle should be adjusted to zero when the hopper is empty. Only a mechanical mixer machine with a hopper arrangement should be allowed for mixing concrete. ❑ The quantity of water actually entering the mixing drum should be checked with the reading of the gauge or valve setting, when starting a job. The batch should be charged into the mixer so that some water enters the drum in advance of cement and aggregate. All water should be in the drum by end of the first 15 seconds of the specified mixing time. Each batch would be mixed until the concrete is uniform in color at least for a period of two minutes after all the materials and water are in the drum. <p><u>Placing of Concrete</u></p> <ul style="list-style-type: none"> ❑ Before any concrete is placed the entire placing program consisting of equipment, layout, number of labors engaged, proposed procedures and methods should be submitted to the Engineer for approval. The Engineer must satisfy himself that the arrangement for mixing and conveying concrete will ensure a nearly continuous flow of concrete during depositing, contractor's labor force won't be overworked affecting quality of work, sufficient overlap is allowed between concrete placing crews working at subsequent shifts, and sufficient lighting arrangements are made if concreting is allowed in the night. ❑ The Engineer must also satisfy himself that the concrete mix design is based on truly representative samples of aggregate and cement which will be actually used during concreting. While taking representative samples from different stacks of aggregates for checking of gradation and other tests a scoop or shovel with sides should be used so that the larger stones won't roll off the side. 	

- All structural elements should have sufficient cover, as specified in the contract, which should be ensured by using proper size cement mortar spacer blocks. The reinforcement fabrication should be finally checked. Before the concrete is actually placed in position, the inside of the formwork should be inspected to see that they have been cleaned and oiled. All reinforcement and other items to be cast in concrete should have clean surfaces. All reinforcement ensuring proper length and spacing between reinforcement bars, proper orientation (verticality/ horizontality) of reinforcement bars and stirrups and adequate provision of development length.
- Concrete must be placed in its final position before the cement reaches its initial set and concrete should normally be compacted in its final position within 30 minutes of leaving the mixer. Concrete should be deposited as nearly as practicable directly in its final position and should not be re handled or caused to flow in a manner which would cause segregation, loss of material or displacement of reinforcement. Concrete should be placed in the shuttering by shovels or other approved implements and should not be dropped for a free fall from a height more than 1.0 meter. When it is necessary to use transfer chutes the Engineer must satisfy himself in respect of type, length, slopes, baffles, vertical terminals and timing of operations. To allow for loss of mortar against the sides of the chute, the first mixes should have less coarse aggregates. Concrete should not be permitted to fall free from the end of the chute by more than 1.0m and chutes should have slopes not flatter than 1 vertical : 3 horizontal but not steeper than 1 vertical : 2 horizontal.
- Concrete once started, should be continuous until the pour is completed and would be placed in successive horizontal layers of uniform thickness preferably ranging from 15 to 90 cm. Concrete should be placed as rapidly as practicable to prevent the formation of cold joints between each succeeding layer. The top surface of each pour and the bedding layer should be approximately horizontal.
- Concrete should be compacted during placing with approved vibrating equipment and consolidated to maximum practicable density, free of pockets of coarse aggregate, should fit tightly against all form surfaces, reinforcements and embedded fixtures. Caution should be exercised not to over vibrate the

concrete to the point of segregation. Tapping or external vibration of forms by hand tool or immersion vibrator must not be permitted and care should be taken to prevent contact of immersion vibrators with reinforcing steel or forms of finished surfaces.

- Concrete should be placed without interruption until completion of part of the work between predetermined construction joints. If stopping of concrete becomes unavoidable anywhere, a properly formed construction joint shall be made where the work is stopped. Joints should be either vertical or horizontal. For inclined or curved member the joint should be at right angles to the axis of the member. The construction joint surface should be roughened, thoroughly cleaned and treated with a thin layer of cement grout before resumption of concreting. Except when placing with slip forms, each placement of concrete in multiple lift work, should be allowed to set for at least 24 hours before the start of a subsequent placement.

Curing & Protection of Concrete

- During Curing of concrete preference should be given to use of continuous spray, or ponded water, continuously saturated covering of sacking, canvas, hessian or other absorbent material, or approved effective curing compounds applied with spraying equipment capable of producing a smooth even-textured coat.
- Fresh concrete should be kept continuously wet for a minimum period of 10 days from the date of placing of concrete, following a lapse of 12-14 hours after laying concrete. However, curing of horizontal surface exposed to dry wind should begin immediately after the concrete has hardened. Water should be applied to formed surfaces immediately upon removal of forms. Immediately after the shuttering is removed, the Engineer should very carefully go over the entire surface of the concrete. Holes left by form bolts etc. should be filled up and made good with mortar composed of one part of cement and one and half parts of sand passing 2.36 mm IS sieve. Superficially honeycombed surface and rough patches should be similarly made good immediately after removal of shuttering and superficial water and air holes should be filled in. The mortar should be well worked into the surface with a wooden

<p>float and the surface irregularities should be removed by grinding.</p> <ul style="list-style-type: none"> □ If reinforcement is exposed or honey combing occurs at vulnerable positions e.g. ends of beams or columns it may be necessary to cut the member partially or completely and reconstruct. The Engineer's decision shall be final in this regard. If only patching is necessary, the defective concrete should be cut till solid concrete is reached (or to a minimum depth of 25 mm) the edges being cut perpendicular to the affected surface or with a small undercut if possible. Anchors, tees or dovetail slots should also be provided wherever necessary to attach the new concrete securely in place. 	
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INSPECTION CHECKLIST FOR BRICK MASONRY WORK

<u>Items</u>	<u>Remarks</u>
<ul style="list-style-type: none"> □ The type of masonry used for structural works should be coursed with proper jointing in layers.. □ bricks should be sufficiently wetted before laying to prevent absorption of water from mortar. □ The courses of masonry should be of same height. The practice of placing loose mortar on the course and then pouring water from top must not be allowed. □ The bed which is to receive the brick should be cleaned, wetted and covered with a layer of fresh mortar. All bricks should be laid full in mortar and in vertical and horizontal joints of uniform thickness. □ All vertical joints should be truly vertical. Vertical joints should be staggered. The Frog should be laid upward. 	

INSPECTION CHECKLIST FOR BRICKWORK AND FINISHES

Items	Remarks
<ul style="list-style-type: none"> ❑ A representative sample of bricks to be sent for testing of compressive strength, water absorption etc. should not be less than twenty bricks. These bricks must be selected at random from the particular batch. For example, if there are ten stacks of bricks, two bricks should be chosen from each stack and these must be taken from different positions in each stack. ❑ All Bricks should be thoroughly soaked in a tank filled with water for a minimum period of one hour (preferably for 24 hours) prior to being laid. However, at the time of laying, bricks should be skin dry and clean. ❑ Mortar should be mixed in the specified proportion only in such quantity as required for immediate use. Initial setting of mortar with Ordinary Portland Cement is normally considered to have taken place in 30 minutes and mortar unused for more than 30 minutes shall be rejected and removed from site of work. ❑ All Brickwork should be laid in English Bond and bricks should be laid with frogs up on a full bed of mortar. Thickness of mortar joints should not exceed 10 mm. ❑ Before laying bricks in foundation, the foundation slab should be thoroughly hacked, swept clean and wetted and a mortar layer not less than 12 mm thick should be spread on the surface of the foundation slab. ❑ When fresh masonry is to join partially/entirely set old masonry, the exposed / jointing surface of the set masonry should be cleaned, roughened and wetted to effect the best possible bonding. ❑ Brickwork should be cured keeping constantly moist on all faces for a minimum period of seven days and green work should be protected from rain by suitable covering. ❑ The surface of brickwork, which is to be subsequently plastered or painted, should be squarely raked out to a depth of 15 mm when the mortar is still green. ❑ Plastering should be started from top and worked down. The plastering surface should be finished off with a plasterer's 	

<p>wooden float. Metal floats shall not be used.</p> <ul style="list-style-type: none"> ❑ Curing for finishes should be commenced as soon as the mortar used for finishing has hardened sufficiently, not to be damaged during curing. The finishes should be kept moist for a period of at least 14 days. 	
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INSPECTION CHECKLIST FOR BUILDING SERVICES AND FINISHES

Items	Remarks
<ul style="list-style-type: none"> ❑ Building services and finishes work shall be closely coordinated and be undertaken in the appropriate sequence. ❑ Building service requirements including water supply pipes and fittings, sanitary fittings and appliances, electrical installation, doors and windows and ventilators etc. shall be inspected for conformance with applicable codes and specifications. ❑ All brickwork in the building will be finished with plastering whereas all stone masonry work will be finished with pointing, if not otherwise specified in the contract. Where plastering work is required, as part of the finishing work, all service lines, conduits, pipes, clamps, door and window frames and all required inserts must be in position before the plastering begins. The plastering shall be always started from the top and worked down. For purpose of giving a smooth finish to the plastering work a plasterer's wooden float should be used and no metal float should be allowed to use. Where pointing is required, the pointing will be done to give the surface an acceptable architectural look. For pointing work, the joints will be raked to a depth of 40 mm and then mortar will be placed in the joints up to a depth of 25 mm by using a trowel. ❑ Painting must be carried out in conformance with specifications. The painting materials and surface preparation must be checked prior to painting. ❑ For all finishes e.g. plastering, pointing, painting or whitewashing the contractor will first prepare a sample area and on approval of the quality of finish in the sample area, the contractor will be allowed to apply all over the building. ❑ Flooring and roofing work shall be undertaken as required by the specifications. 	

INSPECTION CHECKLIST FOR ROAD WORKS

Items	Remarks
<ul style="list-style-type: none"> ❑ The Engineer must check all layout and staking completed by the contractor before starting roadwork and must confirm checking at regular intervals and at completion of the work to ensure that all work conforms to plans and specifications. ❑ A careful and thorough check must be made of all subgrade areas where road materials are to be placed. No road material should be allowed to be placed unless the Engineer has visibly checked and approved the areas and has verified the quality of subgrade preparation by testing procedures as provided in the contract document and elsewhere in this document. ❑ If a question arises as to the suitability of any of the materials in meeting the specifications, the Contractor shall be responsible to provide further field and laboratory testing as may be required and requested by the field engineer. ❑ The base on which bituminous layer is to be laid, should be thoroughly swept clean, free from dust and foreign matter using mechanical broom and dust removed or blown off by compressed air. ❑ A priming coat, wherever needed, followed by a layer of tack coat shall be applied on the base before receiving the bituminous layer. A properly calibrated Bitumen Distributor Tanker having sprayer with self heating arrangement should be used for laying tack coat / prime coat. ❑ For bituminous construction, mixing of aggregate and binder should be thorough to ensure that a homogeneous mixture is obtained in which all particles of the aggregate are coated thoroughly and uniformly 	

INSPECTION CHECKLIST FOR PIPELINE WORKS

Items	Remarks
<ul style="list-style-type: none"> ❑ The engineer should ensure that all required specials, valves and pipes with jointing material duly tested are available before planning for excavation of trenches. No gaps are to be permitted with laying pipes. ❑ The engineer should also review the proposed alignment and grades and site. The pipe line should use appropriate special whenever any change in alignment and grade is required. ❑ The trench should be kept clean and dry before lowering the pipes in the trench. If subsoil water is met with during excavation contractor would provide necessary equipment and laborers for dewatering the trenches. ❑ Over excavation in regard to depth and top width of trench should not be allowed in any case. If the depth of trench is over excavated than required, contractor at his own cost will refill with gravel up to the required depth and properly compact it. ❑ The pipes should be thoroughly investigated for any defects before lowering in the trench. ❑ During jointing of pipe special care should be taken ❑ For water distribution network, water pipes, fittings and connections must be carefully inspected during placement and verified as to compliance ❑ Testing of water system must be carried out in the presence of the field engineer and the entire testing procedure must be carefully checked including performing leakage testing which must meet standards as included in the specification. ❑ The alignment and grade of all pipe, especially the gravity flow sewer pipes should be thoroughly checked by the Engineer. The Engineer must ensure that the pipes have been laid as per the design gradient and should also ensure that the minimum gradient has been achieved in all sections of sewer line. ❑ The pipe section completed and tested is best preserved by keeping them full of water till commissioning. 	

INSPECTION CHECK LIST FOR SEWERAGE AND DRAINAGE WORKS

Items	Remarks
<ul style="list-style-type: none"> <input type="checkbox"/> Availability of equipment and machinery at site <input type="checkbox"/> Ensure proper alignment, depth, gradient, bedding, compaction etc. <input type="checkbox"/> Joints of pipes, pipe size, pipe type, type of bedding, saddles (chair) arrangements <input type="checkbox"/> Locations and size of Manholes, Gully pits, inspection chambers <input type="checkbox"/> Excavation work, shape, size of trenches, safety measures, refilling and reinstatement of road <input type="checkbox"/> Crossing of roads, lanes, existing pipe line/sewer mains, electric and telephone cables <input type="checkbox"/> Construction of manholes, cu-nets, footsteps, gully pits, connecting chambers, <input type="checkbox"/> Hydraulic testing of sewer pipes, permissible leakages from joint and remedial measures in case of leakages beyond permissible limits or any other tests called for in the technical specifications 	

INSPECTION CHECK LIST FOR ELECTRICALWORKS

Items	Remarks
<ul style="list-style-type: none"> <input type="checkbox"/> Control and interlock checks <input type="checkbox"/> Settings of equipment and accessories <input type="checkbox"/> Checking of accuracy/error <input type="checkbox"/> Checking of operating characteristics, pick-up voltages and currents,etc. <input type="checkbox"/> Operational and functional tests on equipment, accessories, etc. <input type="checkbox"/> Complete commissioning checks of the system including any other tests required to be conducted to satisfy the statutory Authorities concerned. 	

Instrumentation & Control System

The following dry tests shall be carried out on the instrumentation & control system.

- Continuity check on all signal/ control/power supply cables.
- Check instrument loop integrity, functionality and calibration; A written report on each instrument in the format required by the Engineer/ Purchaser shall be provided certifying that the instruments have been calibrated to publish specified accuracy.
- Check functionality of the instrument control panels/consoles

APPENDIX D

DOCUMENTATION FORMATS

SI No	Document Type	Responsibility	Format No.
1.	Conformance/Non-Conformance Report	Issued by PIU	F-1
2.	Test Report Log	Maintained by Contractor	F-2
3.	Material Register	Maintained by Contractor	F-3
4.	Daily Work Record/Site Order Book	Maintained by Contractor	F-4
5.	Minutes of Progress Review Meeting	Prepared by PIU	F-5
6.	Interim Evaluation of Contractor Performance	Prepared by PIU	F-6
7.	Quality Certification and Acceptance	Prepared by PIU	F-7
8.	Drawing Release Note (DRN)	Prepared by PIU	F-8
9.	Variation Order	Prepared by PIU/PMU	F-9
10.	Monthly Physical Progress Report	Prepared by Contractor with the help of PIU	F-10
11.	Handing Over Certificate & Taking Over Certificate	Prepared by PIU	F - 11

Format F-1 : CONFORMANCE\NON-CONFORMANCE REPORT (CNC)

Date: _____

Ref:

To

[Contractor]

Package No. : _____ Contract No.: _____

Title of works : _____

Ref: Your letter _____ dated _____.

Based on the review of the submitted test reports, as mentioned in the table below, our comments and instructions are mentioned herein for your suitable action.

Test Report No.	Date	Test Laboratory	Material	Comments <i>(Conforms/ Does not conform. See instructions below)</i>

Instructions (Actions to be taken by Contractor): ____

[PIU]

Format F-2 :TEST REPORT LOG

Contract Package No : _____

Title of Work :

Contract No : _____

Contractor :

Date of Sample	Lab Name	Material / Process	Test Report No	Date of TR	CNC Report No	Date	Conformance / Non-Conformance	Action to be taken by contractor	Consultant Sign	Inspecting Authority Sign

Format F-3 : MATERIAL REGISTER

Contract Package No : _____

Title of work : _____

Contract No : _____

Contractor : _____

Name of Material : _____

Unit of Measure : MT/Bags/Durms/M³/M²

Inward Date	Inward No	Source of Supply	Quantity	Test Report No	CNC Report No	Date of Issue	Quantity Issued	Quantity Balance	Consultant Sign	Inspecting Authority Sign
Cumulative Inward including this _____										
Cumulative Inward including this _____										

Signature of Contractor

Verified by PIU's representative

WORK IN PROGRESS (Describe):			
Signature			
[Contractor]			

...continued page 2

Format F- 5 : MINUTES OF PROGRESS REVIEW MEETING

Meeting Conducted on: _____ Previous Meeting on:

Contract No.	:	_____
Name of the Works	:	_____
Contract Amount	:	_____
Name of Contractor	:	_____

Notice to Proceed	:	_____
Contract Duration	:	_____
Completion Date	:	_____

Elapsed Time: ____mos. ____%

Scheduled Work Completion: __% Actual Work Completed: ____%

Compliance with commitments made during last review meeting

Sl.	COMMITMENTS BY CONTRACTOR / PIU DURING LAST REVIEW MEETING	WHETHER COMPLIED	IF NOT, WHY & WHEN WILL BE COMPLIED

Format F-5

(continued)

Meeting Conducted on: _____

Contract No.	:	_____
Name of the Works	:	_____

Review of Progress, Quality and Coordination during this Period

Sl. No.	PROBLEMS, ISSUES, ACTIONS TO BE TAKEN	ACTION BY	DUE DATE

Format F-5

(continued)

Meeting Conducted on: _____

Contract No.	:	_____
Name of the Works	:	_____

Any Other Business / General Comments:

[Affix dated signatures]

[Contractor]

PIU's Representative

[Engineer]

[Visiting Officer (PMU/PIU)]

Format F- 6 : INTERIM EVALUATION OF CONTRACTOR PERFORMANCE

Evaluation Conducted on _____ : _____
 Previous Evaluation: _____
 Contract No. : _____
 Name of the Works : _____
 Contract Amount : _____
 Name of Contractor : _____
 Notice to Proceed : _____ Work Started on: _____
 Scheduled Completion Date : _____

Elapsed Time: _____ mos. _____ % Work Completed: _____ %

Factors to be considered in evaluation: **Contractor's Performance this**
Period

		<u>Good</u>	<u>Satisfactory</u>
<u>Poor</u>			
Progress of the Works this Period	:		Compliance with
Engineers instructions	:		Quality of
Contractor's supervision	:	_____	_____
Quality of materials supplied	:	- - -	- - -
Storage and handling of materials	:	_____	_____
Quality of workmanship	:		Provision of
adequate and skilled labor	:		Provision of
adequate materials in time	:		Provision of
adequate construction equipment	:		Provision of
necessary testing equipment	:		Provision of
signboard	:	_____	_____
Site conditions/maintenance of site	:	_____	_____
Site safety and public convenience	:		Cooperation for
inspection and measurement	:	_____	_____
CONTRACTOR'S PERFORMANCE THIS PERIOD:		_____	_____

The performance of the Contractor at the date of this review has IMPROVED/
REMAINED THE SAME/ DETERIORATED *[delete non-applicable*
sections] since the last evaluation. The above notwithstanding, the overall
performance of the Contractor is judged to be GOOD/ SATISFACTORY/
POOR *[delete non-applicable sections]* up to this date.

It is hereby agreed that improvements in any deficient areas indicated above and/or as detailed on the attached list are to be immediately taken up by the Contractor, and that the Contractor's performance is to be brought up to an acceptable standard by _____ [date]. A further review of the Contractor's performance will be conducted on _____ [date], and actions will be taken as per contract in case the deficiencies have not been satisfactorily rectified.

[Affix dated signatures]

[Contractor]

PIU's Representative

[Engineer]

[Visiting Officer (PMU/PIU)]

Format F- 7

PARTICULARS OF CONTRACT

Name of Works : _____

Contract No. : _____

Contractor : _____

R.A. Bill No./Date : _____

_____ **Period Covered** : _____ to _____

QUALITY CERTIFICATE

This is to certify that we have inspected the conduct of the works in accordance with the established Quality Control procedures and that the items included in this Interim Payment Certificate satisfy the required quality of works and are acceptable with regard to the specifications and standards as proscribed under the Contract.

Signature/Date:

[Design & Supervision Consultant]

ACCEPTANCE NOTE

This is to certify we accept the Consultant's Quality Certificate.

Signature/Date:

[Engineer]

Format F- 8

DRAWING RELEASE NOTE (DRN)

Ref:

Date:

To

Borough No:

Contract No:

Title of works:

Please find enclosed two (2) copies each of the following working drawings. With these you are requested to proceed with the preparation of construction drawings and submit four (4) sets of each such construction drawing for our approval.

DRAWING TITLE

DRAWING NO.

**REVISION
NO.**

DATE

[Engineer]

ACKNOWLEDGEMENT COPY

Receipt Date:

To
Engineer

Ref: DRN/

Date:

Borough No:

Contract No:

Title of works:

Received your above referred DRN along with enclosures.

[Contractor]

.....

-

Time for Completion	Original..... months
	Prior to this change months
	Change in this order months
	Final time for completion months

Signatures

[PIU]

[PMU]

Format F- 10

PHYSICAL PROGRESS REPORT FOR THE MONTH OF.....

Report Date
 Package
 Name Lot:
 (Description)
 Contact No.
 Contractor
 Commencement Date (As per
 contract) Completion Date (As
 per Contract)
 Duration of Contract in Days (As per
 contract)
 Contract Price:
 Rs. Cumulative
 Target
 Cumulative
 Acheieved Total

Date
 Descripti
 on
 Unit No. Description Location Description

Time Elapsed

Sl. No.	Bill of Quantity Items (Group by Major Items in BOQ)	Quanti ty	Unit	Weight	Planned Commencement Dat	Planned Completion Date	Target upto Last Month	Achieved upto Last Month	Target this Month	Achieved this Month	Cumulative Target	Cumulative Achieved	Cumulative Achieved (%)	Short Fall / Surplus	Time Elapsed (%)	Target for the Next Month
1																
2																
3																
4																
5																
6																
7																
8																
	GRAND TOTAL															

Note: Contactor to fill up the major items of bill of quantities after discussion with the Engineer

Format F – 11 : HANDING OVER CERTIFICATE

Name of Work :

Package No. :

Contract No. :

Contract Price (Rs.) :

Actual Price of works completed (Rs.) :

1. It is hereby certified that the works have been completed and passed the tests on completion. The completed works are listed in Appendix to Appendix with as built drawing and attached with this certificate. Some minor outstanding works and defects as listed in Appendix which shall substantially affect the use of works for the intended purpose. The works were carried out by M/s as Contractor under Contract Agreement no. and the works were accordingly taken over by the Employer with effect from (taking overdate).
2. As per conditions of Contract the defect liability period started from this period shall expire on
3. The items / works specified in Appendix remain to be completed or corrected. The

Contractor is instructed to complete or correct the same by (Date).

Signed by Engineer

Signed by Contractor

.....

.....

Date

Date

Taken over on behalf of Employer

.....

Date

Appendixes :

1. Final inspection report for substantial completion
2. As built drawings (..... Nos.)
3. Test Reports
4. List of defects to be set right
5. Annexure to Handing over certificate with cost break up

ANNEXURE TO HAND OVER CERTIFICATE No. Dated

1. **Work Package No. :** **Contractor :**

2. **Description of Work Package :** **Address :**

3. **Contract No. :**

4. **Dates of Final Inspection :**

5. **Inspection done by :** **Sub**
Contractor :
Address :

Sl.	Name	Designation
1.		
2.		
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TAMIL NADU URBAN HABITAT DEVELOPMENT BOARD

**Project Name: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector
Project.**

BIDDING DOCUMENT For Procurement of works for

**Construction of 520 (G+3) tenements including Development
works at Pallipalayam scheme in Komarapalayam Taluk at
Namakkal District.**

**Under Open Competitive Bidding
(Following ADB's single stage two envelope bidding procedure)**

Part 1 – Technical Bid: Volume 3 – Drawings

Issued on: 02 March, 2024

Invitation for Bids No.: IRSHUPSP/NCB/04

OCB No.: IRSHUPSP/PAL/04

Employer: Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu

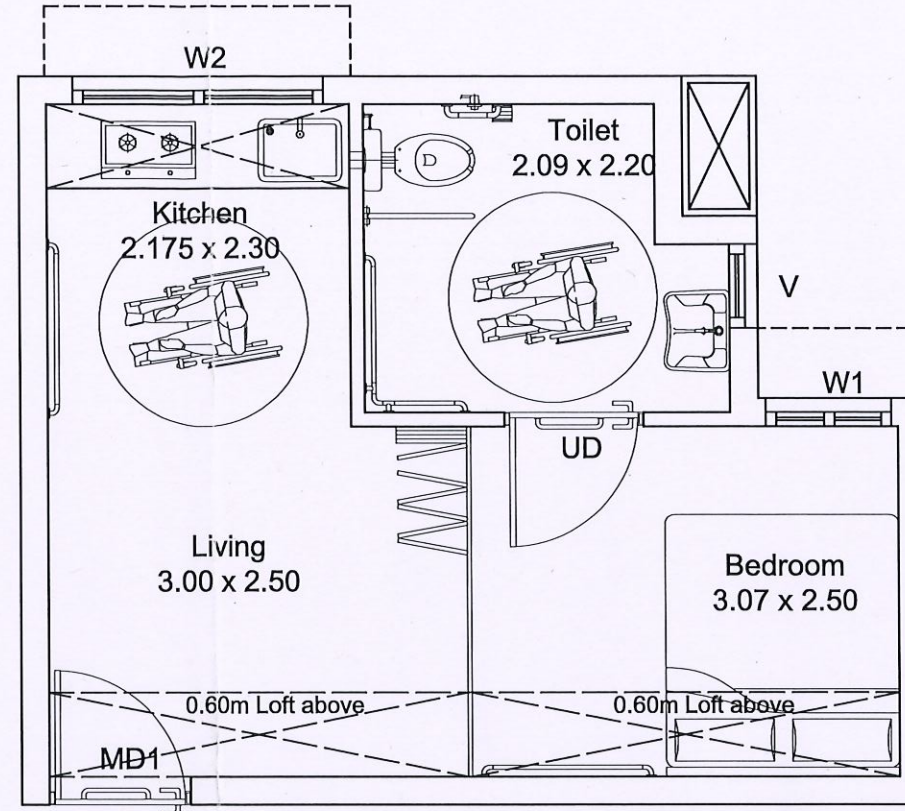
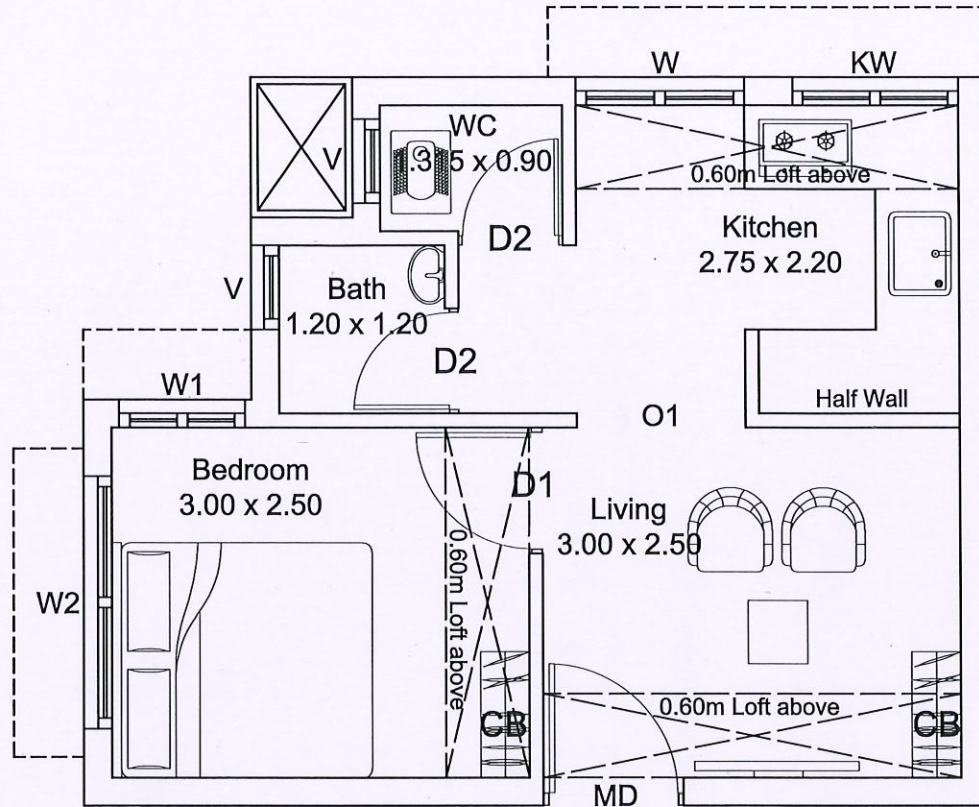
Country: India

Issued by Office of
Superintending Engineer, Project Monitoring Unit,
Inclusive, Resilient and Sustainable Housing for Urban Poor Sector
Project
Tamil Nadu Urban Habitat Development Board,
No.5, Kamarajar Salai, Chennai – 600 005,
Tamil Nadu, India.

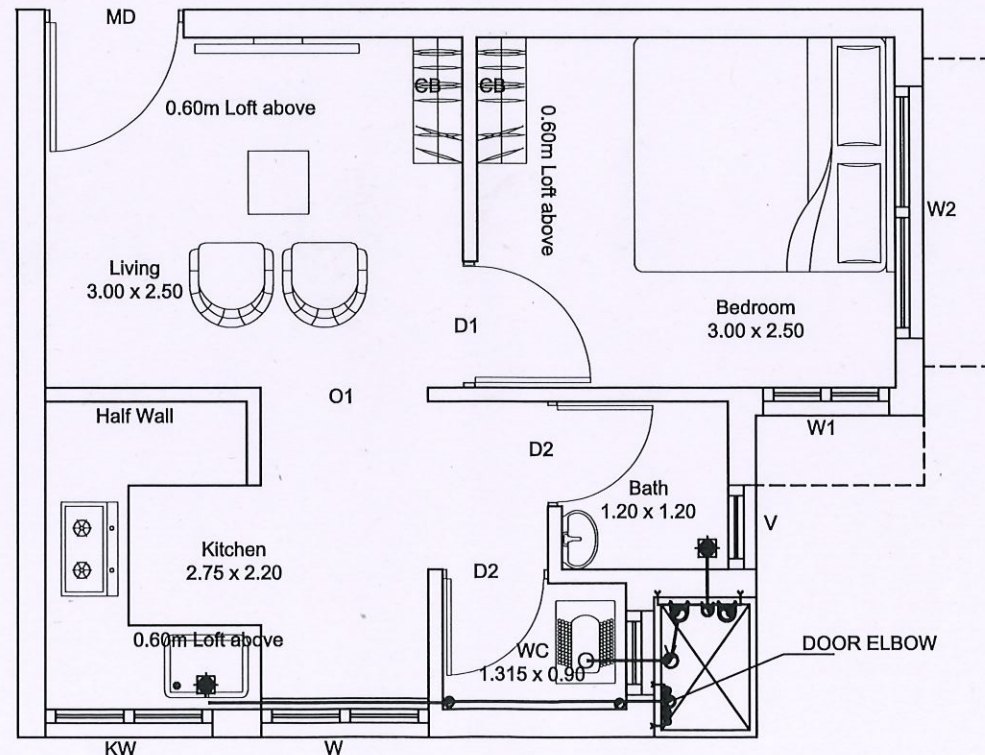
E-mail: tnuhdbprocurement@gmail.com

Normal Unit

PWD Unit



MEP- UNIT PLAN



NOTE: KITCHEN WASTE WATER OUTER BEND PIPE IS USED FOR DOOR ELBOW

- NOTE:**
- ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
 - FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

PROPOSED UNIT PLANS FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS

COMMON AREA / UNIT	- 6.68 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10

NO	DATE	REVISION	PREP.	CHKD.	DEALE.	APPD.
SCALE: PROJECT PALLIPALAYAM						
SIZE: DWG. TITLE UNIT PLAN						
DWG. NO: TNUHDB/PMU/PALLIPALAYAM / UNIT DESIGN						
FILE LOC: D-TNUHDB-PALLIPALAYAM - UNIT-PLAN						
PRPD.BY: A.JAGANNATHAN						
CKD.BY: V.HARISH						

<i>[Signature]</i> 09/12/24 TECHNICAL ASST.	<i>[Signature]</i> 9/12/24 TOWN PLANNING SPECIALISTS(TPS)
<i>[Signature]</i> 9/12/24 SENIOR PLANNER	<i>[Signature]</i> 10/22/24 SE (PMS) CHIEF ENGINEER

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

PROPOSED SITE PLAN FOR CONSTRUCTION OF (G+3) FLOORS 520 TENEMENTS IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK, NAMAKAL DISTRICT.

S.No	USE	AREA in sq.m	LAND in %	NOTATION
1.	Residential Area	8790.00	54.80 %	
2.	OSR Area	1613.04	10.05 %	
3.	Space reserved for Public Purpose	520.09	3.24 %	
4.	Space reserved for STP	486.49	3.03 %	
5.	Sump & Pump room Area	50.66	0.31 %	
6.	Road Area	2705.72	16.87 %	
7.	Pathway	903.57	5.63 %	
8.	Landscape/Greenbelt area	971.61	6.06 %	
TOTAL		16041.18	100.00 %	

AREA STATEMENT:

PLOT EXTENT (as per FMB)	- 16200.00 sq.m.
PLOT EXTENT (as per Site)	- 20710.896 sq.m.
PLOT EXTENT (Superimposed)	- 16041.18 sq.m.
DENSITY	- 324.20 units/Hect.
FLOOR SPACE INDEX (FSI) (EXCLUDING INFRA STRUCTURE)	- 1.183
FLOOR SPACE INDEX (FSI) (INCLUDING INFRA STRUCTURE)	- 1.219
PLOT COVERAGE	- 30.24 %

SOLAR CALCULATION DETAILS:

TOTAL No. OF TENEMENTS	: 520 Nos.
No. OF PERSONS / FAMILY	: 5.0 Persons.
TOTAL No. OF PERSONS	: 2600 Nos.
REQUIRED WATER FOR 1PERSON	: 75 Lit/Day
TOTAL WATER REQUIREMENT(2600 x 75)	: 1,95,000 Lit /Day
ONE SOLAR CAPACITY	: 3000 Lit
REQUIRED SOLAR (195000/3000)	: 65 Nos.

REFERENCE:

ADOPTED TYPE DESIGN NO	BLOCK-01	BLOCK-02	BLOCK-03	BLOCK-04	BLOCK-05	BLOCK-06	BLOCK-07	BLOCK-08
NO OF FLOORS	G+3	G+3	G+3	G+3	G+3	G+3	G+3	G+3
PLINTH AREA / UNIT	36.42 Sq.m	36.52 Sq.m	36.27 Sq.m	37.29 Sq.m	36.42 Sq.m	35.44 Sq.m	36.47 Sq.m	37.25 Sq.m
NO OF UNITS / BLOCKS	16 Nos.	17 Nos.	20 Nos.	16 Nos.	16 Nos.	12 Nos.	19 Nos.	14 Nos.
TOTAL NO. OF UNITS/ BLOCK	64 Nos.	68 Nos.	80 Nos.	64 Nos.	64 Nos.	48 Nos.	76 Nos.	56 Nos.
NO OF BLOCKS	01 No	01 No	01 No	01 No	01 No	01 No	01 No	01 No
TOTAL NO. OF UNITS	64 Nos.	68 Nos.	80 Nos.	64 Nos.	64 Nos.	48 Nos.	76 Nos.	56 Nos.

TOTAL NO. OF UNITS (64+68+80+64+64+48+76+56) = 520 Nos.

FLOORWISE AREA DETAILS IN SQ.MT.

FLOOR NAME	BLOCK 01	BLOCK 02	BLOCK 03	BLOCK 04	BLOCK 05	BLOCK 06	BLOCK 07	BLOCK 08
Ground floor	583.27	621.40	728.08	877.22	583.27	425.27	693.84	822.14
1st Floor	582.47	620.60	728.28	886.42	582.47	425.07	692.74	821.34
2nd Floor	582.47	620.60	728.28	886.42	582.47	425.07	692.74	821.34
3rd Floor	582.47	620.60	728.28	886.42	582.47	425.07	692.74	821.34
Total	2330.68	2483.20	2952.92	3536.48	2330.68	1700.48	2772.16	3286.16
Proposed Public Building (Plinth shop, Anganwadi, Convenience store, Inehood centre & library)	877.60							
Total FSI Area (2330.68 + 2483.20 + 2952.92 + 3536.48 + 2330.68 + 1700.48 + 2772.16 + 3286.16) + 877.60	19886.20							

OSR DETAILS:

LEAST PLOT EXTENT	- 16041.18 SQ.MT
OSR AREA	- 1613.04 SQ.MT (10% OF LEAST PLOT EXTENT)

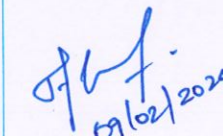
VEHICLE PARKING AREA DETAILS:

No. of Parking Required (520 x 53)	- 572 Nos.
No. of Parking Provided	- 572 Nos.
Parking lot size	- (1.0 x 1.80) m.
Area/Parking lot	- 1.80 sq.m.
TOTAL OF TWO WHEELER PARKING AREA (572 x 1.8)	- 1029.60 sq.m

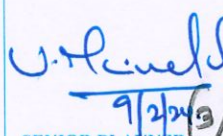
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01	24.03.2023	G+4 & G+5				

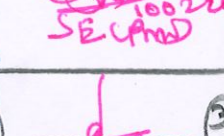
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ALL DIMENSIONS ARE IN METER.

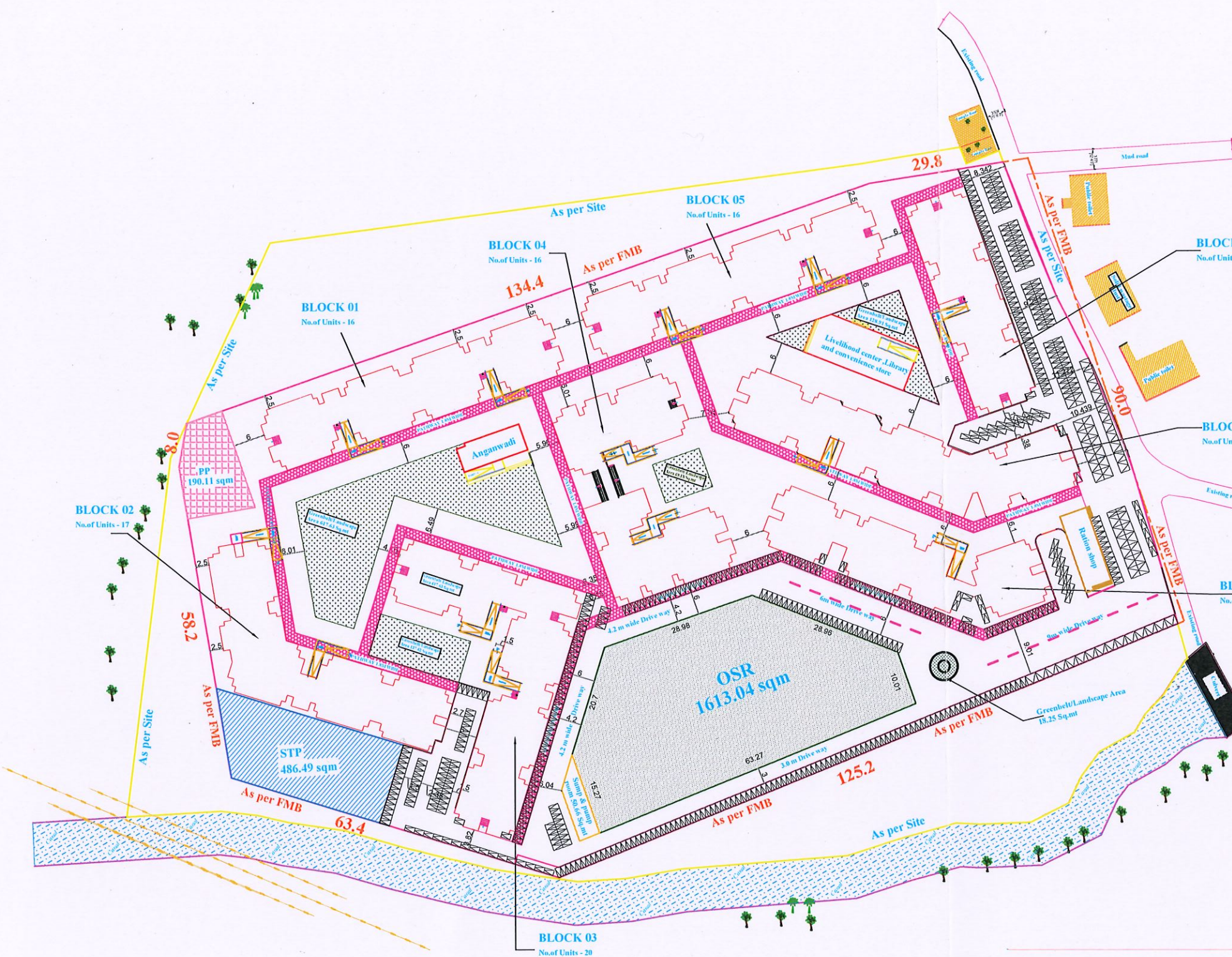
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SIZE A0	FILE LOC	F-RUBA-PALLIPALAYAM-ADIYANUTHU
DWG. NO	TNSCB/PMU/PALLIPALAYAM/SITE PLAN	REV. 00
DRAWN	M.THANGAMARIAPPAN	
CHECKED BY	V.HARISH	


 09/02/2024
 TECHNICAL ASST.


 09/02/2024
 TOWN PLANNING SPECIALISTS (TPS)


 09/02/2024
 SENIOR PLANNER


 09/02/2024
 CHIEF ENGINEER



T.D.NO.05,9/2023
BLOCK-01
G+3 FLOORS
(16 UNITS / FLOOR)
64 UNITS/BLOCK

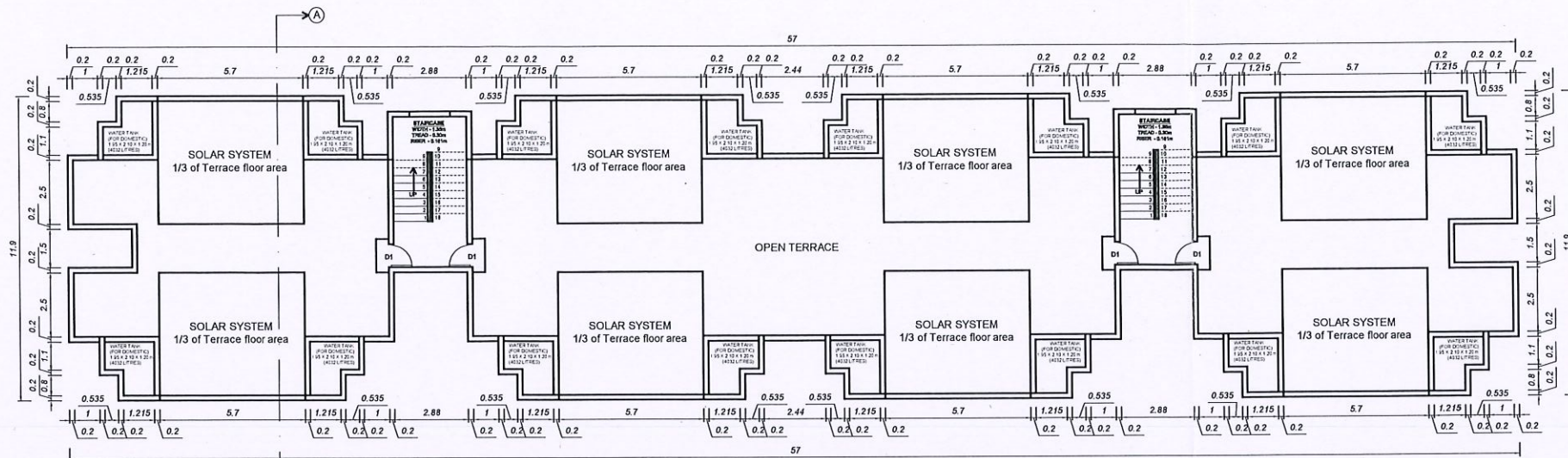
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

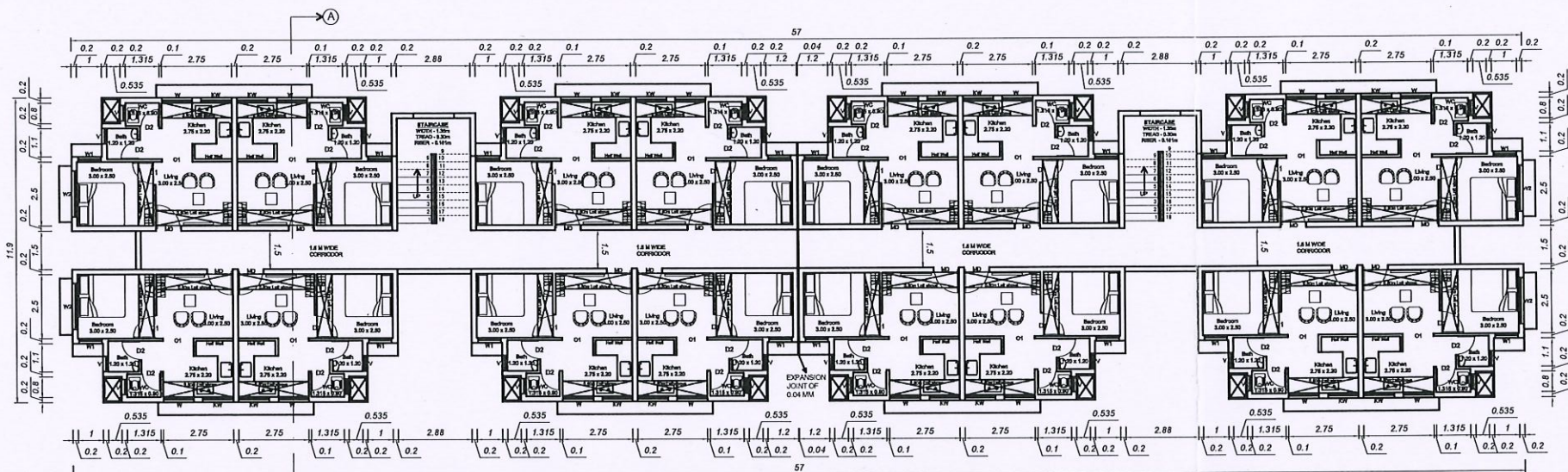
PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.42 SQ.M
COMMON AREA / UNIT	- 6.68 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.74 SQ.M

SCHEDULE OF JOINERIES

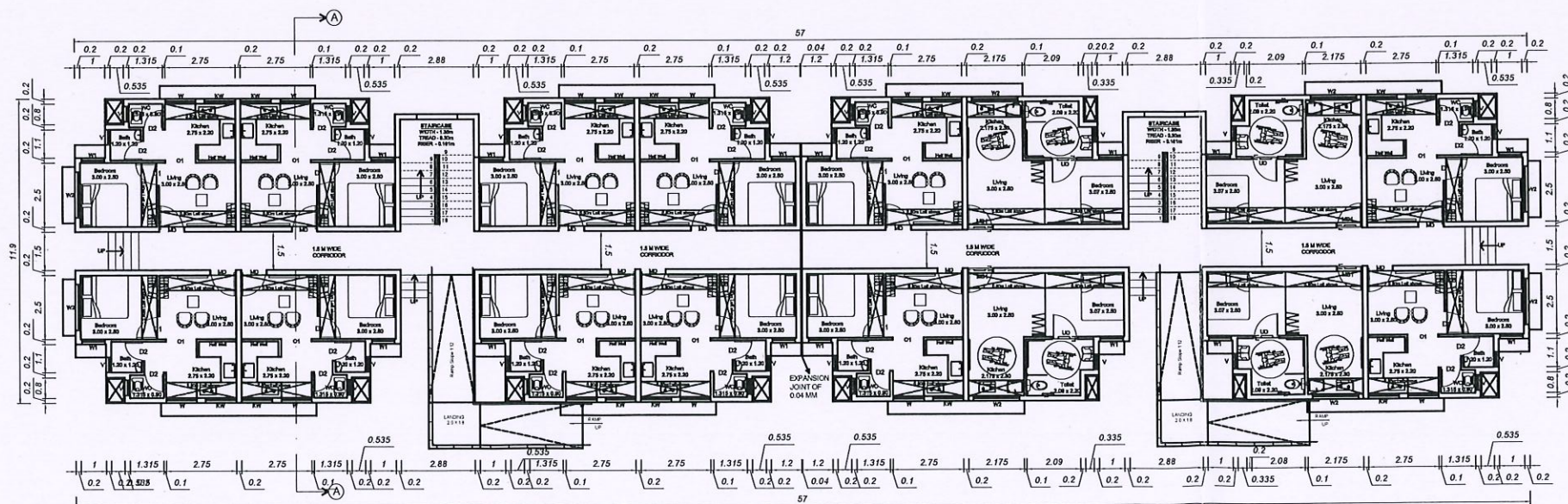
TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TERRACE FLOOR PLAN



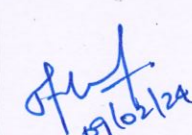
TYPICAL FLOOR PLAN 1st, 2nd & 3rd

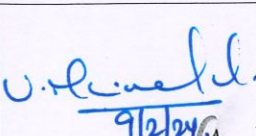


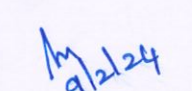
GROUND FLOOR PLAN

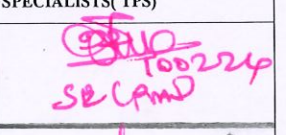
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 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALT.	APPD.
SCALE	PROJECT PALLIPALAYAM					
1:150						
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A0						
DWG. NO	TRUHHB/PMU/PALLIPALAYAM / TYPE DESIGN					REV. 00
FILE LOC	D-TRUHHB-PALLIPALAYAM - DESIGN-PLAN					
PRPD BY	AJAGANNATHAN					
CKD BY	V HARISH					

 9/16/24
 TECHNICAL ASST.

 9/24/24
 SENIOR PLANNER

 9/16/24
 TOWN PLANNING SPECIALISTS (TPS)

 10/22/24
 CHIEF ENGINEER

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.06/2023
BLOCK-02 G+3 FLOORS
(17 UNITS / FLOOR)
68 UNITS/BLOCK


PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

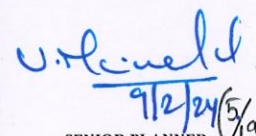
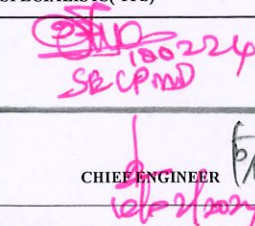
AREA DETAILS OF BLOCK 02:

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.52 SQ.M
COMMON AREA / UNIT	- 6.44 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 30.08 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10

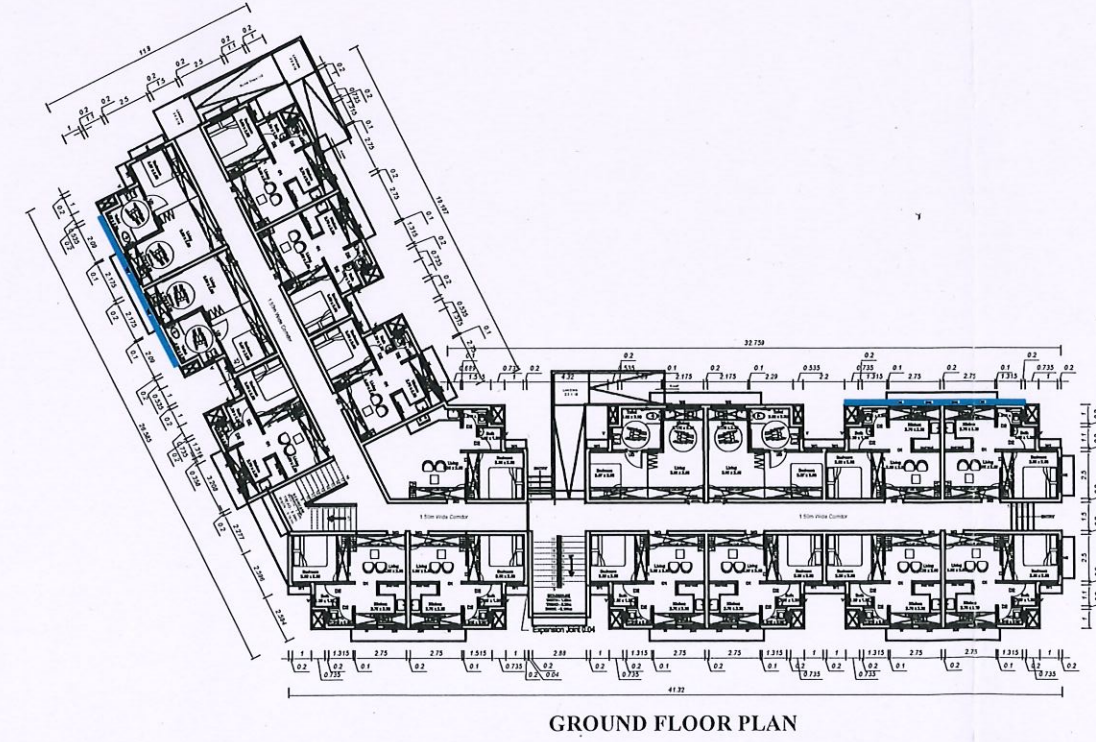
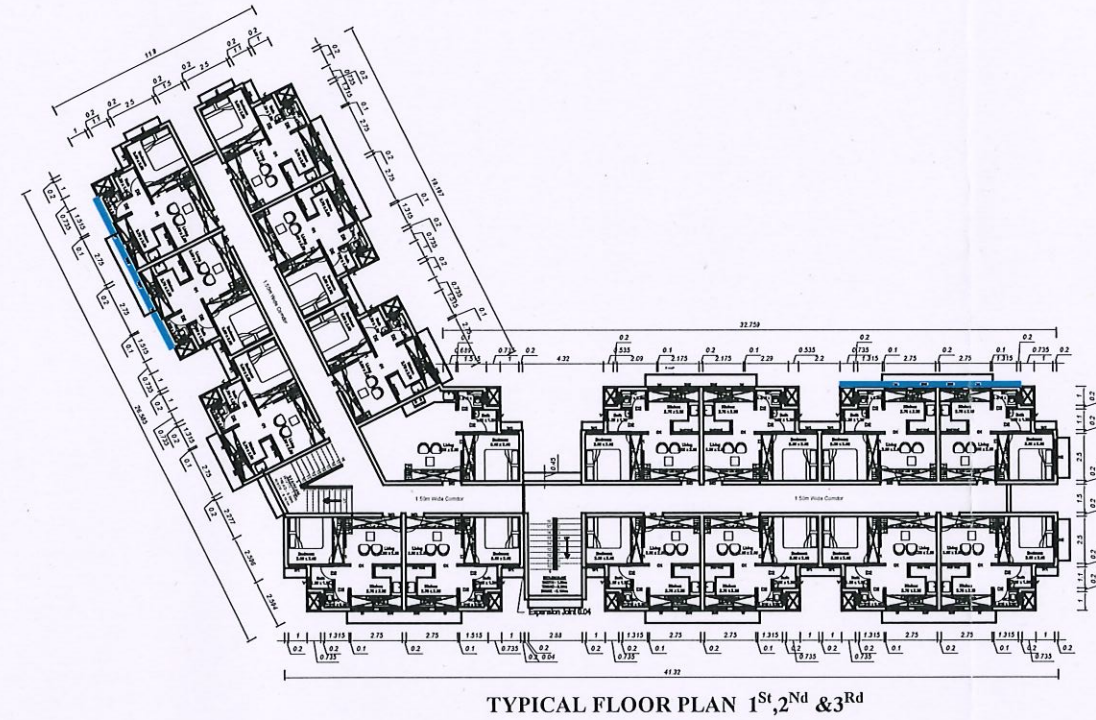
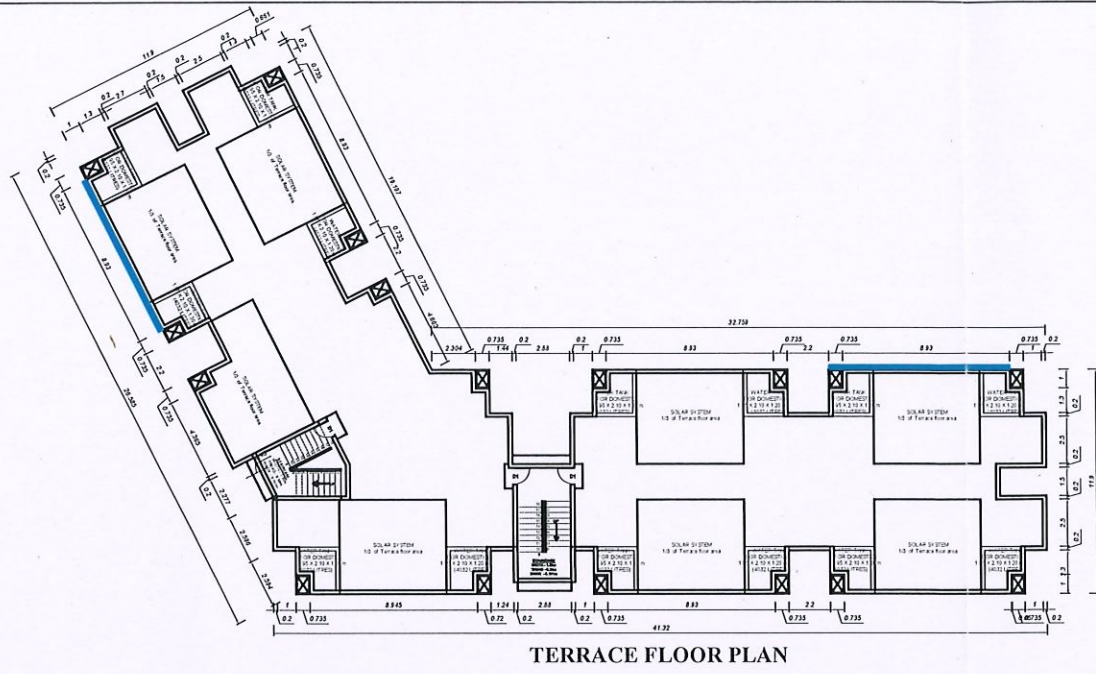
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DWG. NO		TNUHDB/PMU/PALLIPALAYAM/TYPE DESIGN				REV.	00
FILE LOC		D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD.BY		M.THANGAMARIAPPAN					
CKD.BY		V.HARISH					

 TECHNICAL ASST.	 TOWN PLANNING SPECIALISTS (TPS)
 SENIOR PLANNER (1/a)	 CHIEF ENGINEER (1/a)

NOTE:

- ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
- FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
- R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION



TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

PROPOSED TYPE DESIGN FOR CONSTRUCTION OF (G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

BLOCK-02 G+3 FLOORS
(17 UNITS / FLOOR)
68 UNITS/BLOCK

AREA DETAILS OF BLOCK 02:

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.52 SQ.M
COMMON AREA / UNIT	- 6.44 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 30.08 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.00
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10

NOTE:

- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- ACTUAL SHADES TO BE SPECIFIED AFTER TESTING.
- APART FROM INDICATED LOCATIONS, ALL OTHER WALLS TO BE PAINTED WHITE.
- COLORS SHOULD BE FINALIZED AFTER TESTING ON SITE AND OBTAINING APPROVAL FOR THE BOARD
- FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING .
- R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALT.	APPD.
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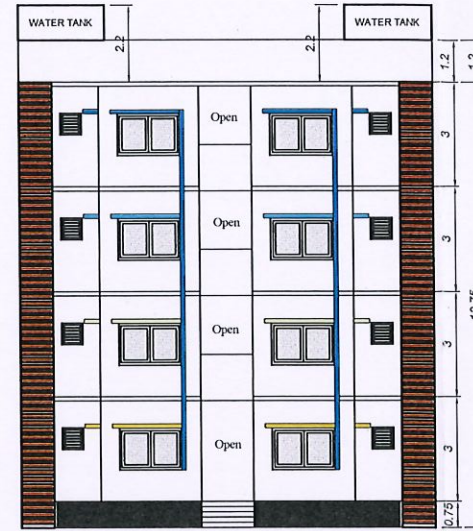
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PRPD.BY:	SABARAJITHAN	
SIZE:	DWG. TITLE:	BLOCK-02- ELEVATION DRAWING - A01 & D01
CKD.BY:	V.HARISH	
DWG. NO:	TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN	REV. 01

 TECHNICAL ASST.	 TOWN PLANNING SPECIALISTS (TPS)
 SENIOR PLANNER	 CHIEF ENGINEER

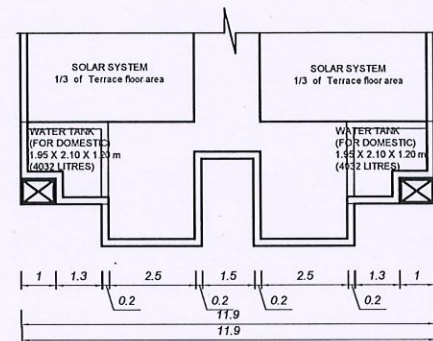
RELEASED FOR APPROVAL CONSTRUCTION INFORMATION



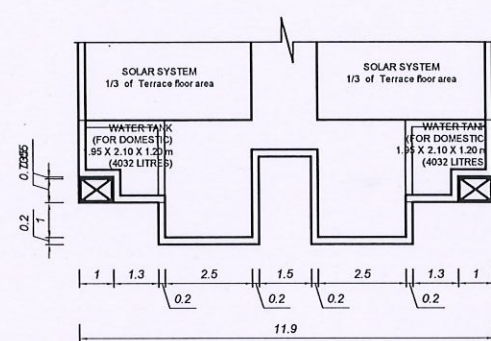
ELEVATION - A01



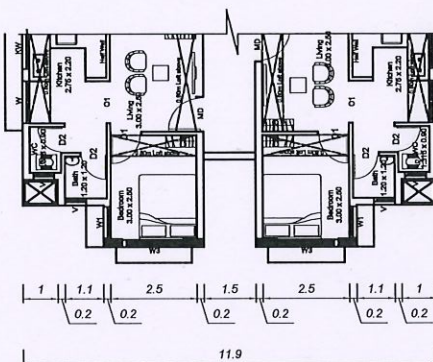
ELEVATION - D01



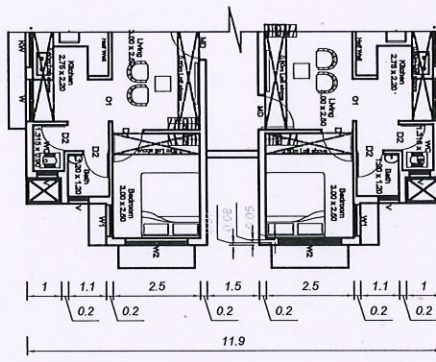
TERRACE FLOOR PLAN - ELEVATION - A01



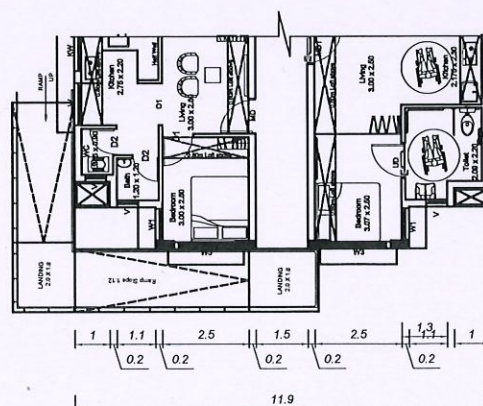
TERRACE FLOOR PLAN - ELEVATION - D01



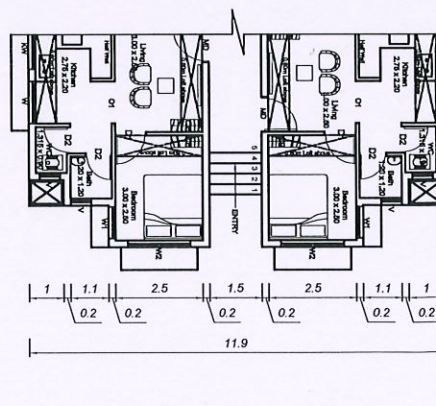
TYPICAL FLOOR PLAN (I, II & III) - ELEVATION - A01



TYPICAL FLOOR PLAN (I, II & III) - ELEVATION - D01



GROUND FLOOR PLAN - ELEVATION - A01



GROUND FLOOR PLAN - ELEVATION - D01

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

BLOCK-02 G+3 FLOORS (17 UNITS / FLOOR) 68 UNITS/BLOCK

AREA DETAILS OF BLOCK 02:

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.52 SQ.M
COMMON AREA / UNIT	- 6.44 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 30.08 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
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MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
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UD	SWING DOOR	1.00	2.10
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W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.00
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10

- NOTE:
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 - ACTUAL SHADES TO BE SPECIFIED AFTER TESTING.
 - APART FROM INDICATED LOCATIONS, ALL OTHER WALLS TO BE PAINTED WHITE.
 - COLORS SHOULD BE FINALIZED AFTER TESTING ON SITE AND OBTAINING APPROVAL FOR THE BOARD
 - FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

1	24/12/23	CHANGE IN PLINTH AREA AND PATTERN OF DEVELOPMENT	✓	✓	✓	✓
NO	DATE	REVISION	PROP.	CORR.	SCALE	APPR.

SCALE:	PROJECT	PALLIPALAYAM
SIZE:	DWG. TITLE	BLOCK-02- ELEVATION DRAWING -C01
DWG. NO:	TRU/HD/PMU/PALLIPALAYAM / TYPE DESIGN	REV. 01
PRPD BY:	A JAGANNATHAN	
CKD BY:	V.HARISH	

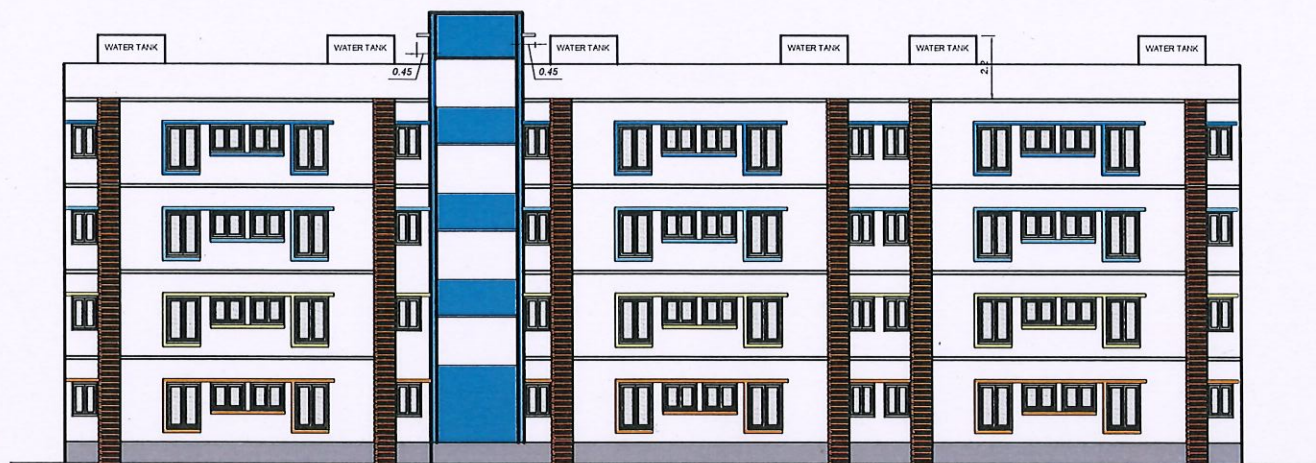
A. Jaganathan
TECHNICAL ASST.

V. Harish
SENIOR PLANNER

S. S. S. S.
TOWN PLANNING SPECIALISTS (TPS)

S. S. S. S.
CHIEF ENGINEER

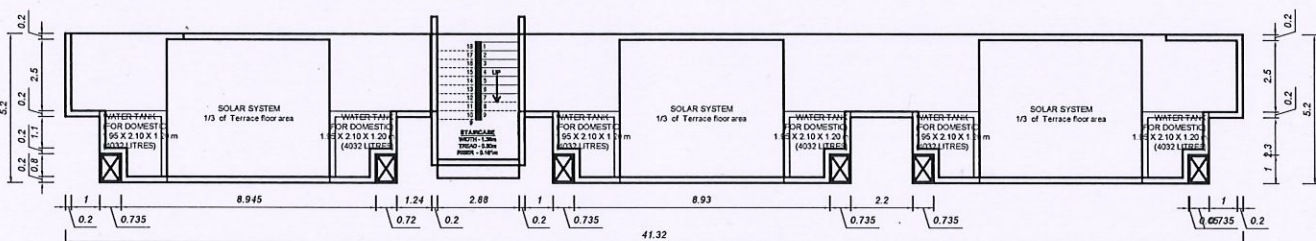
RELEASED FOR APPROVAL CONSTRUCTION INFORMATION



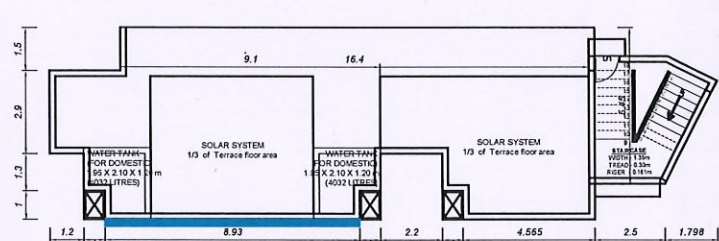
ELEVATION - C01



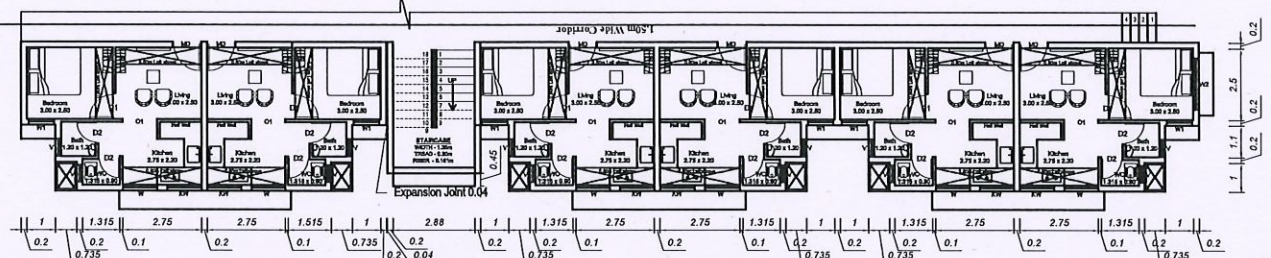
ELEVATION - B01



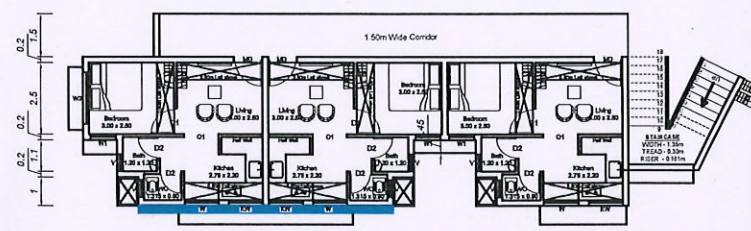
TERRACE FLOOR PLAN



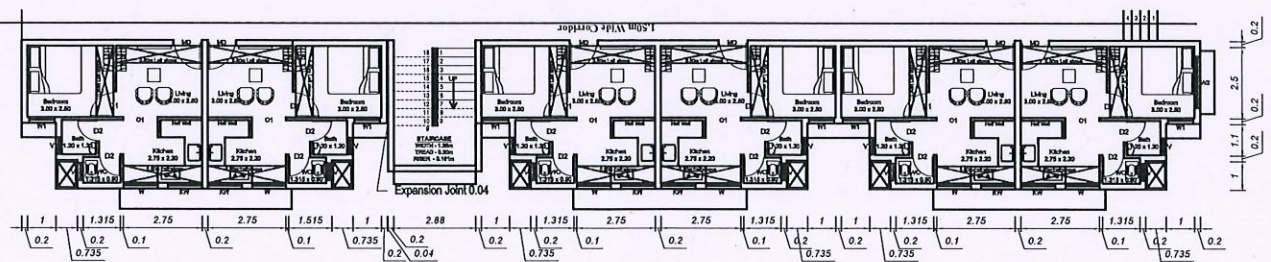
TERRACE FLOOR PLAN



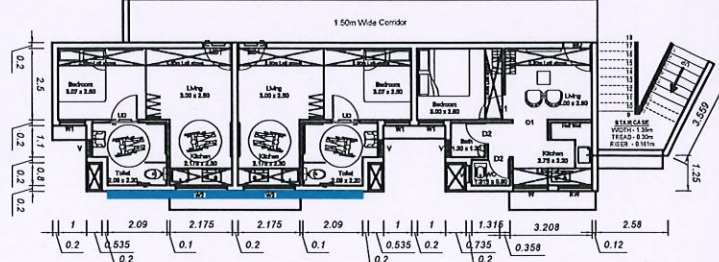
TYPICAL FLOOR PLAN (I, II & III) - ELEVATION - C01



TYPICAL FLOOR PLAN (I, II & III) - ELEVATION - B01



GROUND FLOOR PLAN - ELEVATION - C01



GROUND FLOOR PLAN - ELEVATION - B01



T.D.NO.07/2023
 BLOCK- 03
 G+3 FLOORS
 (20 UNITS / FLOOR)
 80 UNITS/BLOCK

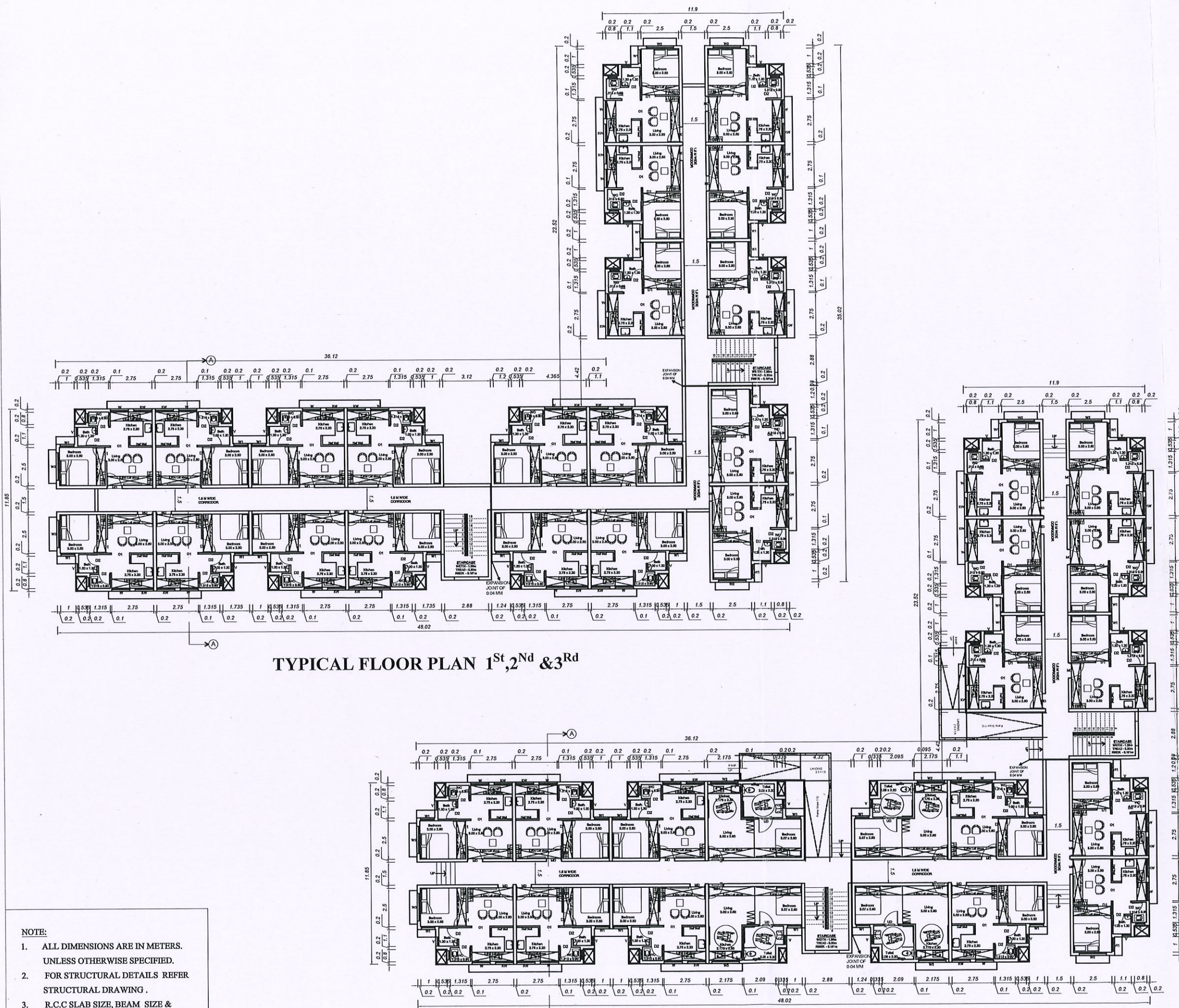
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.27 SQ.M
COMMON AREA / UNIT	- 6.53 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.74 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TYPICAL FLOOR PLAN 1st, 2nd & 3rd

GROUND FLOOR PLAN

- NOTE:
1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.
 2. FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING .
 3. R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROF.	CHD.	DEALT.	APTD.
SCALE:	PROJECT	PALLIPALAYAM				
1:150	DWG. TITLE	BLOCK - 03 - BUILDING FLOOR PLAN				
SIZE	DWG. NO	TNUHDB/MU/PALLIPALAYAM / TYPE DESIGN				
A0	FILE LOC	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN				
	PRPD.BY	SABARAJITHAN				
	CKD.BY	V.HARISH				

TECHNICAL ASST. *Shijith 9.2.24*
 SENIOR PLANNER (9/19) *U. Praveen 9/2/24*
 TOWN PLANNING SPECIALISTS(TPS) *M. Balaji 9/2/24*
 CHIEF ENGINEER (9/19) *Subramanian 9/2/24*

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.07/2023
BLOCK- 03
G+3 FLOORS
(20 UNITS / FLOOR)
80 UNITS/BLOCK

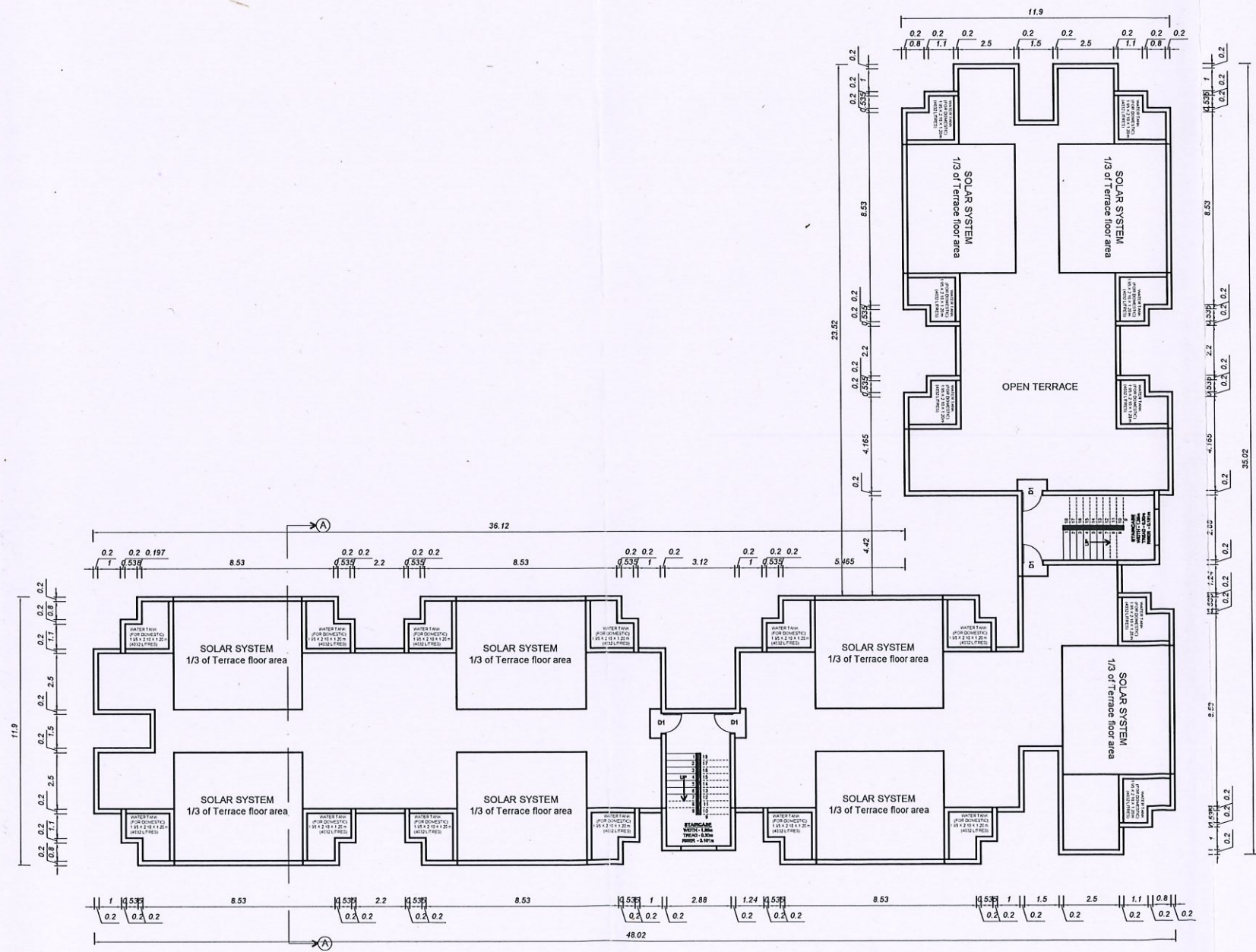
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.27 SQ.M
COMMON AREA / UNIT	- 6.50 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.77 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TERRACE FLOOR PLAN

- NOTE:**
1. ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
 2. FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING .
 3. R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHD.	DEALT.	APPD.
SCALE:	PROJECT	PALLIPALAYAM				
1:150	DWG. TITLE	BLOCK - 03 - BUILDING FLOOR PLAN				
SIZE	A0	REV. 00				
DWG. NO	TNUHDB/PMU/PALLIPALAYAM/ TYPE DESIGN					REV. 00
FILE LOC	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD.BY	SABARAJITHAN					
CKD.BY	VHARISH					

<p><i>Aljia</i> 02.2.24</p> <p>TECHNICAL ASST.</p>	<p><i>My</i> 9/2/24</p> <p>TOWN PLANNING SPECIALISTS (TPS)</p>
<p><i>U. Srinivas</i> 9/2/24 (10/1a)</p> <p>SENIOR PLANNER</p>	<p><i>[Signature]</i> 10/1a</p> <p>CHIEF ENGINEER</p>

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.08/2023
BLOCK- 04
G+3 FLOORS
(16 UNITS / FLOOR)
64 UNITS/BLOCK

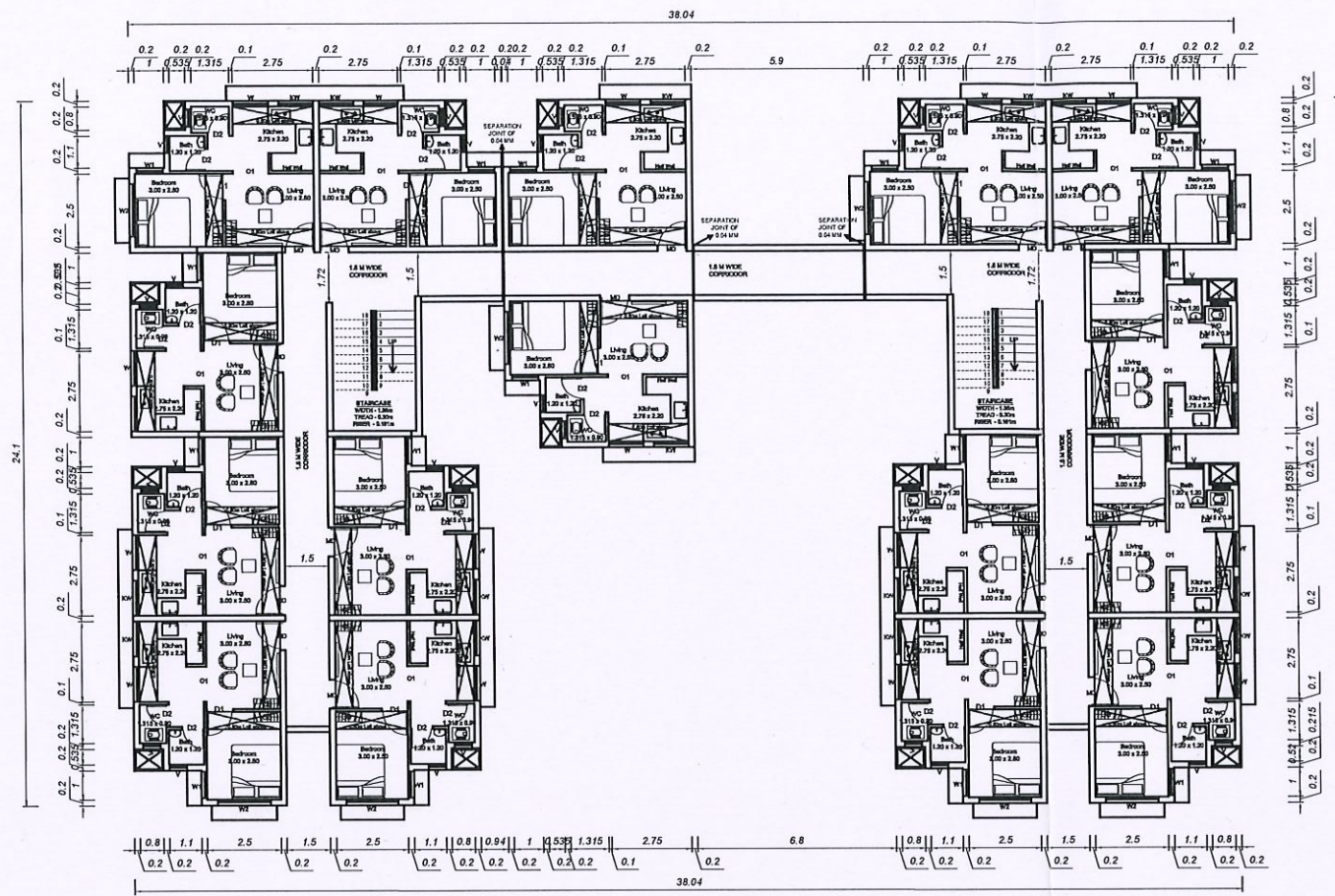
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

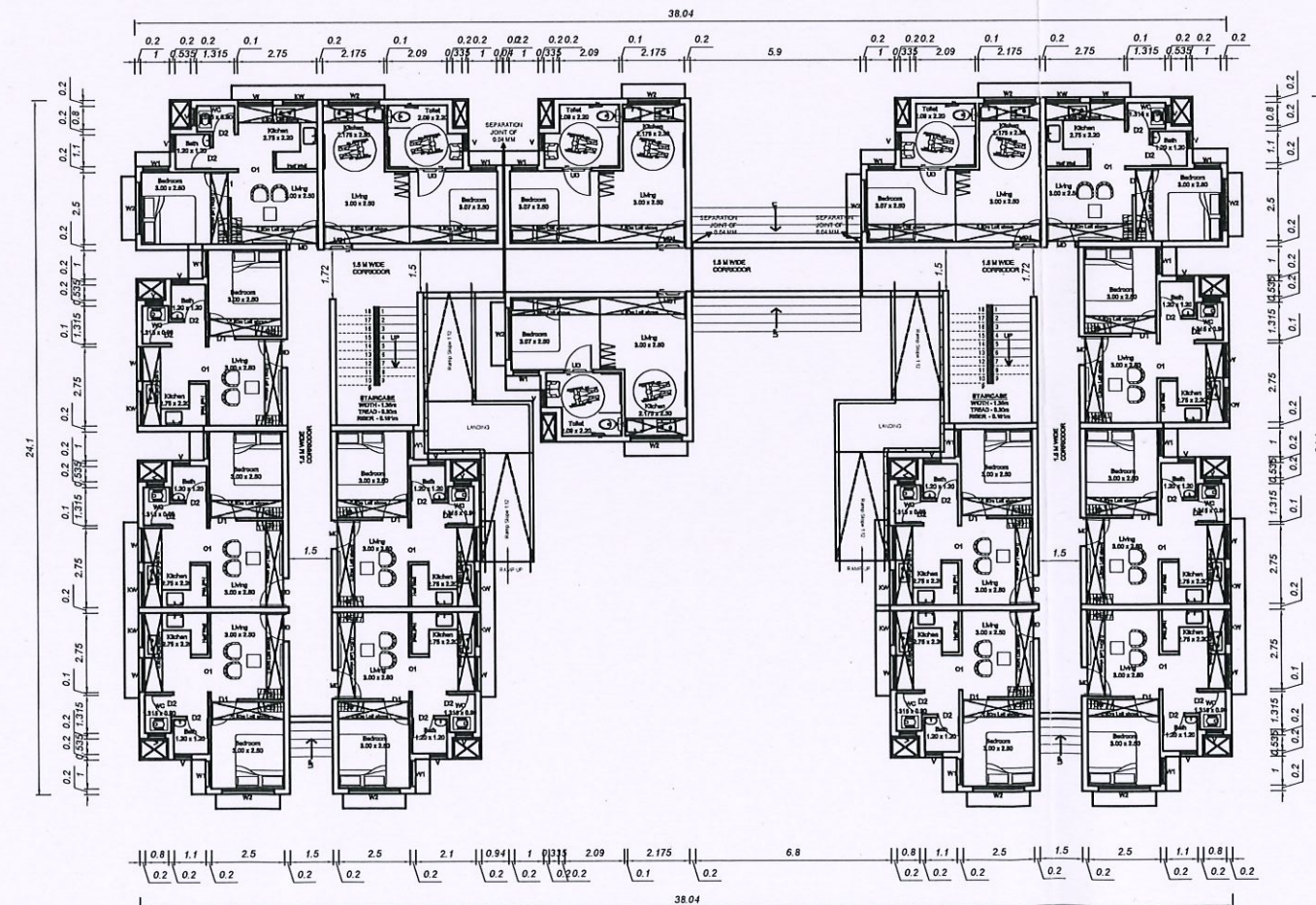
PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 37.29 SQ.M
COMMON AREA / UNIT	- 7.50 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TYPICAL FLOOR PLAN 1st,2nd &3rd



GROUND FLOOR PLAN

- NOTE:**
1. ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
 2. FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 3. R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALT.	APPD.
SCALE:	PROJECT	PALLIPALAYAM				
1:150	DWG. TITLE	BLOCK - 04 - BUILDING FLOOR PLAN				
SIZE						
A0						
DWG. NO.	TNUHDB/PMU/PALLIPALAYAM/ TYPE DESIGN					REV. 00
FILE LOC.	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD.BY	SABARAJATHAN					
CKD.BY	V.HARISH					

<p><i>[Signature]</i> 9/2/24</p> <p>TECHNICAL ASST.</p>	<p><i>[Signature]</i> 9/2/24</p> <p>SENIOR PLANNER</p>	<p><i>[Signature]</i> 9/2/24</p> <p>TOWN PLANNING SPECIALISTS (TPS)</p>	<p><i>[Signature]</i> 9/2/24</p> <p>CHIEF ENGINEER</p>
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RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.08/2023
BLOCK- 04
G+3 FLOORS
(16 UNITS / FLOOR)
64 UNITS/BLOCK

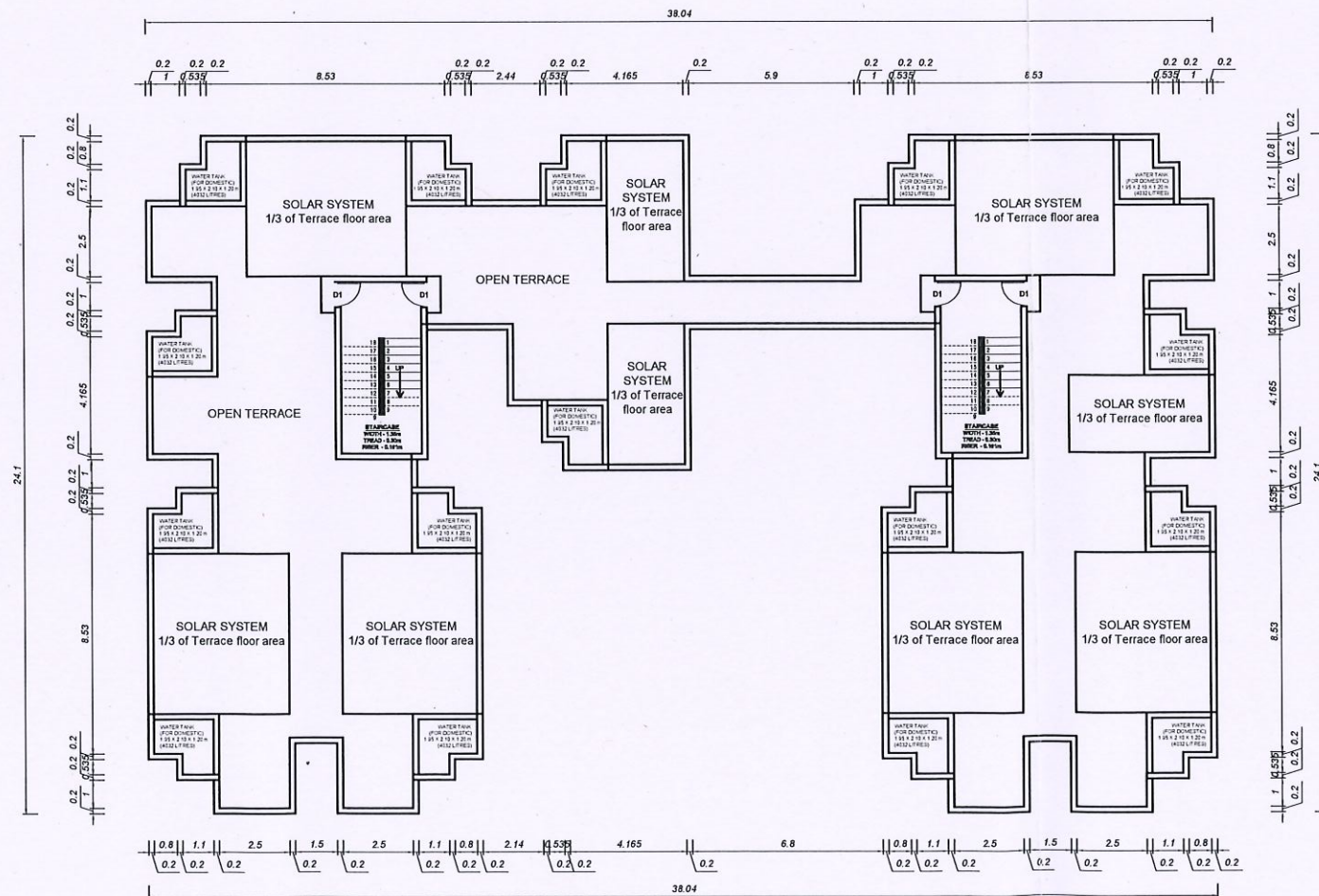
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 37.28 SQ.M
COMMON AREA / UNIT	- 7.49 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.79 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TERRACE FLOOR PLAN

NOTE:

1. ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
2. FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
3. R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALT.	APPD.

SCALE: PROJECT PALLIPALAYAM
1:150
SIZE: DWG. TITLE BLOCK - 04 - BUILDING FLOOR PLAN
A0
DWG. NO: TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN
FILE LOC: D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN
PRPD BY: SABARAJITHAN
CKD BY: V HARISH

Handwritten signatures and dates:

- Technical Asst. (Signature: 9/2/24)
- Senior Planner (Signature: V. Srinivasan, Date: 9/2/24 (12/19))
- Town Planning Specialist (Signature: M. 9/2/24)
- Chief Engineer (Signature: 100224, Date: 12/19)

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

T.D.NO.05,9/2023
 BLOCK- 05
 G+3 FLOORS
 (16 UNITS / FLOOR)
 64 UNITS/BLOCK

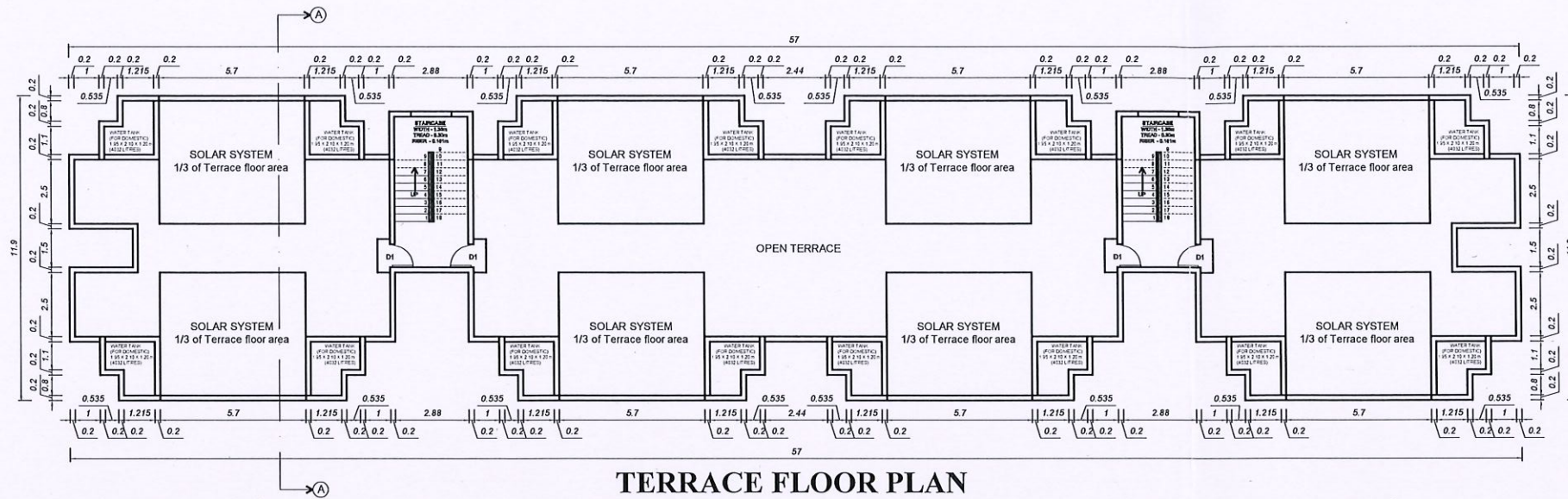
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 01 & 05 :

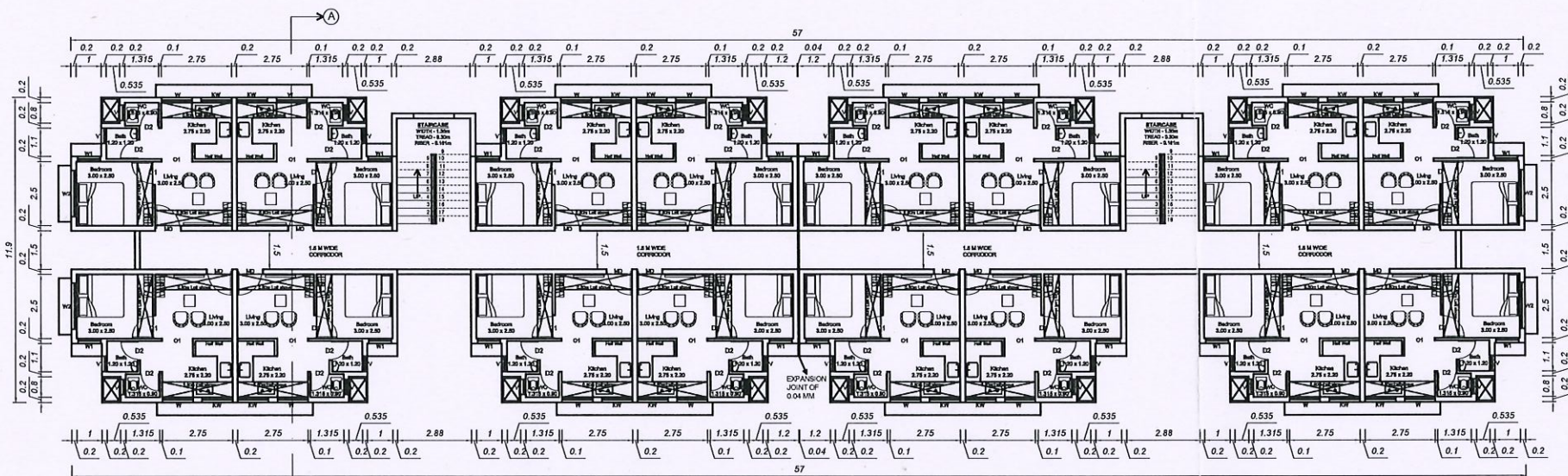
PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.42 SQ.M
COMMON AREA / UNIT	- 6.68 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.74 SQ.M

SCHEDULE OF JOINERIES

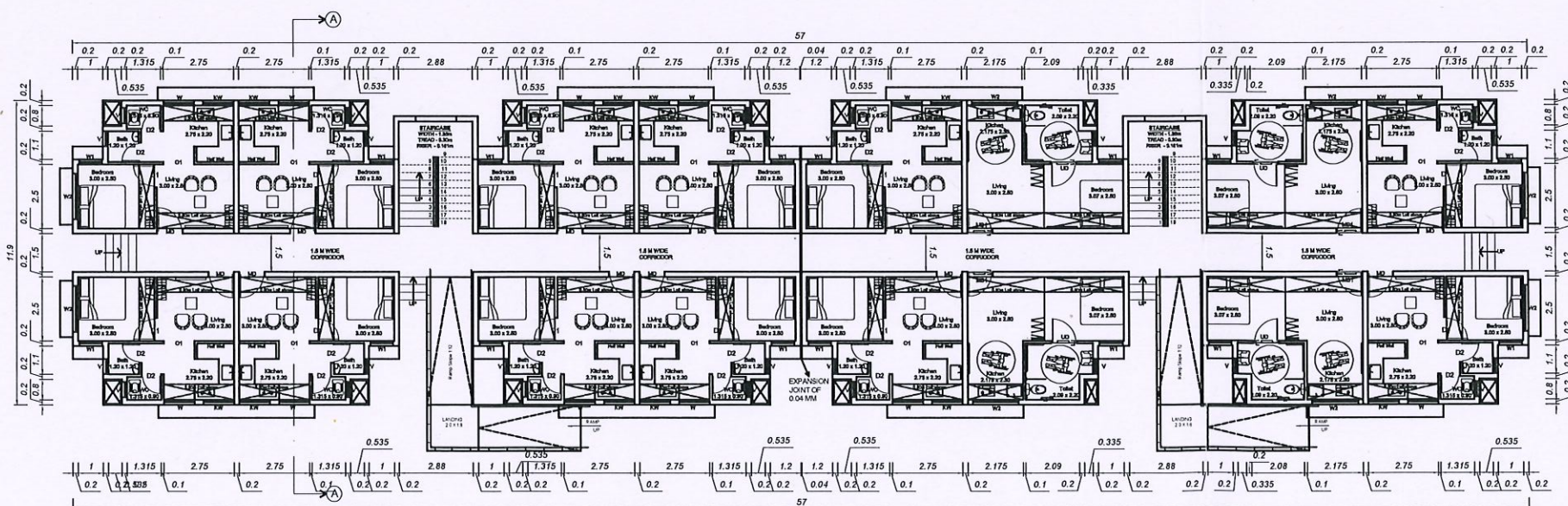
TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TERRACE FLOOR PLAN



TYPICAL FLOOR PLAN 1st, 2nd & 3rd



GROUND FLOOR PLAN

- NOTE:
- ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.
 - FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PREP.	CHKD.	DEALT.	APPD.
SCALE:		PROJECT	PALLIPALAYAM			
SIZE:	DWG. TITLE		BLOCK - 05 - BUILDING FLOOR PLAN			
A0	REV.		00			
DWG. NO.	TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN					
FILE LOC.	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD BY.	A.JAGANNATHAN					
CKD BY.	V.HARISH					

TECHNICAL ASST.
 SENIOR PLANNER (13/19)
 TOWN PLANNING SPECIALISTS (TPS)
 CHIEF ENGINEER (13/19)

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.09/2023
BLOCK-06
G+3 FLOORS
(12 UNITS / FLOOR)
48 UNITS/BLOCK

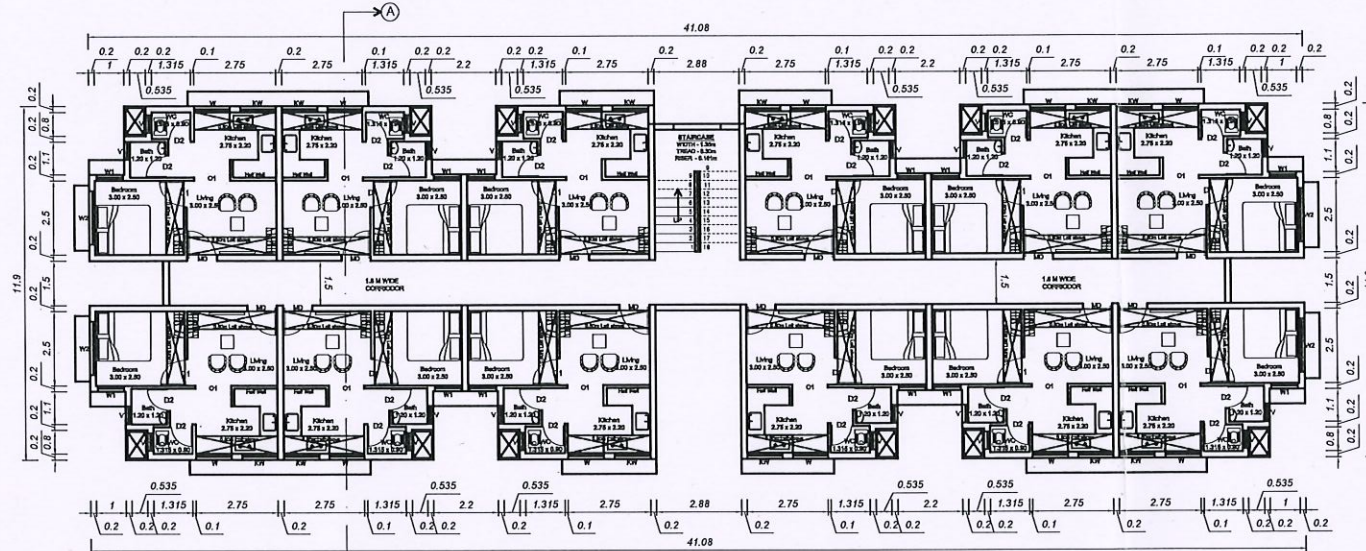
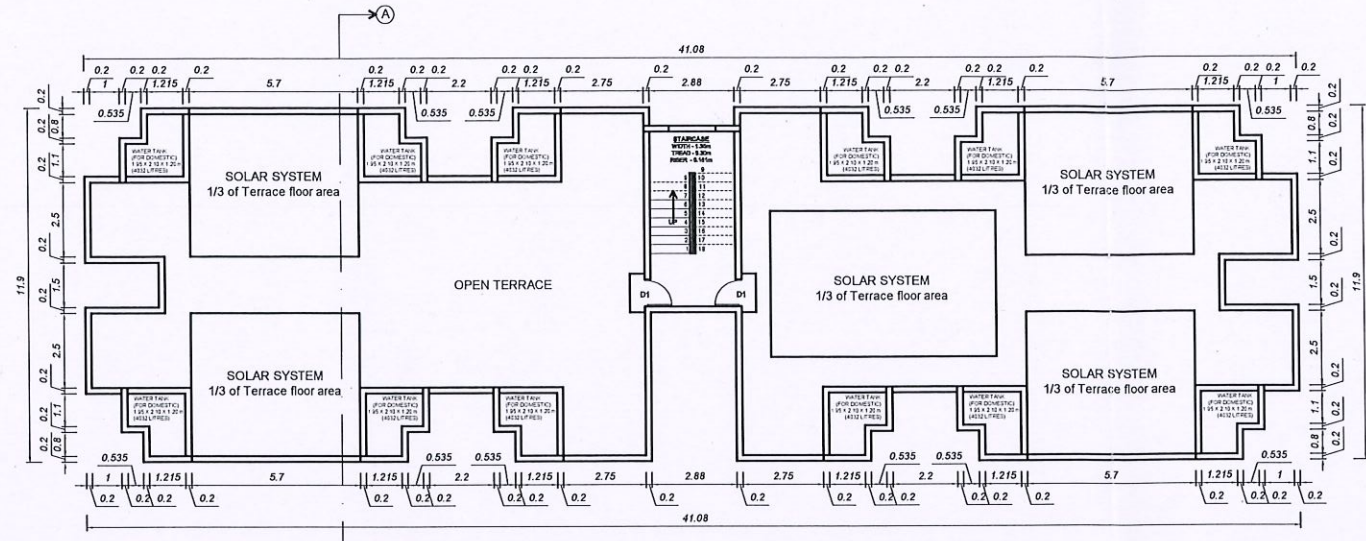
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 06 :

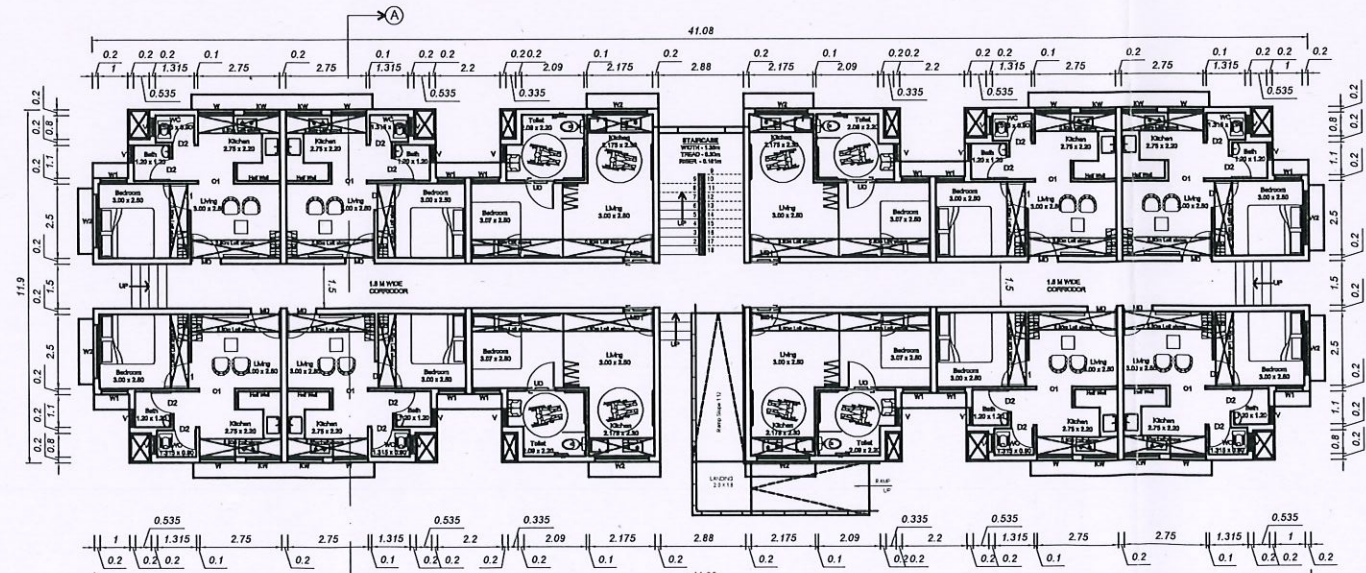
PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 35.43 SQ.M
COMMON AREA / UNIT	- 5.66 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.77 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TYPICAL FLOOR PLAN 1st, 2nd & 3rd



GROUND FLOOR PLAN

- NOTE:**
- ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
 - FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALT.	APPD.
SCALE:	PROJECT	PALLIPALAYAM				
1:150	DWG. TITLE	BLOCK - 06 - BUILDING FLOOR PLAN				
SIZE:						
A0						
DWG. NO	TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN					REV. 00
FILE LOC	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD.BY	A.JAGANNATHAN					
CKD.BY	V.HARISH					

TECHNICAL ASST.	<i>M. 9/2/24</i> TOWN PLANNING SPECIALISTS (TPS)
SENIOR PLANNER	<i>V. Harish</i> CHIEF ENGINEER (14/10)

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.10/2023
BLOCK-07 G+3 FLOORS
(19 UNITS / FLOOR)
76 UNITS/BLOCK

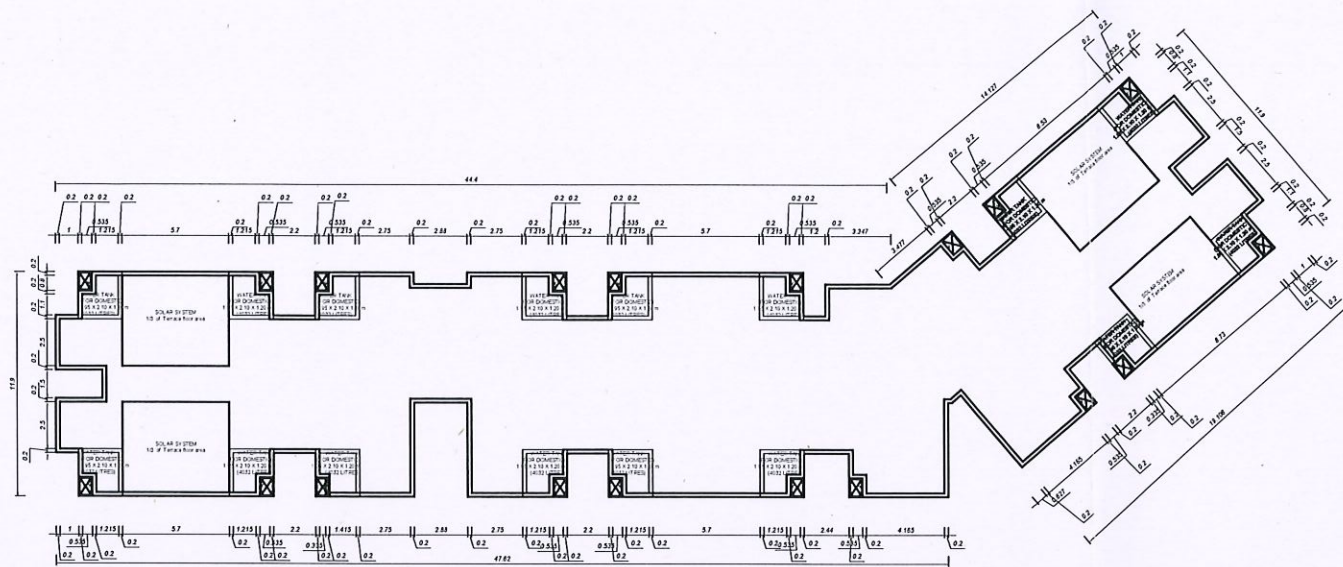
PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.

AREA DETAILS OF BLOCK 02:

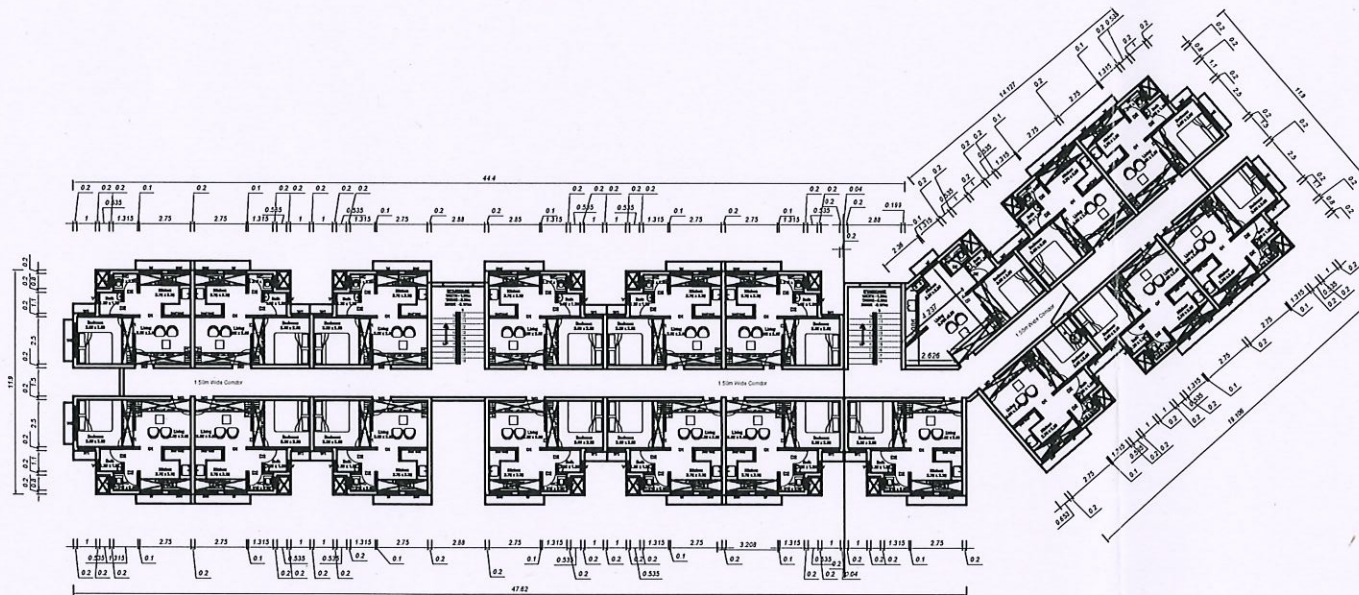
PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 36.47 SQ.M
COMMON AREA / UNIT	- 6.37 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 30.10 SQ.M

SCHEDULE OF JOINERIES

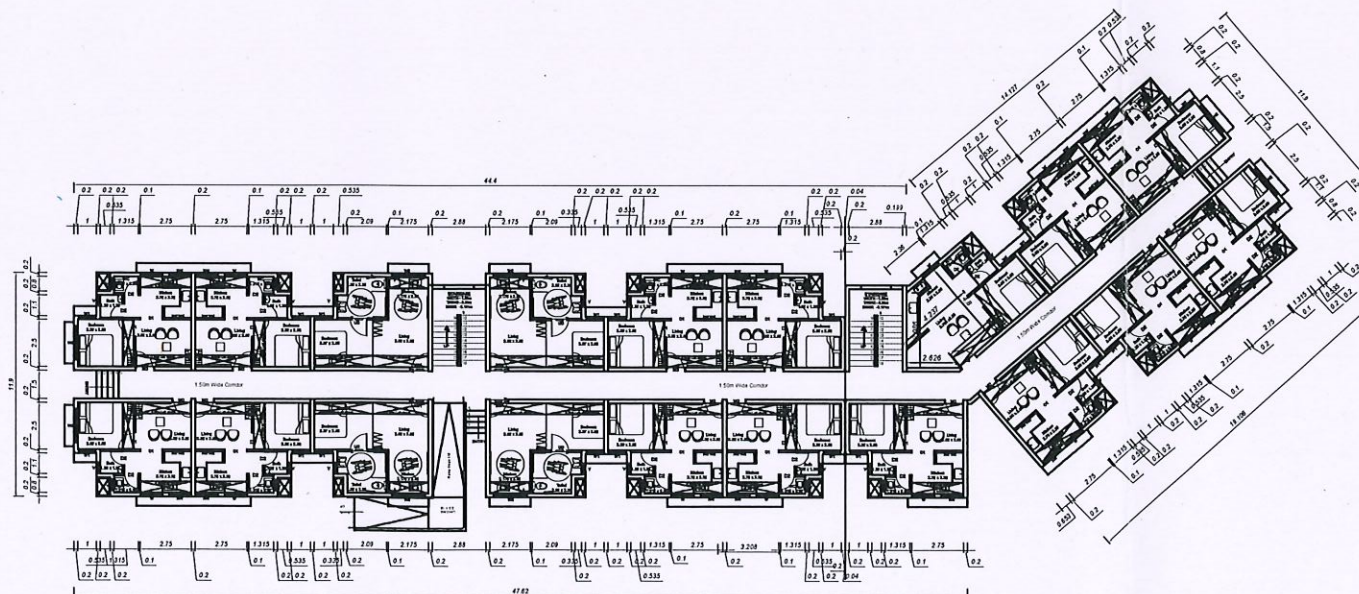
TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10



TERRACE FLOOR PLAN



TYPICAL FLOOR PLAN 1st, 2nd & 3rd



GROUND FLOOR PLAN

NOTE:

- ALL DIMENSIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED.
- FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
- R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

NO	DATE	REVISION	PROP.	CHKD.	DEALL	APPR.
SCALE:	PROJECT	PALLIPALAYAM				
SIZE:	DWG. TITLE	BLOCK -07- BUILDING FLOOR PLAN.				
DWG. NO	TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN					REV. 00
FILE LOC.	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN					
PRPD.BY	K.SATHISH KUMAR					
CKD.BY	V.HARISH					

TECHNICAL ASST.	TOWN PLANNING SPECIALISTS(TPS)
SENIOR PLANNER	CHIEF ENGINEER

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.11/2023
BLOCK-08 G+3 FLOORS
(14 UNITS / FLOOR)
56 UNITS/BLOCK

PROPOSED TYPE DESIGN FOR CONSTRUCTION OF(G+3) FLOORS 520 TENEMENTS AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKAL DISTRICT.


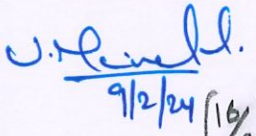
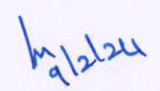
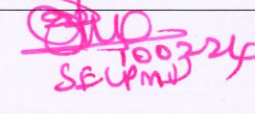
AREA DETAILS OF BLOCK 02:

PLINTH AREA / UNIT (INCLUDING COMMON AREA)	- 37.25 SQ.M
COMMON AREA / UNIT	- 7.46 SQ.M
CARPET AREA / UNIT (GENERAL UNIT)	- 25.41 SQ.M
CARPET AREA / UNIT (PwD UNIT)	- 25.79 SQ.M
PLINTH AREA / UNIT (EXCLUDING COMMON AREA)	- 29.79 SQ.M

SCHEDULE OF JOINERIES

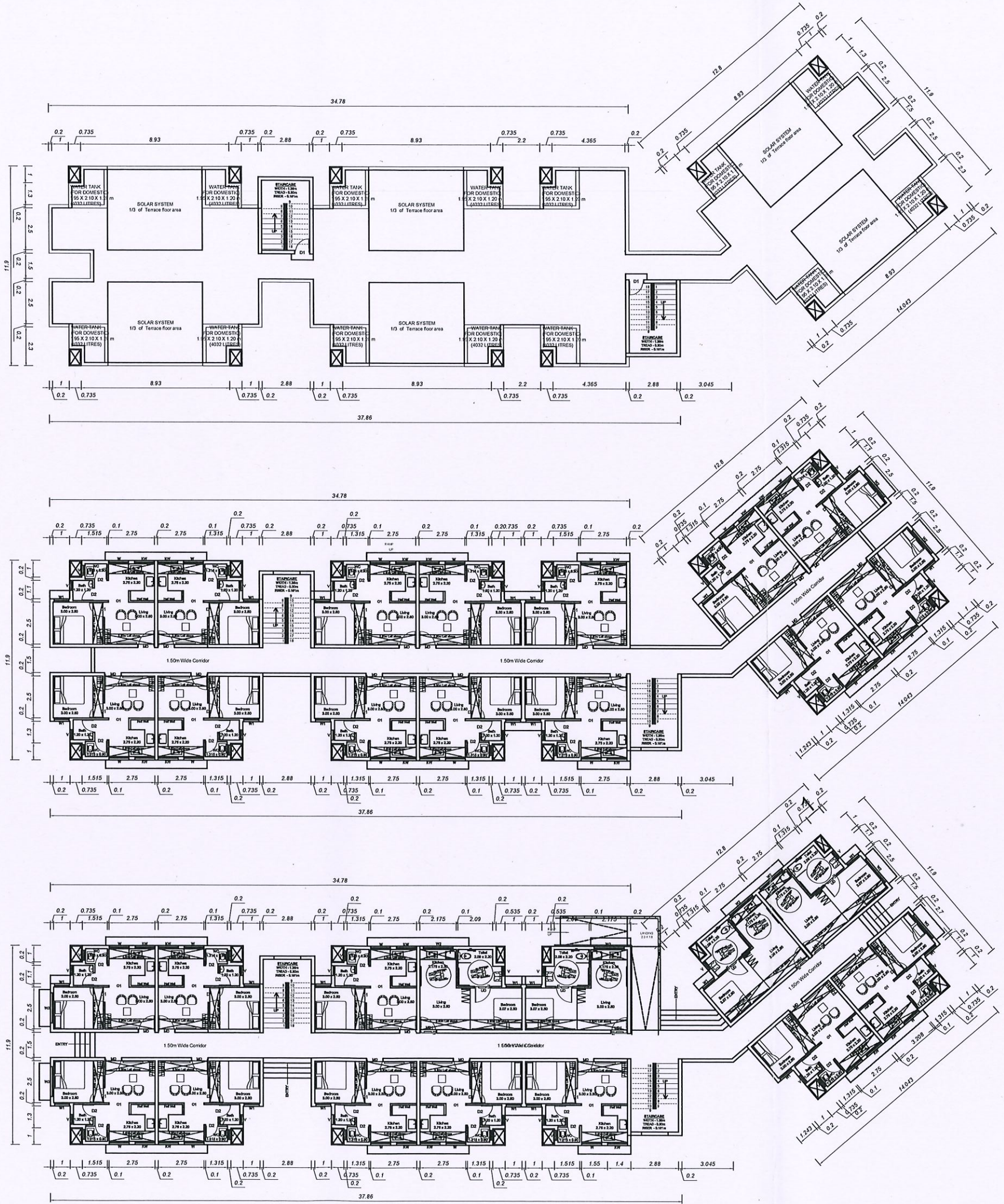
TYPE	DESCRIPTION	WIDTH	HEIGHT
MD	MAIN DOOR	1.00	2.10
MD1	MAIN SWING DOOR	1.00	2.10
D1	DOOR	0.90	2.10
D2	DOOR	0.75	2.10
UD	SWING DOOR	1.00	2.10
W	WINDOW	1.20	1.65
W1	WINDOW	0.90	1.20
W2	WINDOW	1.80	1.20
KW	KITCHEN WINDOW	1.20	1.00
V	VENTILATOR	0.60	0.60
O1	OPENING	1.20	2.10

NO	DATE	REVISION	PROJ.	CENK.	DEALT.	APPD.
SCALE		PROJECT	PALLIPALAYAM			
SIZE		DWG. TITLE	BLOCK -08- BUILDING FLOOR PLAN.			
DWG. NO		TNUHDB/PMU/PALLIPALAYAM/ TYPE DESIGN				REV. 00
FILE LOC.		D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN				
PRPD.BY		K.SATHISH KUMAR				
CKD.BY		V.HARISH				

 9/2/24
 TECHNICAL ASST.
 9/2/24 (16/1a)
 SENIOR PLANNER
 9/2/24
 TOWN PLANNING SPECIALISTS (TPS)
 10/3/24
 CHIEF ENGINEER (16/1a)

- NOTE:
- ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.
 - FOR STRUCTURAL DETAILS REFER STRUCTURAL DRAWING.
 - R.C.C SLAB SIZE, BEAM SIZE & DETAILS REF STRUCTURAL DRAWING.

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION



T.D.NO.12/2023,
CONVENIENT STORE,
LIVELIHOOD CENTRE & LIBRARY
G+2 FLOORS

PALLIPALAYAM SCHEME
G+ 3 FLOORS - 520 UNITS

AREA DETAILS:

GROUND FLOOR AREA (CONVENIENT STORES -5 NOs) (INCLUDING COMMON AREA)	- 159.05 SQ.M
GROUND FLOOR AREA (CONVENIENT STORES -5 NOs) (EXCLUDING COMMON AREA)	- 69.64 SQ.M
FIRST FLOOR AREA (LIVELIHOOD CENTRE - 1 No) (INCLUDING COMMON AREA)	- 159.05 SQ.M
FIRST FLOOR AREA (LIVELIHOOD CENTRE - 1 No) (EXCLUDING COMMON AREA)	- 144.53 SQ.M
SECOND FLOOR AREA (LIBRARY -1No) (INCLUDING COMMON AREA)	- 159.05 SQ.M
SECOND FLOOR AREA (LIBRARY -1No) (EXCLUDING COMMON AREA)	- 100.84 SQ.M
TOTAL (INCLUDING)	- 477.15 SQ.M
TOTAL (EXCLUDING)	- 315.01 SQ.M

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	SIZE
RS	ROLLING SHUTTER	2.10 x 2.10
MD	DOOR	1.00 x 2.10
D1	DOOR	1.00 x 2.10
D2	DOOR	0.75 x 2.10
W	WINDOW	1.80 x 1.60
V1	VENTILATOR	0.50 x 0.60

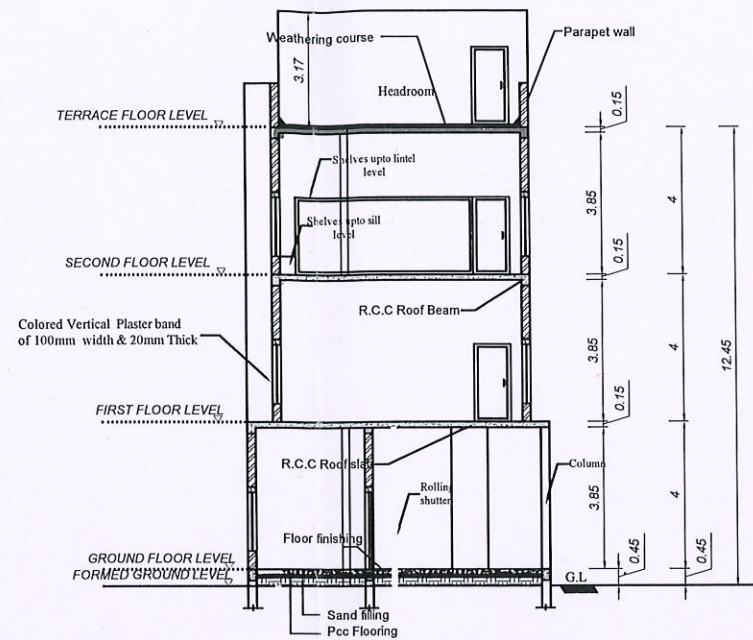
NOTE:
THE LIVELIHOOD CENTER TO INCLUDE MOVABLE FURNITURE, WALL STORAGE AND/OR LOCKERS FOR PARTICIPANTS TO STORE GOODS AND MATERIALS, AND WALL SPACE FOR TRAINERS TO PROJECT PRESENTATIONS DURING TRAINING SESSIONS.

NOTE:
1. ALL DIMENSIONS ARE IN METER.
2. THE TYPED DESIGN TO BE ADOPTED FOR PALLIPALAYAM SCHEME.

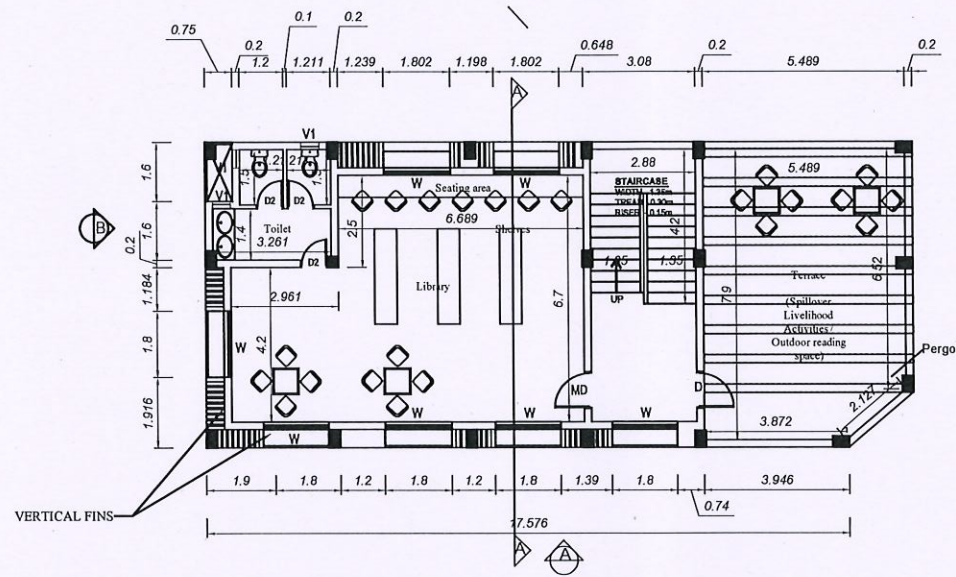
SCALE:	PROJECT	PALLIPALAYAM
1:100	DWG. TITLE	ANGANWADI, CONVENIENCE STORE, LIVELIHOOD CENTRE & LIBRARY
SIZE	DWG. NO	TNSCB/PMU/PALLIPALAYAM/SOCIAL AMENITIES
A0	FILE LOC	F-RUBA-PALLIPALAYAM - DESIGN-PLAN
	DRAWN BY	THANGAMARIAPPAN.M
	CHECKED BY	HARISH V.
	REV.	00



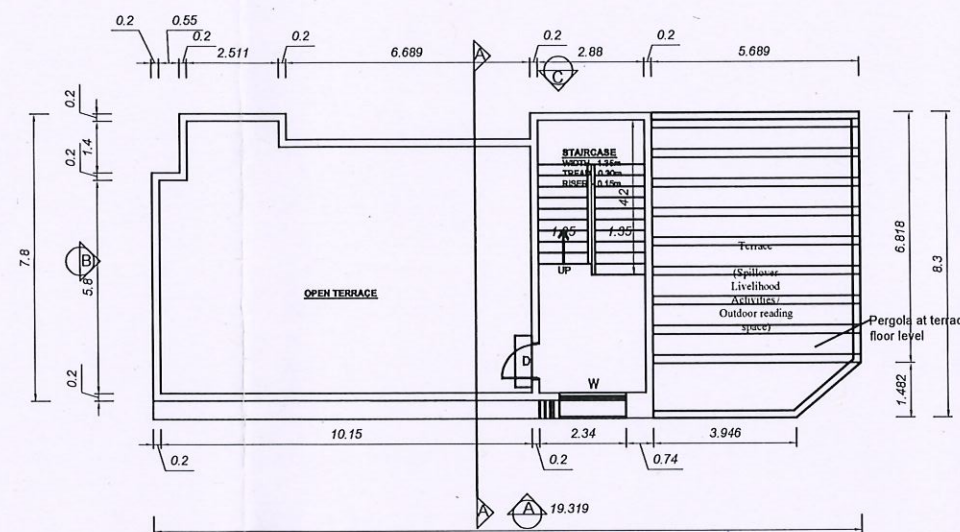
ELEVATION-A



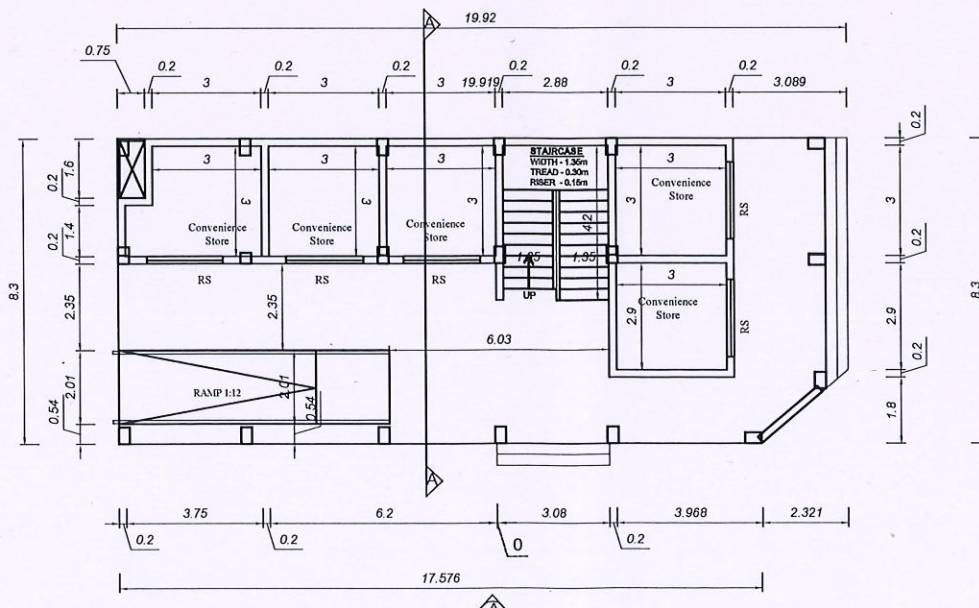
SECTION-A



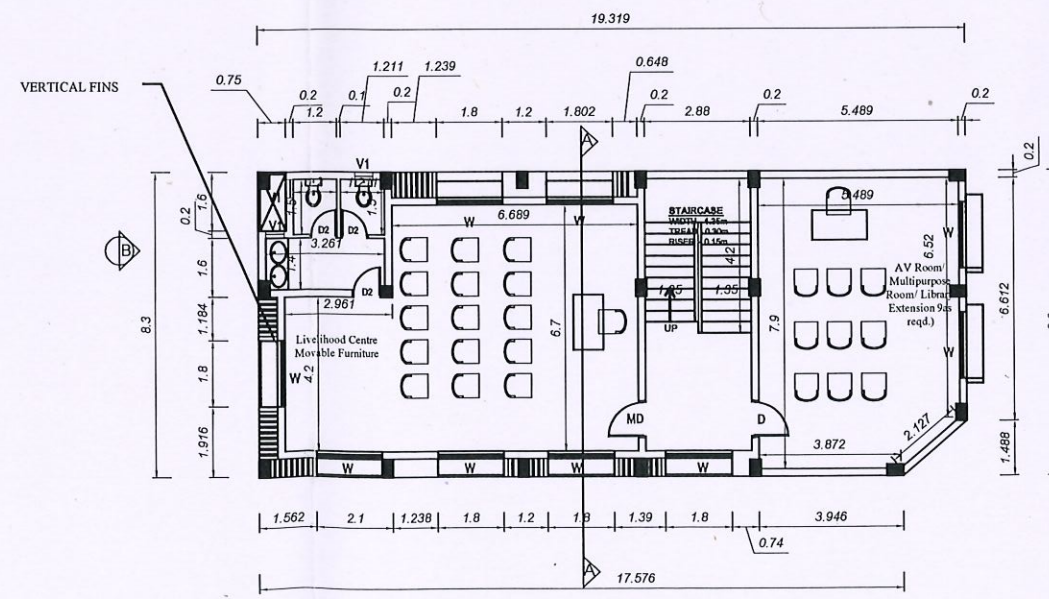
LIVELIHOOD CENTRE SECOND FLOOR PLAN



LIVELIHOOD CENTRE TERRACE FLOOR PLAN



LIVELIHOOD CENTRE GROUND FLOOR PLAN



LIVELIHOOD CENTRE FIRST FLOOR PLAN

TECHNICAL ASST. *M. Thyagarajan* 09/02/24

SENIOR PLANNER *V. Harish V.* 9/2/24 (17/1a)

TOWN PLANNING SPECIALISTS(TPS) *M. Thyagarajan* 21/2/24

CHIEF ENGINEER *V. Harish V.* 17/2/24 (17/1a)

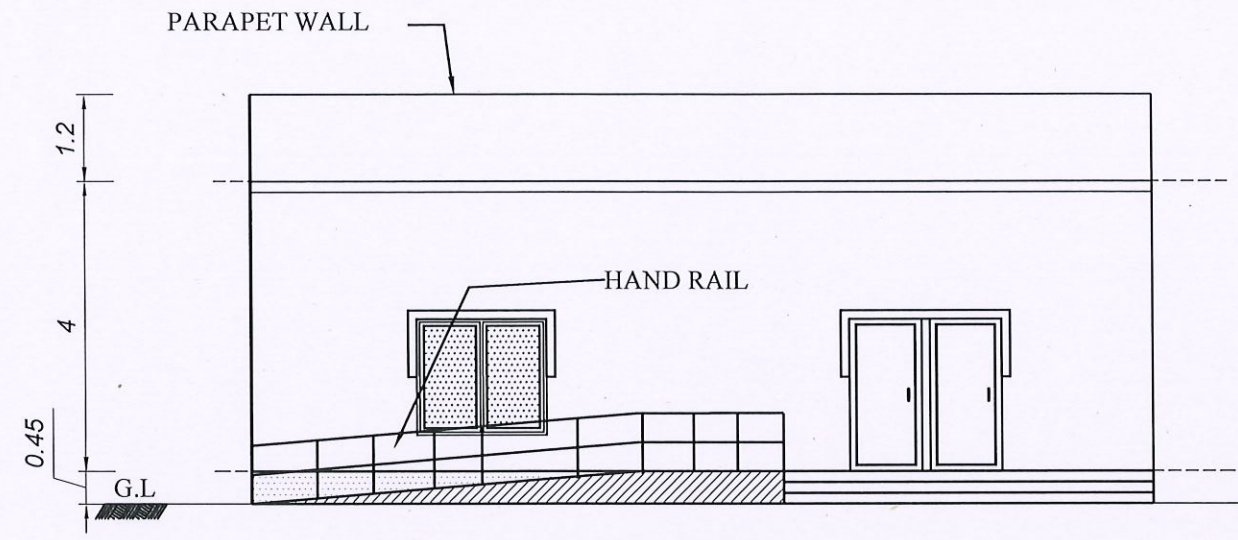
RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

PROPOSED TYPE DESIGN FOR CONSTRUCTION OF ANGANWADI AT PALLIPALAYAM IN S.NO.378/2, PALLIPALAYAM VILLAGE, KUMARAPALAYAM TALUK & NAMAKKAL DISTRICT

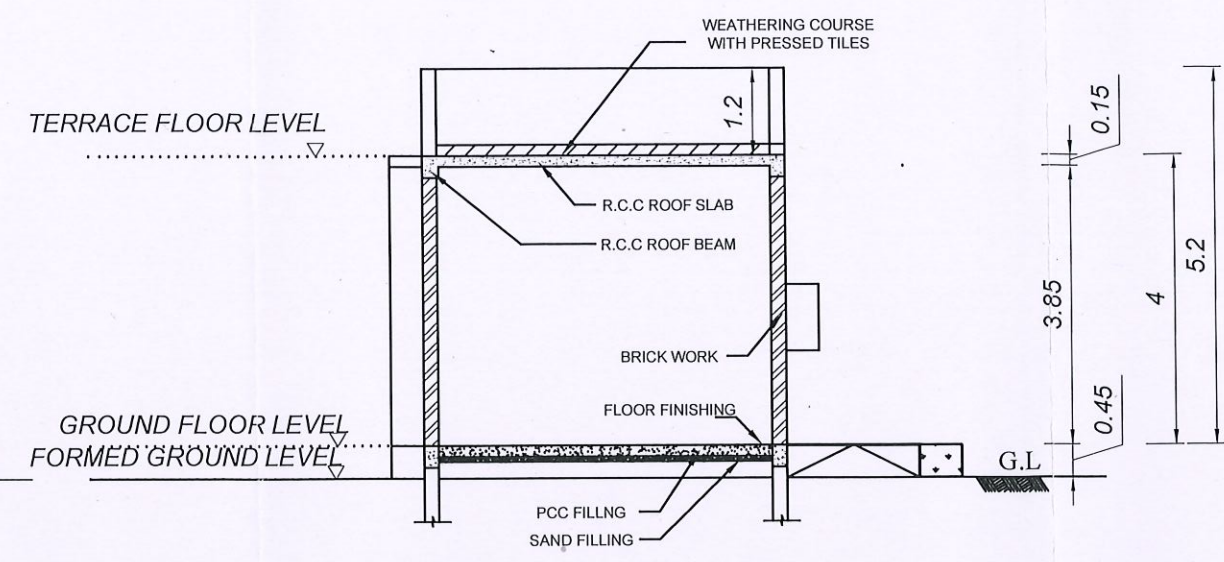
AREA DETAILS:
GROUND FLOOR AREA (ANGANWADI) - 62.14 SQ.M

SCHEDULE OF JOINERIES

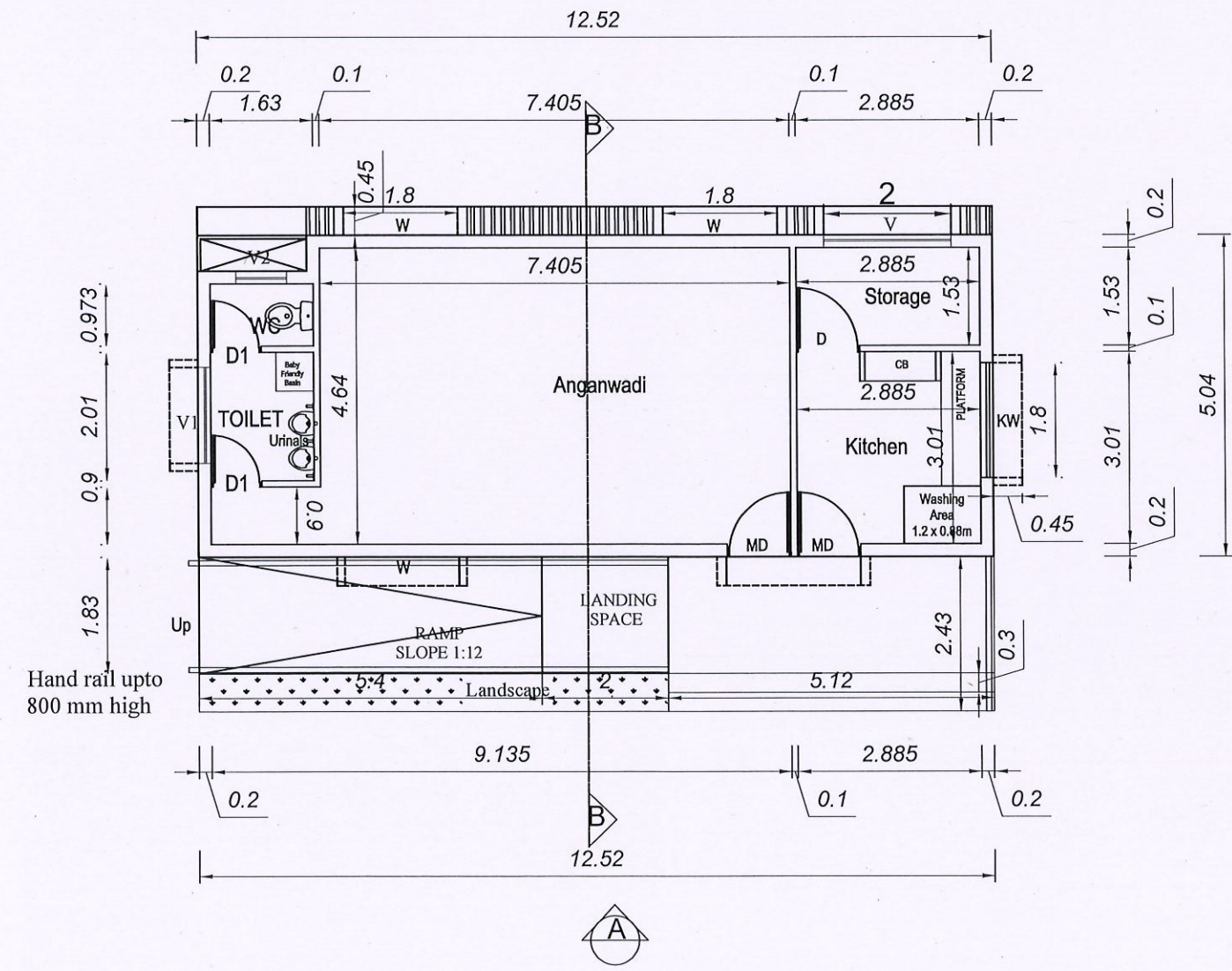
TYPE	DESCRIPTION	SIZE
RS	ROLLING SHUTTER	2.10 x 2.10
MD	DOOR	1.00 x 2.10
D	DOOR	1.00 x 2.10
D1	DOOR	0.80 x 2.10
W	WINDOW	1.80 x 1.60
KW	KITCHEN WINDOW	1.80 x 1.00
V	VENTILATOR	2.00 x 0.60
V1	VENTILATOR	1.50 x 0.60
V2	VENTILATOR	0.80 x 0.60



ELEVATION-A



SECTION - BB



ANGANWADI GROUND FLOOR PLAN

NOTE:
1. ALL DIMENSIONS ARE IN METER.
2. THE TYPED DESIGN TO BE ADOPTED FOR PALLIPALAYAM SCHEME.

SCALE	PROJECT	PALLIPALAYAM
1:100		
SIZE	DWG. TITLE	ANGANWADI
A3		
DWG. NO.	TNUHDB/PMU/PALLIPALAYAM / TYPE DESIGN	
FILE LOC	D-TNUHDB-PALLIPALAYAM - DESIGN-PLAN	

PRPD.BY : S.BUVANENTHRAN
CKD.BY : V.HARISH

 TECHNICAL ASST.	 TOWN PLANNING SPECIALISTS (TPS)
 SENIOR PLANNER	 CHIEF ENGINEER

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION

TAMIL NADU URBAN HABITAT DEVELOPEMENT BOARD

T.D.NO.14/2023,
RATION SHOP
GROUND FLOOR

PROPOSED TYPE DESIGN FOR
CONSTRUCTION OF RATIONSHOP AT
PALLIPALAYAM IN S.NO.378/2,
PALLIPALAYAM VILLAGE,
KUMARAPALAYAM TALUK & NAMAKKAL
DISTRICT

AREA DETAILS:

1) RATION SHOP
GROUND FLOOR AREA - 38.21 Sq.m

SCHEDULE OF JOINERIES

TYPE	DESCRIPTION	SIZE
RS	ROLLING SHUTTER	2.00 x 2.50
RS1	ROLLING SHUTTER	1.00 x 1.20
D	DOOR	1.22 x 2.50
W	WINDOW	1.60 x 1.60

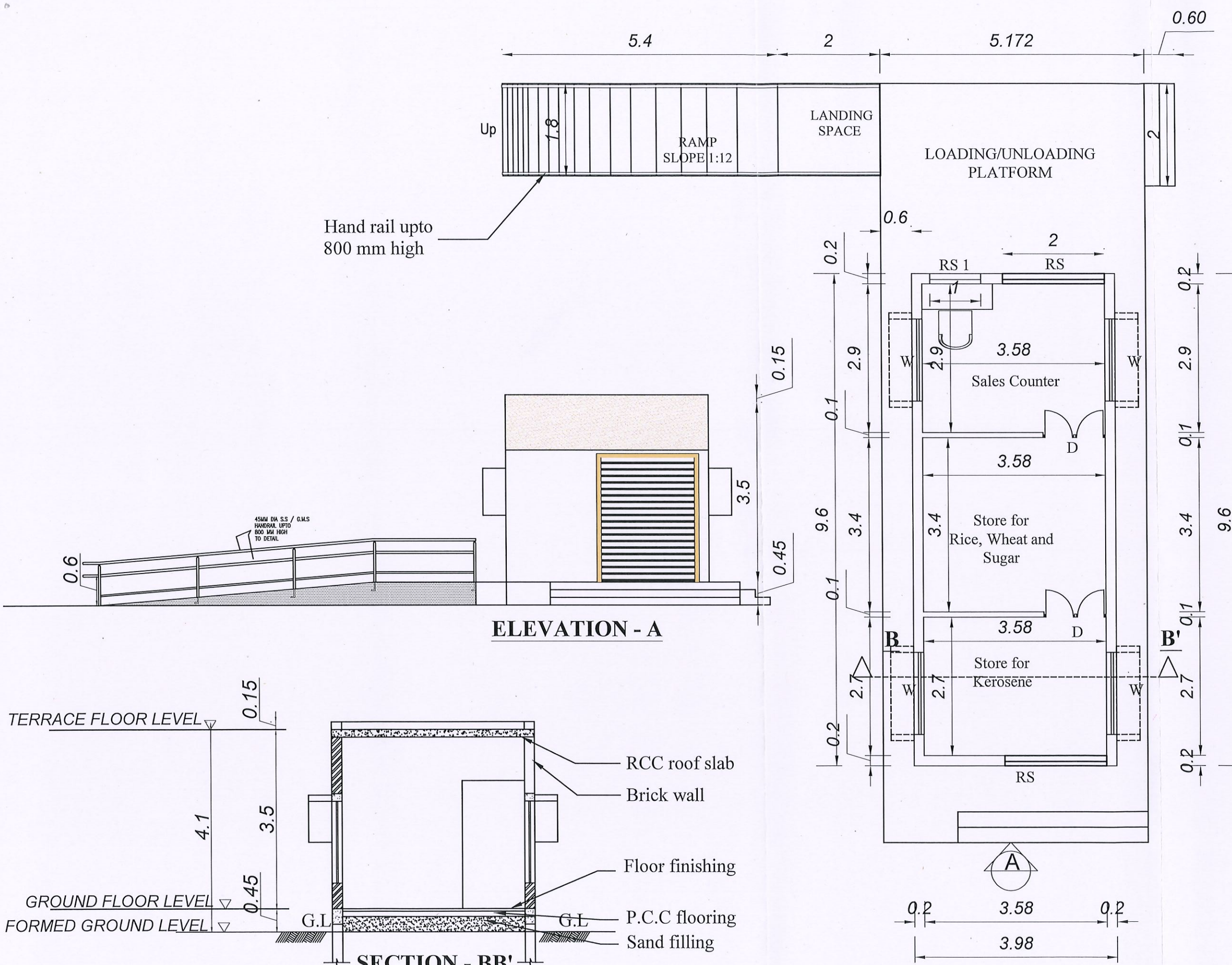
NOTE:
1. ALL DIMENSIONS ARE IN METER.
2. THE TYPED DESIGN TO BE ADOPTED FOR
PALLIPALAYAM SCHEME.

SCALE	PROJECT	PALLIPALAYAM	
1:100	DWG. TITLE	RATION SHOP	
SIZE	A4		
DWG. NO	TNUHDB-PMU/PALLIPALAYAM / TYPE DESIGN		
FILE LOC	D-TNUHDB-PALLIPALAYAM-DESIGN-PLAN		REV. 00

PRPD BY : S.BUVANENTHRAN
CKD BY : V.HARISH

TECHNICAL ASST. *[Signature]*
SENIOR PLANNER *[Signature]*
TOWN PLANNING SPECIALISTS (TPS) *[Signature]*
CHIEF ENGINEER *[Signature]*

RELEASED FOR APPROVAL CONSTRUCTION INFORMATION



RATION SHOP GROUND FLOOR PLAN



TAMIL NADU URBAN HABITAT DEVELOPMENT BOARD

Project Name: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project.

BIDDING DOCUMENT For Procurement of works for

Construction of 520 (G+3) tenements including Development works at Pallipalayam scheme in Komarapalayam Taluk at Namakkal District.

**Under Open Competitive Bidding
(Following ADB's single stage two envelope bidding procedure)**

Part 2 – Price Bid

Issued on: 02 March, 2024

Invitation for Bids No.: IRSHUPSP/NCB/04

OCB No.: IRSHUPSP/PAL/04

Employer: Tamil Nadu Urban Habitat Development Board, Government of Tamil Nadu

Country: India

Issued by Office of
Superintending Engineer, Project Monitoring Unit,
Inclusive, Resilient and Sustainable Housing for Urban Poor Sector
Project
Tamil Nadu Urban Habitat Development Board,
No.5, Kamarajar Salai, Chennai – 600 005,
Tamil Nadu, India.
E-mail: tnuhdbprocurement@gmail.com

Letter of Price Bid

Date:
Invitation for Bids No.: IRSHUPSP/NCB/04
OCB No.: IRSHUPSP/PAL/04

To: The Superintending Engineer,
Project Monitoring Unit,
Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu
Tamil Nadu Urban Habitat Development Board,
No.5, Kamarajar Salai, Chennai – 600 005, Tamil Nadu, India

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8;
- (b) We offer to execute in conformity with the Bidding Documents and the Technical Bid submitted for the following Works:
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:

-----[amount of local currency in words], [amount in figures]
<i>The total bid price from the Summary of Bill of Quantities should be entered by the bidder inside this box. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the bid.</i>

- (d) The discounts offered and the methodology for their application are:
- (e) Our Bid shall be valid for a period of ----- days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our Bid is accepted, we commit to obtain and submit a performance security in accordance with the Bidding Documents;
- (g) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract: *

Name of Recipient	Address	Reason	Amount
.....
.....

- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(j) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date
.....

* *If none has been paid or is to be paid, indicate "none".*

Preamble to Bill of Quantities

1. The Bill of Quantities (BOQ) shall be read in conjunction with the Instructions to Bidders, General and Particular Conditions of Contract, Specifications, and Drawings.
2. The quantities given in the BOQ are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer, and valued at the rates and prices bid in the priced BOQ, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, surveying, setting out, erection, maintenance, all lead and lift, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.
4. General directions and descriptions of work and Materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.
5. The method of execution and measurement of completed work for payment shall be in accordance to the respective procedures provided in the Technical Specifications under this Contract and in the absence of which shall be in accordance to the relevant BIS Standard and Standard Specification of the State of Tamil Nadu or Standard Specification published by the Central Public Works Department, Government of India as the case may be.
6. Rock is defined as all material that, in the opinion of the Employer's Representative, require blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for their removal, and that cannot be extracted by ripping with a tractor of at least 150 brake horsepower (BHP) with a single, rear-mounted, heavy-duty ripper.
7. All defective works are liable to be demolished, rebuilt and defective materials replaced by the contractor at his own cost and time
8. In view of the site location and their prevailing condition, it is mandatory to the Contractor to visit the site and make himself thoroughly familiar with the site conditions, access and account for all possible difficulties and other requirements mentioned elsewhere in his bid prior to submission. When a contractor submits his bid for this work, it will be considered that he has quoted for this work with full and complete knowledge of the site and prevailing conditions, and no claim for additional compensation shall be entertained on this account.
9. Description of items in this BOQ is by itself not complete, and for a full description the BOQ should be read together with the Technical Specifications and Drawings. Rates quoted in the BOQ are deemed to have included all aspects covered in the Preamble and Technical Specifications, and all features and details shown in the Drawings.
10. The Bidder shall, in the course of studying the bid document, point out all his/her remarks on the documents and make all his/her queries to the Employer who will study these remarks and clarify any discrepancy between the Bidding Documents.
11. Submissions shall be strictly in accordance with the documents and shall not be qualified in any way. The Bidder shall not alter the text of the BOQ.
12. Extra and excess items of work shall not vitiate the Contract. The Contractor shall be bound to execute extra items of work as directed by the Engineer. The rates for extra items will be as per rates decided under Contract Conditions.
13. For the evaluation process, if requested by the Evaluation Committee, the Contractor shall provide a sheet analysis for all priced items showing how the rate entered was derived.
14. The rates shall be deemed to include all the cost of Works described in the Bidding Documents to complete the works as per the scope of work.

15. The Bidder shall satisfy himself/herself as to the meaning of every item in the BOQ. The rates and prices inserted in the BOQ by the bidder shall be deemed to cover all costs, taxes, customs and import duties, levies, profits, risks, liabilities, insurance and obligations set forth or implied in the bid, as well as proper operation, maintenance and management of the Works including, but not limited to the following:
 - (i) All labour and Materials including consumables;
 - (ii) All temporary work of every description required including over ground pumping and other requirements to avoid disruption to the service whilst maintenance or repair work is carried out;
 - (iii) The provision and use of all equipment, tools and Plant of every kind, whether mechanical or non-mechanical, required for the expeditious carrying out of the Works in their proper sequence;
 - (iv) Provision for scaffolding, staging, guard rails, temporary stairs, temporary access during execution, approach roads up to the Site for the movement of vehicles, and heavy excavation machinery with supporting transport facility;
 - (v) Provision for excavation, back-filling, bringing to the Site extra fill for back-fill, making good and reinstating surfaces, disposing of surplus material, dealing with all groundwater and wastewater flows, and for work in close proximity to other utility apparatus including protecting that apparatus;
 - (vi) Provision for work on pipeline corridors such as traffic control measures, safety barriers, obtaining any approvals and permits from authorities, and reinstatement of surfaces;
 - (vii) Cooperation and coordination of the work with related authorities, other contractors and utilities, including obtaining their permission before starting the related Works if required; and
 - (viii) Providing security arrangements to guard the Site and premises at all times and to maintain strict control on the movement of Materials and labour until the completion of the work.
16. Works itemized in the BOQ will be subject to measurement. Such measurement will be in the unit of measurement shown the BOQ and payment shall be made on the measured quantities.
17. All rules and regulations of the labor department, contract labor Laws, provident fund and employee state insurance and connected Laws, and all other Laws of the land are to be complied with by the Bidder within the quoted rates.
18. The Provisional Sum included and so designated in the BOQ shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with the Conditions of Contract. It will be used by the Engineer for nominated sub-contractors, line agencies, and installation of power connections, third party inspecting agencies, charges levied by statutory electrical, telephone, or other authorities, or for other miscellaneous works. The use of the Provisional Sum will also be for relocation of utilities above or underground that conflict with the existing or permanent line or level of the Works, independent sampling and laboratory testing, as directed by the Engineer, replacement or compensation for plants and trees removed due to the Works set case, IEC activities, etc or as directed by the Engineer.
19. All dismantling/ excavation items will include disposal of excavated surplus soil/material will all lead and lift. No extra payment for transportation for disposal of material or stacking in store etc will be paid.