ALL INDIA INSTITUTE OF MEDICAL SCIENCES
DR. B.R.A. INSTITUTE OF ROTARY CANCER HOSPITAL
ANSARI NAGAR, NEW DELHI-110 029, INDIA.
(STORE SECTION)

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TENDER ENQUIRY DOCUMENT
(Two Bid System for Machinery & Equipments)
(On-line mode/e-procurement system)

Advertised Tender Enquiry No.: IR-02/IRCH/R.O./2025-26(CPP)

BRIEF DESCRIPTION OF GOODS

Advanced High Energy Linear Accelerator (LA) System – 02 Set under buyback basis with Turnkey Work

SECTION-I

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

ANSARI NAGAR, NEW DELHI-110 029

DR. BRA IRCH

NOTICE INVITING TENDERS (NIT)

Advertised Tender Enquiry No: **IR-02/IRCH/RO/2025-26(CPP).** On behalf of Chief, Dr BRAIRCH, AIIMS, Ansari Nagar, New Delhi-110 029, online bids are invited in two bid systems (Techno-Commercial Bid and Financial Bid) from the reputed, eligible and qualified firms/manufacturers for the supply of the following Goods:

S. No.	Brief Description of Goods	Quantity	**Amount of Bid Security/EMD** (in Rs. or for an equivalent amount in foreign currency)
1.	Advanced High Energy Linear Accelerator (LA) System – 02 Set under buyback basis with Turnkey Work	02 Set	Rs.1,40,00,000/-

CRITICAL DATE SHEET

Published Date & Time	15.05.2025 at 04.30 P.M
Bid Document Download/Sale Start Date	15.05.2025 at 04.30 P.M
Seek Clarification Start Date	15.05.2025 at 04.30 P.M
Seek Clarification End Date	22.05.2025 at 05.30 P.M
Pre-Bid Meeting Date & Time	28.05.2025 at 03.00 P.M
Pre-Bid Meeting Place & Address	Chief, Board Room 2nd Floor, Dr.BRAIRCH, AIIMS, New Delhi-110029
Bid Submission Start Date & Time	15.06.2025 at 05.00 P.M
Bid Submission End Date & Time	14.07.2025 at 03.00 P.M.
Bid Opening Date & Time	15.07.2025 at 04.00 P.M.

Instructions:

1. Bids shall be submitted online only at the CPPP website: https://eprocure.gov.in/eprocure/app

2. The Bidder shall download the Tender Enquiry Document directly from the website https://eprocure.gov.in/eprocure/app and shall not tamper/modify it including the downloaded Price Bid template in any manner. In case the same is found to be tempered/modified in any manner, the Tender/Bid will be summarily rejected and EMD will be forfeited.

3. The complete bidding process is online. Bidders should be in possession of a valid Digital Signature Certificate (DSC) of class III for online submission of bids. Prior to bidding, DSC needs to be registered on the website mentioned above.

4. Bidders are advised to follow the instructions provided in the "Instructions for Online Bid Submission" in Para No. 11 of GIB of the Tender Enquiry Document.

5. Bidders are advised to visit this website regularly to keep themselves updated, for any changes/ modifications in the Tender Enquiry Document.

6. Intending bidders are advised to visit the CPPP website https://eprocure.gov.in/eprocure/app regularly till the closing date of submission of bid, for any corrigendum.

7. The documents to be submitted in their bid may be scanned with 100 dpi with the black and white option which helps in fast uploading.

8. The EMD/Bid Security shall be deposited through Bank Guarantee/Demand Draft/FDR drawn in favour of the **Chief, Dr. BRAIRCH, AIIMS New Delhi.** The original Earnest Money/Bid Security must be delivered to **Senior Stores Officer, Room No. 18, Ground floor, Dr. BRARICH, AIIMS, New Delhi-110029** till the bid opening date and time as mentioned in "Critical Date Sheet" failing which the bid shall be summarily rejected.

SECTION - II

GENERAL INSTRUCTIONS TO BIDDERS (GIB)

A. PREAMBLE

1. Definitions and Abbreviations

1.1. The following definitions and abbreviations, which have been used in these documents shall have the meanings as indicated below:

1.2. **Definitions:**

i. "Purchaser" means the organization i.e. AIIMS/Center/Hospital/Department/Sections purchasing goods and services as incorporated in the Tender Enquiry Document.

ii. "Bid" means Quotation / Tender received from a Firm / Tenderer / Bidder.

iii. "Bidder" means Tenderer/ the Individual or Firm submitting Bids / Quotation / Tender.

iv. "Supplier" means the individual or the firm supplying the goods and services as incorporated in the contract/purchase order.

v. "Goods" means all articles, materials, commodities, livestock, furniture, fixtures, raw material, spares, instruments, machinery, equipment, vehicles, medicines, assemblies, sub-assemblies, accessories, intangible products like software, technology transfer, licenses, patents or other intellectual properties purchased or otherwise acquired for the use of Government but excludes books, publications, periodicals, etc. for a library. The term 'goods' also includes works and services which are incidental or consequential to the supply of such goods, such as transportation, insurance, installation, commissioning, training and maintenance.

vi. "Services" means services allied and incidental to the supply of goods, such as transportation, installation, commissioning, provision of technical assistance, training, after-sales service, maintenance service and other such obligations of the supplier covered under the contract.

vii. "Bid Security" (BS) means Earnest Money Deposit / monetary or financial guarantee to be furnished by a bidder along with its tender.

viii. "Contract" means the written agreement entered into between the purchaser and the supplier, together with all the documents mentioned therein and including all attachments, annexures etc. therein.

ix. "Performance Security" means a monetary or financial guarantee to be furnished by the successful bidder for the due performance of the contract placed on it. Performance Security is also known as Security Deposit.

x. "Consignee" means the Center/Hospital/Department/Sections /person to whom the goods are required to be delivered as specified in the Contract.

xi. "Specification" also called Technical Specifications means the document/standard that prescribes the requirement with which goods or services have to conform.

xii. "Inspection" means activities such as measuring, examining, testing, gauging one or more characteristics of the product or service and comparing the same with the specified requirement mentioned in the contract to determine conformity.

xiii. "Day" means calendar day.

Abbreviations:

(i) "ATE" means Advertised Tender Enquiry

(ii) "NIT" means Notice Inviting Tenders.

(iii) "GIB" means General Instructions to Bidders

(iv) "SIT" means Special Instructions to Bidders

(v) "GCC" means General Conditions of Contract

(vi) "SCC" means Special Conditions of Contract

(vii) "LC" means Letter of Credit

(viii) "DP" means Delivery Period

(ix) "BG" means Bank Guarantee

(x) "GST" means Goods & Service Tax

(xi) "CD" means Custom Duty

(xii) "BL" means Bill of Lading

(xiii) "FOB" means Free on Board

(xiv) "CIF" means Cost, Insurance and Freight

(xv) "CIP (Destinations)" means Carriage and Insurance Paid up to the named port of destination. Additionally, the Insurance (local transportation and storage) would be extended and borne by the Supplier from ware house to the consignee site for a period including 3 months beyond the date of delivery.

(xvi) "INCOTERMS" means International Commercial Terms as of the date of Bid Opening

(xvii) "CAMC" means Comprehensive Annual Maintenance Contract (labour, spare and preventive maintenance)

2. Introduction

2.1. The Purchaser has issued these Tender Documents for the purchase of goods and related services as mentioned in Section – VI "List of Requirements", which also indicates, *inter-alia,* the required delivery schedule, terms and place of delivery.

2.2. This section (Section - II "General Instructions to Bidders") provides the relevant information as well as instructions to assist prospective bidders in the preparation and submission of bids. It also

includes the mode and procedure to be adopted by the bidder for receipt and opening as well as scrutiny and evaluation of bids and subsequent placement of contract.

2.3. The bidder shall also read the Special Instructions to Bidders (SIB) related to this purchase, as contained in Section - III of these documents and follow the same accordingly. Whenever there is a conflict between the GIB and the SIB, the provisions contained in the SIB shall prevail over those in the GIB.

2.4. Before formulating the bid and submitting the same to the purchaser, the bidder should read and examine all the terms, conditions, instructions, etc. contained in the Tender Document. Failure to provide and/or comply with the required information, instructions etc. incorporated in these Tender Documents may result in rejection of its Bid.

3. Availability of Funds

3.1. Expenditure to be incurred for the proposed purchase will be met from the funds available with the purchaser/consignee.

4. Language of Bid

4.1. The bid submitted by the bidder and all subsequent correspondence and documents relating to the bid exchanged between the bidder and the purchaser, shall be written in the English language. However, the language of any printed literature furnished by the bidder in connection with its bid may be written in any other language provided the same is accompanied by an English translation and, for purposes of interpretation of the bid, the English translation shall prevail**.**

5. Eligible Bidders

5.1. This Invitation for Tenders is **open** to all bidders who fulfil the eligibility criteria specified in these documents.

6. Eligible Goods and Services

6.1. All goods and related services to be supplied under the contract shall have their origin in India or any other country with which India has not banned trade relations. The term "origin" used in this clause means the place where the goods are mined, grown, produced, or manufactured or from where the related services are arranged and supplied.

7. Bid Expense

7.1. The bidder shall bear all costs and expenditures incurred and/or to be incurred by it in connection with its bid including preparation, uploading of its bid and for subsequent processing the same.

The purchaser will, in no case be responsible or liable for any such cost, expenditure etc regardless of the conduct or outcome of the Tender process.

B. TENDER ENQUIRY DOCUMENT

8. Content of Tender Enquiry Document

8.1. In addition to Section I – "Notice Inviting Tender" (NIT), the Tender Enquiry Document includes:

- Section II – General Instructions to Bidders (GIB)
- Section III – Special Instructions to Bidders (SIB)
- Section IV – General Conditions of Contract (GCC)
- Section V – Special Conditions of Contract (SCC)
- Section VI – List of Requirements
- Section VII – Technical Specifications & General Points
- Section VIII – Qualification Criteria
- Section IX – Tender Acceptance Form
- Section X – Price Schedules (BoQs)
- Section XI - Check List
- Section XII – Bank Guarantee Form for Bid Security
- Section XIII – Manufacturer's Authorization Form
- Section XIV – Bank Guarantee Form for Performance Security/CAMC Security
- Section XV – Contract Forms A & B
- Section XVI – Performa of Consignee Receipt Certificate
- Section XVII – Performa of Final Acceptance Certificate by the consignee

8.2. The relevant details of the required goods and services, the terms, conditions and procedure for Tender, bid evaluation, placement of contract, the applicable contract terms, also, the standard formats to be used for this purpose are incorporated in the above-mentioned documents. The interested bidders are expected to examine all such details etc. to proceed further.

9. Corrigendum to Tender Enquiry Document

9.1. At any time prior to the deadline for submission of bids, the purchaser may, for any reason deemed fit by it, modify the Tender Enquiry Document by issuing a suitable Corrigendum to it.

9.2. Corrigendum will be notified through https://eprocure.gov.in/eprocure/app only.

9.3. In order to provide reasonable time to the prospective bidders to take necessary action in preparing their bids as per the amendment, the purchaser may, at its discretion extend the deadline appropriately for the submission of bids and other allied time frames, which are linked with that deadline.

10. Clarification of Tender Enquiry Document

10.1. A bidder requiring any clarification or elucidation on any issue of the Tender Enquiry Document may take up the same with the purchaser through CPP Portal only. The purchaser will respond through CPP Portal to such request provided the same is uploaded within the time schedule mentioned in "Critical Date Sheet

C. PREPARATION OF BIDS

11. Documents Comprising the Bid

11.1. The **Two Bid System**, i.e. "Techno – Commercial Bid" and "Price Bid" prepared by the bidder shall comprise the following:

A) Techno – Commercial Bid (Un-priced Bid)

i) Scanned copy of "EMD/Bid Security" furnished in accordance with GIB clause 19.1 alternatively, documentary evidence as per GIT clause 19.2 for claiming exemption from payment of EMD/Bid security to be uploaded.

ii) Scanned copy of "Technical Specifications Quoted" as per Section- VII of Tender Enquiry Document viz-a-viz technical specification of the quoted equipment.

iii) Scanned copy of "Technical Brochure/Catalogue of OEM of quoted equipment" detailing its technical parameters.

iv) Scanned copy of the "Tender Acceptance Form" as per Section IX is to be uploaded.

v) Scanned copy of the "Performance Statement" as per Section VIII along with relevant copies of orders and the End Users' satisfaction certificate to be uploaded

vi) Scanned Copy of GST Registration Certificate. The Scanned Copies of the following documents, wherever applicable may be uploaded under "Other Important Documents".

vii) Scanned copy of Documentary evidence, as necessary in terms of clauses 5 and 17 of GIB establishing that the bidder is eligible to submit the bid and, also, qualified to perform the contract if its bid is accepted to be uploaded.

viii) Bidders who quote for goods manufactured by other manufacturers shall upload scanned copy of the "Manufacturer's Authorization Form" as per Section XIII. While giving authorization to the agent, to quote on their behalf, the manufacturer has to give the reasons for not quoting directly against this bid in the Manufacturer's Authorization Form to be uploaded.

ix) Scanned copy of the Power of Attorney in favour of the signatory of the Tender/Bid and signatory of the Manufacturer's Authorization Form is to be uploaded.

x) Scanned copy of Documents and relevant details to establish in accordance with GIB clause 18 that the goods and the allied services to be supplied by the bidder conform to the requirement of the Tender Enquiry Document to be uploaded.

xi) Scanned copy of Documents confirming to Sole Proprietorship/ Partnership/Private Limited Firm in the country of origin as the case may be to be uploaded.

xii) Public Procurement (Preference to Make in India) order no. P-45021/2/2017-BE-II dated 15 June 2017 issued by DPIIT, Ministry of Commerce and Industry as amended from time to time and its subsequent orders notifications issued by concerned Nodal Ministry will be applicable. A scanned copy of the local supplier declaration /certificate **as per section VIII, Performa 'B'** is to be uploaded.

xiii) Restrictions under Rule 144 (xi) of the GFRs 2017 as per order no. F.No.6/18/2019 PPD dated 23rd July 2020 regarding land Border sharing issued by the Department of Expenditure, Public Procurement Division will be applicable. Relevant documents regarding this order are to be uploaded (if applicable).

Note: It is the responsibility of the bidder to go through the Tender Enquiry Document to ensure uploading all required documents in addition to the above, (if any) and should be compiled government of India guidelines/policies (MII, MSME, Land Border etc.) issued time-to-time.

B) Price Bid:

i) Price Schedule(s) as per BoQ format filled up with all the details including Make, Model etc. of the goods offered to be uploaded.

Note:

a. Instructions related to column 11 of BoQ related to "Currency Conversion against each Item". Select "Full Conversion" in case the Bidder wants to Quote Goods in INR only. Select "Partial Conversion" in case the Bidder wants to Quote Goods in Foreign currency OR in both Foreign currency and INR. It is mandatory to Quote "Turnkey" and "CAMC" in INR only.

b. If Quoted Currency is not in Foreign Currency, Column No. 13 can't be blank, it is mandatory to fill 0.00 at least.

ii) Scanned Copy of Consumables, optional accessories/items, Spares, etc. as per the requirement of the Tender Enquiry Document.

Schedule of price bid in the form of BOQ_XXXX.xls

The below-mentioned (Section X) price bid format is provided as BoQ_XXXX.xls along with this Tender Enquiry Document at https://eprocure.gov.in/eprocure/app. Bidders are advised to download this BoQ_XXXX.xls as it is and quote their offer/rates in the permitted column and upload the same in the commercial bid. **The bidder shall not tamper/modify the downloaded price bid template in any manner**. In case the same is found to be tempered/modified in any manner, the tender will be completely rejected and the tenderer is liable to be banned from doing business with AIIMS New Delhi.

11.2. The authorized signatory of the bidder must digitally sign the bid. Individuals digitally signing the bid or other documents connected with a contract must specify whether they sign as:

i. A 'Sole Proprietor' of the firm or constituted attorney of such Sole Proprietor.

ii. In the case of a partnership firm he must have the authority to quote & to refer to an arbitration dispute concerning the business of the partnership either by virtue of the partnership agreement or a power of attorney;

iii. Constituted attorney of the firm if it is a company.

Note:

a) In case of (ii) above, a copy of the partnership agreement duly registered with "Registrar of Firm's" or general power of attorney, in either, case, attested by a Notary Public should be uploaded, or an affidavit on stamped paper of all the partners admitting execution of the partnership agreement or the general power of attorney should be uploaded.

b) In case of the partnership firms, where no authority to refer disputes concerning the business of the partnership has been conferred on any partner, the bid and all other related documents must be signed by every partner of the firm and uploaded.

c) Person digitally signing the Tender Acceptance Form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, liable for rejection of bid or cancel of contract and hold the signatory liable for all cost and damages.

11.3. A bid, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

11.4. Bid sent by fax/email shall be ignored.

12. Bid Currencies

12.1. The bidder supplying indigenous goods or already imported goods shall quote only in Indian Rupees (INR).

12.2. For imported goods if supplied directly from abroad, prices shall be quoted in any freely convertible currency say USD, EUR, GBP, SGD, AUD, CHF, or YEN. As regards price(s) for allied services, if any is required with the goods, the same shall be quoted in Indian Rupees only, if such services are to be performed/undertaken in India. Commission for Indian Agent, if any and if payable shall be indicated in the space provided for in the Price Schedule and will be payable in Indian Rupees only after satisfactory supply, installation and acceptance of the goods. The rate of conversion shall be taken as of the date of placement of the purchase order.

12.3. Bids, where prices are quoted in any other way shall be treated as non -non-responsive and rejected.

13. Bid Prices

13.1. The Bidder shall indicate on the Price Schedule provided in BoQ all the specified components of prices shown therein including the unit prices, applicable taxes and total bid prices of the goods and services it proposes to supply against the requirement. All the columns shown in the Price Schedule should be filled up as required.

13.2. If there is more than one schedule in the "List of Requirements", the bidder has the option to submit its bid for any one or more schedules. However, while quoting for a schedule, the bidder shall quote for the complete requirement of goods and services as specified in that particular schedule.

13.3. The quoted prices for goods offered from within India and for goods offered from abroad are to be indicated separately in the applicable Price Schedules in BoQ.

13.4. While filling up the columns of the Price Schedule, the following aspects should be noted for compliance:

13.4.1. For domestic goods or goods of foreign origin located within India, the prices in the corresponding Price Schedule shall be entered separately in the following manner:

a) The price of the goods, quoted ex-factory/ ex-showroom/ ex-warehouse/ off-the-shelf, as applicable, including packing charges and GST and Custom Duty already paid or payable on the components and raw material used in the manufacture or assembly of the goods quoted ex-factory etc. or on the previously imported goods of foreign origin quoted ex-showroom etc.;

b) Any taxes and duty, which will be payable on the goods in India if the contract is awarded;

c) Charges towards Inland Transportation, Insurance (local transportation and storage) would be borne by the Supplier from ware house to the consignee site for a period including 3 months beyond the date of delivery, Loading/Unloading and other local costs incidental to the delivery of the goods to their final destination as specified in the List of Requirements and Price Schedule;

d) The price of Incidental Services (including installation & commissioning, supervision, demonstration and training), at the consignee site as mentioned in the List of Requirements, Technical Specification and Price Schedule;

e) The prices of Turnkey Work (if any), as mentioned in the List of Requirements, Technical Specification and Price Schedule; and

f) The price of CAMC, as mentioned in the List of Requirements, Technical Specification and Price Schedule.

13.4.2. For goods offered from abroad, the prices in the corresponding price schedule shall be entered separately in the following manner:

a) The price of goods quoted on FOB price at the port of loading/ FCA price at the airport of loading, as mentioned in the List of Requirements, Technical Specification and Price Schedule.

b) The amount of Freight and Insurance (port of loading to the port of entry) and other incidental costs.

c) The price of Incidental Services (including Installation & Commissioning, Supervision, Demonstration and Training) at the Consignee's site as mentioned in the List of Requirements, Technical Specification and Price Schedule.

d) The price of Extended Insurance (local transportation and storage) from the port of entry to the consignee site for a period including 3 months beyond the date of delivery.

e) The Unit Price on CIP Name port of Destination + Extended Insurance (local transportation and storage)

f) The price of total Price on CIP Named port of Destination +Insurance (local transportation on and storage)

g) The prices of Turnkey Work (if any), as mentioned in the List of Requirements, Technical Specification and Price Schedule; and

h) The price of CAMC, as mentioned in the List of Requirements, Technical Specification and Price Schedule.

13.5. **Additional information and instruction on Taxes and Duties:**

13.5.1. GST (Goods & Services Tax)

If the bidder desires to ask for GST (goods and services tax) to be paid extra, the same must be specifically stated. In the absence of any such stipulation, the price will be taken inclusive of GST and no claim for the same will be entertained later.

13.5.2. **Custom Duty** the Purchaser will pay the Custom Duty wherever applicable.

13.6. For transportation of imported goods offered from abroad, relevant instructions as incorporated under GCC Clause 10 shall be followed.

13.7. For insurance of goods to be supplied, relevant instructions as provided under GCC Clause 11 shall be followed.

13.8. Unless otherwise specifically indicated in this Tender Enquiry Document, the terms FCA, FOB, CIF, CIP etc. for imported goods offered from abroad, shall be governed by the

rules & regulations prescribed in the current edition of INCOTERMS - 2010, published by the International Chamber of Commerce, Paris

13.9. The need for an indication of all such price components by the bidders, as required in this clause (viz., GIB clause 13) is for the purpose of comparison of the bids by the purchaser and will in no way restrict the purchaser's right to award the contract on the selected bidder on any of the terms offered.

14. Indian Agent

14.1. If a foreign bidder has engaged an agent in India in connection with its bid, the foreign bidder, in addition to indicating the Indian agent's commission, if any, in a manner described under GIB sub-clause 12.2 above, shall also furnish the following information:

a) The complete name and address of the Indian Agent.
b) The details of the services to be rendered by the agent for the subject requirement.
c) Details of Service outlets in India, nearest to the consignee(s), to render services during the Warranty and CAMC period.

15. Firm Price

15.1. Unless otherwise specified in the SIB, prices quoted by the bidder shall remain firm and fixed during the currency of the contract and not subject to variation on any account.

15.2. However, as regards taxes and duties, if any, chargeable on the goods and payable, the conditions stipulated in GIB clause 13 will apply.

16. Alternative Models

16.1. Alternative Models are permitted. The Bidder can quote alternate models meeting the specifications of the Tender document of the same manufacturer with single Bid Security.

16.2. If an agent submits the bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same Advertised Tender Enquiry for the same item/product. In a bid, either the Indian Agent on behalf of the Principal/OEM or the Principal/OEM itself can bid but both cannot bid simultaneously for the same models in the same Advertised Tender Enquiry.

16.3. One Principal/OEM cannot authorise two agents simultaneously for the same item against the same Advertised Tender Enquiry.

17. Documents Establishing Bidder's Eligibility and Qualifications

17.1. Pursuant to GIB clause 11, the bidder shall furnish, as part of its bid, relevant details and documents establishing its eligibility to quote and its qualifications to perform the contract if its bid is accepted.

17.2. The documentary evidence needed to establish the bidder's qualifications shall fulfil the following requirements:

a) In case the bidder offers to supply goods, which are manufactured by some other firm, the bidder has been duly authorized by the manufacturer of the goods to quote for and supply the goods to the purchaser. The bidder shall submit the manufacturer's authorization letter to this effect as per the standard form provided under Section XIII in this document.

b) In case the bidder is not doing business in India, it is duly represented by an agent stationed in India fully equipped and able to carry out the required contractual functions and duties of the supplier including after-sale service, maintenance & repair etc. of the goods in question, stocking of spare parts and fast-moving components and other obligations, if any, specified in the conditions of contract and/or technical specifications.

18. Documents establishing good's Conformity to Tender Enquiry Document.

18.1. The bidder shall upload in its bid the required as well as the relevant documents like technical data, literature, drawings etc. to establish that the goods and services offered in the bid fully conform to the goods and services specified by the purchaser in the Tender Enquiry Document. For this purpose, the bidder shall also upload a clause-by-clause commentary on the technical specifications and other technical details incorporated by the purchaser in the Tender Enquiry Document to establish the technical responsiveness of the goods and services offered in its bid.

18.2. In case there is any variation and/or deviation between the goods & services prescribed by the purchaser and those offered by the bidder, the bidder shall list out the same in a chart form without ambiguity and provide the same along with its bid.

18.3. If a bidder furnishes wrong and/or misguiding data, statement(s) etc. about the technical acceptability of the goods and services offered by it, its bid will be liable to be ignored and rejected in addition to other remedies available to the purchaser in this regard.

19. Bid Security (BS) /EMD

19.1. Pursuant to GIB clauses 8.1 and 11.1 A (i) the bidder shall furnish along with its bid, Bid Security for the amount as shown in the Notice Inviting Tenders (NIT). It is required to protect the purchaser against the risk of the bidder's unwarranted conduct as amplified under sub-clause 19.7 below.

19.2. The original Earnest Money/Bid Security must be delivered to the address as given in NIT till the bid opening date and time as mentioned in the "Critical Date Sheet" failing which the bid shall be summarily rejected. The scanned copy of the original Bid Security/EMD may be uploaded along with the bid.

19.3. The bidders who are currently registered with MSME for the specific goods as per the Tender document specification shall be eligible for exemption from Bid Security as defined in the MSE Procurement Policy issued by the department of MSME. In case the bidder falls into this category, the bidder shall upload the relevant certificate of registration issued by the department of MSME.

19.4. The Bid Security shall be denominated in Indian Rupees or equivalent currencies as per GIB clause 12.2. The Bid Security shall be furnished in one of the following forms:

(i) Account Payee Demand Draft/ Banker's cheque
(ii) Fixed Deposit Receipt
(iii) Bank Guarantee

19.5. The demand draft or banker's cheque shall be drawn on any commercial bank in India or the country of the bidder, in favour of as indicated in the NIT payable at New Delhi. In the case of a Bank Guarantee, the same is to be provided from any commercial bank in India or the country of the bidder as per the format specified under Section XII in these documents.

19.6. The Bid Security shall be valid for a period of forty-five (45) days beyond the validity period of the bid. As the validity period of the Bid as per Clause 20 of GIB is 270 days, the Bid Security shall be valid for 315 days from the Techno – techno-commercial bid opening date.

19.7. The Bid Security of unsuccessful bidders will be returned without any interest, after the expiry of the bid validity period, but not later than thirty days after the conclusion of the resultant contract. The Bid Security of the successful bidder will be returned without any interest, after receipt of performance security from that bidder.

19.8. Bid Security is required to protect the purchaser's right against the risk of the Bidder's conduct, which would warrant the forfeiture of the Bid Security. Bid Security of a bidder will be forfeited, if the bidder withdraws or amends its bids or impairs or derogates from the bid in any respect within the period of validity of its bid or if it comes to the notice that the information/documents furnished in its bid are incorrect, false, misleading or forged without prejudice to other rights of the purchaser. The Bid Security of the successful bidder

will be forfeited without prejudice to other rights of the Purchaser if it fails to furnish the required performance security within the specified period.

19.9. In the case of a Bank Guarantee furnished from banks outside India (i.e. foreign Banks), it should be authenticated and countersigned by any nationalized bank in India by way of back-to-back counter guarantee and the same should be submitted along with the bid.

20. Bid Validity

20.1. If not mentioned otherwise in the SIB, the bid shall remain valid for acceptance for a period of 270 days (Two hundred and Seventy days) after the date of bid opening prescribed in the Tender Document. Any bid valid for a shorter period shall be treated as unresponsive and rejected.

20.2. In exceptional cases, the bidder may be requested by the purchaser to extend the validity of their bids up to a specified period. Such request(s) and responses thereto shall be conveyed by mail/fax/email. The bidders, who agree to extend the bid validity, are to extend the same without any change or modification of their original bid and they are also to extend the validity period of the Bid Security accordingly. A bidder, who may not agree to extend its bid validity after the expiry of the original validity period, their bid will not be considered further and the Bid Security furnished by them shall be returned.

20.3. In case the day up to which the bids are to remain valid falls on/ subsequently declared a holiday or closed day for the purchaser, the bid validity shall automatically be extended up to the next working day.

21. Signing of Bid

21.1. The bidders shall submit their online bids as per the instructions for the online bid process contained in GIB Clause 11.

22. Instructions for Online Bid Submission:

22.1. The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, preparing their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information that is useful for submitting online bids on the CPP Portal may be obtained at: https://eprocure.gov.in/eprocure/app**.**

23. REGISTRATION ON CPP PORTAL:

23.1. Bidders are required to enrol on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "**Online bidder Enrolment**" on the CPP Portal which is free of charge.

23.2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

23.3. Bidders are advised to register their valid email addresses and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

23.4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify/nCode/eMudhra etc.), with their profile.

23.5. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.

23.6. Bidder then logs in to the site through the secured log-in by entering their user ID/password and the password of the DSC / e-Token.

24. SEARCHING FOR TENDER ENQUIRY DOCUMENT

24.1. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.

24.1.1. Once the bidders have selected the tenders they are interested in, they may download the required documents/tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS/e-mail in case there is any corrigendum issued to the tender document.

24.1.2. The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification/help from the Helpdesk.

25. PREPARATION OF BIDS

25.1. **Bidders** should take into account any corrigendum published on the tender document before submitting their bids.

25.2. Please go through the tender advertisement and the Tender Enquiry Document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted and the number of documents - including the names and content of each of the documents that need to be submitted. Any deviations from these may lead to the rejection of the bid.

25.3. Bidder, in advance, should get ready the documents/BoQ to be uploaded as indicated in the Tender Enquiry Document and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Scanned documents to be uploaded may be scanned with 100 dpi with the black and white option which helps in reducing the size of the scanned document and resulting in fast uploading. It is the responsibility of the bidder to ensure that uploaded scanned documents are legible.

25.4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents has been provided to the bidders. Bidders can use the "My Space" or ''Other Important Documents'' area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for the bid submission process.

C. SUBMISSION OF BIDS

26. Submission of Bids

26.1. Bidders should log into the site well in advance of bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

26.2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the Tender Enquiry document.

26.3. The bidder has to select the payment option as "offline" to pay the Bid Security/ EMD as applicable and enter details of the instrument.

26.4. The bidder should prepare the Bid Security/EMD as per the instructions specified in the Tender Enquiry Document. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the Tender Enquiry Document. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned

copy and the data entered during bid submission time. Otherwise, the uploaded bid will be rejected.

26.5. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white-coloured (unprotected) cells with their respective financial quotes and other details (such as the name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

26.6. The server time (which is displayed on the bidders' dashboard) will be considered the standard time for referencing the deadlines for submission of the bids by the bidders, the opening of bids etc. The bidders should follow this time during bid submission.

27. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128-bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system-generated symmetric key. Further, this key is subjected to asymmetric encryption using buyers'/bid openers' public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

a) The uploaded Tender/Bid shall become readable only after the tender opening by the authorized bid openers.

b) Upon the successful and timely submission of bids (ie after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

c) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

28. ASSISTANCE TO BIDDERS

28.1. Any queries relating to the Tender Enquiry Document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the NIT.

28.2. Any queries relating to the process of online bid submission or queries relating to the CPP Portal, in general, may be directed to the 24x7 CPP Portal Helpdesk.

D. BID OPENING

29. Opening of Bids

E- Bids will be opened after the due time and date and the bidders may check the status etc. on the CPP Portal.

E. SCRUTINY AND EVALUATION OF BIDS

30. Basic Principle

30.1. Bids will be evaluated on the basis of the terms & conditions already incorporated in the Tender Enquiry Document, based on which bids have been received and the terms, conditions etc. mentioned by the bidders in their bids. No new conditions will be brought in while scrutinizing and evaluating the bids.

31. Scrutiny of Bids

31.1. The Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required Bid Securities have been furnished, whether the documents have been properly signed and stamped and whether the Bids are generally in order.

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

31.3. The Bids will be scrutinized to determine whether they are complete and meet the essential and important requirements, conditions etc. as prescribed in the Tender Enquiry Document. The bids, which do not meet the basic requirements, are liable to be treated as non-responsive and will be rejected.

31.4. The following are some of the important aspects, for which a bid shall be declared non-responsive during the evaluation and will be ignored;

i. Tender Acceptance Form as per Section IX (signed & stamped) was not uploaded.

ii. Bid validity is shorter than the required period.

iii. Required Bid Security (Amount, validity etc.)/exemption documents have not been uploaded as per stipulated provisions.

iv. Bidder has quoted for goods manufactured by other manufacturers (s) without the required Manufacturer's Authorization Form as per Section XIII.

v. Bidder has not agreed to give the required Performance Security of the required amount in an acceptable form in terms of GCC clause 5, read with modification, if any, in Section - V – "Special Conditions of Contract", for the due performance of the contract.

vi. Bidder has not agreed to other essential condition(s) specially incorporated in the Tender document like terms of payment, liquidated damages clause, warranty clause, dispute resolution mechanism, and applicable law.

vii. Poor/unsatisfactory past performance.

viii. Bidders who stand de-registered/banned/blacklisted by any Central Govt. Ministries/Departments/Hospitals/Institutes.

ix. Bidder is not eligible as per Clauses 5, 6 & 17 of GIB.

x. Bidder has not quoted for the entire quantity as specified in the List of Requirements in the quoted schedule.

xi. Bidders have not agreed to the delivery terms and delivery schedule.

32. Minor Infirmity/Irregularity/Non-Conformity

32.1. If during the evaluation, the purchaser finds any minor informality and/or irregularity and/or non-conformity in a bid, the purchaser will convey its observation on such 'minor' issues, which has not price implication, to the bidders by registered/speed post/ e-mail/fax etc. asking the bidder to respond by a specified date. If the bidder does not reply by the specified date or gives an evasive reply without clarifying the point at issue in clear terms, that bid will be liable to be ignored.

33. Qualification Criteria

33.1. Bids of the bidder, who have not uploaded the required documents or do not meet the required Qualification Criteria prescribed in Section VIII, will be treated as non - responsive and will not be considered further.

34. Conversion of bid currencies to Indian Rupees

34.1. In case the Tender Documents permit the bidder to quote their prices in different currencies, all such quoted prices of the responsive bidder will be converted to a single currency viz., Indian Rupees for the purpose of equitable comparison and evaluation, as per the exchange

rates established by the Reserve Bank of India for similar transactions, as on the date of 'Price Bid' opening.

35. Schedule-wise Evaluation

35.1. In case the List of Requirements contains more than one schedule, the responsive bids will be evaluated and compared separately for each schedule. The bid for a schedule will not be considered if the complete requirements prescribed in that schedule are not included in the bid. However, as already mentioned in GIB sub clause 13.2, the bidders have the option to quote for any one or more schedules and offer discounts for combined schedules. Such discounts wherever applicable will be taken into account to determine the lowest evaluated cost for the purchaser in deciding the successful bidder for each schedule, subject to the bidder (s) being responsive.

36. Comparison of Bids

36.1. Unless mentioned otherwise in Section – III – Special Instructions to bidder and Section – VI – List of Requirements, the comparison of the responsive Bids shall be carried out on Free Delivery at consignee site basis. The quoted Turnkey Work prices and CAMC prices will also be added for comparison/ranking purposes for evaluation. "Net Present Value (NPV) of the Comprehensive Annual Maintenance Contract Charges (CAMC) quoted for 8 years after the warranty period shall be added to the bid price for evaluation and will be calculated after discounting the quoted price by a discounting factor of 10% per annum." However, the payment of CAMC shall be made to the successful bidder at approved rates.

37. Additional Factors and Parameters for Evaluation and Ranking of Responsive Bidders

37.1. Further to GIB Clause 36 above, the purchaser's evaluation of a bid will include and take into account the following:

i) In the case of goods manufactured in India or goods of foreign origin already located in India, GST will be contractually payable (to the bidder), on the goods if a contract is awarded to the bidder; and

ii) in the case of goods of foreign origin offered from abroad, Customs Duty and GST will be contractually payable (to the bidder) on the goods if the contract is awarded to the bidder.

37.2. The purchaser's evaluation of the bid will also take into account the additional factors, if any, incorporated in SIB in the manner and to the extent indicated therein.

37.3. The Purchaser reserves the right to give the price preference to small-scale sectors etc. and purchase preference to central public sector undertakings as per the instruction in vogue while evaluating, comparing and ranking the responsive Bids.

38. Bidder's capability to perform the contract

38.1. The purchaser, through the above process of bid scrutiny and bid evaluation, will determine to its satisfaction whether the bidder, whose bid has been determined as the lowest evaluated responsive bid is eligible, qualified and capable in all respects to perform the contract satisfactorily. If, there is more than one schedule in the List of Requirements, then, such determination will be made separately for each schedule.

38.2. The above-mentioned determination will, inter alia, take into account the bidder satisfying all the requirements of the purchaser as incorporated in the Tender Enquiry Document. Such determination will be based upon scrutiny and examination of all relevant data and details submitted by the bidder in its bid as well as such other allied information as deemed appropriate by the purchaser.

39. Contacting the Purchaser

39.1. From the time of submission of the bid to the time of awarding the contract, if a bidder needs to contact the purchaser for any reason relating to the NIT /Tender Enquiry Document and/or its bid, it should do so only through the CPP portal.

39.2. In case a bidder attempts to influence the purchaser in the purchaser's decision on scrutiny, comparison & evaluation of bids and awarding the contract, the bid of the bidder shall be liable for rejection in addition to appropriate administrative actions being taken against that bidder, as deemed fit by the purchaser.

F. AWARD OF CONTRACT

40. Purchaser's Right to accept any bid and to reject any or all bids.

40.1. The purchaser reserves the right to accept in part or in full any bid or reject any or more bid(s) without assigning any reason or to cancel the Tender process and reject all bids at any time prior to the award of the contract, without incurring any liability, whatsoever to the affected bidder(s).

41. Award Criteria

41.1. Subject to GIT clause 40 above, the contract will be awarded to the lowest evaluated responsive bidder decided by the purchaser in terms of GIB Clause 38.

42. Variation of Quantities at the Time of Award/ Currency of Contract

42.1. At the time of awarding the contract, the purchaser reserves the right to increase or decrease by up to twenty-five (25) per cent, the quantity of goods and services mentioned in the schedule (s) in the "List of Requirements" (rounded off to next whole number) without any change in the unit price and other terms & conditions quoted by the bidder.

42.2. If the quantity has not been increased at the time of the awarding of the contract, the purchaser reserves the right to increase by up to twenty-five (25) per cent, the quantity of goods and services mentioned in the contract (rounded off to next whole number) without any change in the unit price and other terms & conditions mentioned in the contract, during the currency of the contract.

43. Notification of Award

43.1. Before the expiry of the bid validity period, the purchaser will notify the successful bidder (s) in writing, by registered / speed post or by fax/ email (to be confirmed by registered / speed post) that its bid for Goods & Services, which have been selected by the purchaser, has been accepted, also briefly indicating there in the essential details like description, specification and quantity of the goods & services and corresponding prices accepted. The successful bidder must furnish to the purchaser the required Performance Security within thirty days from the date of dispatch of this notification, failing which the Bid Security will be forfeited and the award will be cancelled. Relevant details about Performance Security have been provided in clause 5 of GCC under Section IV.

43.2. The Notification of Award shall constitute the conclusion of the Contract.

44. Issue of Contract

44.1. Promptly after notification of the award, the Purchaser will mail the contract form (as per Section XV) duly completed and signed, in duplicate, to the successful bidder by registered / speed post.

44.2. Within twenty-one days from the date of the contract, the successful bidder shall return the original copy of the contract, duly signed and dated, to the Purchaser/ by registered / speed post/courier.

44.3. The Purchaser reserves the right to issue the Notification of Award consignee-wise.

45. Non-receipt of Performance Security and Contract by the Purchaser

45.1. Failure of the successful bidder in providing Performance Security and/or returning contract copy duly signed in terms of GIB clauses 43 and 44 above shall make the bidder liable for forfeiture of its Bid Security and, also, for further actions by the Purchaser as per the clause 24-Termination of default of GCC under Section IV.

46. Return of Bid Security/EMD

46.1. The Bid Security/EMD of the successful bidder and the unsuccessful bidder will be returned to them without any interest, whatsoever, in terms of Clause 19 of GIB.

47. Publication of Bid Result

47.1. The name and address of the successful bidder (s) receiving the contract(s) will be mentioned in the CPP Portal.

G. CORRUPT OR FRAUDULENT PRACTICES

48. Corrupt or Fraudulent Practices

48.1. It is required by all concerned namely the Bidder /Suppliers/ Purchaser/Consignee/End User etc. to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Purchaser: -

(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 of anything of value to influence the action of a public official in the procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;

(b) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract by the purchaser if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing the contract.

SECTION – III

SPECIAL INSTRUCTIONS TO BIDDERS
(SIB)

The following Special Instructions to Bidders will apply for this purchase. These special instructions will modify/substitute/supplement the corresponding General Instructions to Bidders (GIB) incorporated in Section II. The corresponding GIB clause numbers have also been indicated in the text below:

In case of any conflict between the provision in the GIB and that in the SIB, the provision contained in the SIB shall prevail.

Sl. No.	GIB Clause No.	Topic	SIB Provision
A	1 to 7	Preamble	No Change
B	8 to 10	Tender Enquiry Document	No Change
C	11 to 25	Preparation of Bids	No Change
D	26 to28	Submission of Bids	No Change
E	29	Bid Opening	No Change
F	30 to 39	Scrutiny and Evaluation of Bids	No Change
G	40 to 47	Award of Contract	No Change
H	48	Corrupt or Fraudulent Practices	No Change

SECTION - IV

GENERAL CONDITIONS OF CONTRACT (GCC)

1. Application

1.1. The General Conditions of Contract incorporated in this section shall be applicable for this purchase to the extent the same are not superseded by the Special Conditions of Contract prescribed under Section V, List of requirements under Section VI and Technical Specification under Section VII of this document.

2. Use of contract documents and information

2.1. The supplier shall not, without the purchaser's prior written consent, disclose the contract or any provision thereof including any specification, drawing, sample or any information furnished by or on behalf of the purchaser in connection therewith, to any person other than the person(s) employed by the supplier in the performance of the contract emanating from this Tender Document. Further, any such disclosure to any such employed person shall be made in confidence and only so far as necessary for the purposes of such performance for this contract.

2.2. Further, the supplier shall not, without the purchaser's prior written consent, make use of any document or information mentioned in GCC sub-clause 2.1 above except for the sole purpose of performing this contract.

2.3. Except the contract issued to the supplier, each and every other document mentioned in GCC sub-clause 2.1 above shall remain the property of the purchaser and, if advised by the purchaser, all copies of all such documents shall be returned to the purchaser on completion of the supplier's performance and obligations under this contract.

3. Patent Rights

3.1. The supplier shall, at all times, indemnify and keep indemnified the purchaser, free of cost, against all claims which may arise in respect of goods & services to be provided by the supplier under the contract for infringement of any intellectual property rights or any other right protected by patent, registration of designs or trademarks. In the event of any such claim in respect of alleged breach of patent, registered designs, trademarks etc. being made against the purchaser, the purchaser shall notify the supplier of the same and the supplier shall, at his own expense take care of the same for settlement without any liability to the purchaser.

4. Country of Origin

4.1. All goods and services to be supplied and provided for the contract shall have the origin in India or in the countries with which the Government of India has trade relations.

4.2. The word "origin" incorporated in this clause means the place from where the goods are mined, cultivated, grown, manufactured, produced or processed or from where the services are arranged.

4.3. The country of origin may be specified in the Price Schedule.

5. Performance Security

5.1. Within Thirty (30) days from the date of the issue of notification of award by the Purchaser, the supplier shall furnish Performance Security to the Purchaser for an amount equal to three per cent (3%) of the total value of the contract, valid up to ninety (90) days after the date of completion of all contractual obligations by the supplier, including the warranty obligations.

5.2. The Performance security shall be denominated in Indian Rupees or in the currency of the contract as detailed below:

It shall be in any one of the forms namely Account Payee Demand Draft or Fixed Deposit Receipt drawn from any Scheduled bank in India or Bank Guarantee issued by a Scheduled bank in India, in the prescribed form as provided in Section XIV of this document in favour of the Purchaser. The validity of the Fixed Deposit Receipt or Bank Guarantee will be for a period up to ninety (90) days beyond the Warranty Period.

5.3. In the event of any failure /default of the supplier with or without any quantifiable loss to the government including the furnishing of consignee wise Bank Guarantee for CAMC security as per Performa in Section XIV, the amount of the performance security is liable to be forfeited. The needful will be done to cover any failure/default of the supplier with or without any quantifiable loss to the Government.

5.4. In the event of any amendment issued to the contract, the supplier shall, within fifteen (15) days of the issue of the amendment, furnish the corresponding amendment to the Performance Security (as necessary), rendering the same valid in all respects in terms of the contract, as amended.

5.5. The supplier shall enter into Comprehensive Annual Maintenance Contract as per the 'Contract Form – B' in Section XV with respective consignees, 3 (three) months prior to the completion of the Warranty Period. The CAMC will commence from the date of expiry of the Warranty Period.

5.6. Subject to GCC sub-clause 5.3 above, the Purchaser will release the Performance Security without any interest to the supplier on completion of the supplier's all contractual obligations including the warranty obligations & after receipt of Consignee wise bank guarantee for CAMC security in favour of the concerned Director AIIMS/ Chief of Centres/MS of Hospital/ Head of the Department/ Dean as per the format in Section XIV.

6. Technical Specifications and General Points

6.1. The Goods & Services to be provided by the supplier under this contract shall conform to 'Technical Specification' under Section VII of this document.

7. Packing and Marking

7.1. The packing for the goods to be provided by the supplier should be strong and durable enough to withstand, without limitation, the entire journey during transit including transhipment (if any), rough handling, open storage etc. without any damage, deterioration etc. As and if necessary, the size, weights and volumes of the packing cases shall also take into consideration, the remoteness of the final destination of the goods and the availability or otherwise of transport and handling facilities at all points during transit up to the final destination as per the contract.

7.2. The quality of packing, the manner of marking within & outside the packages and the provision of accompanying documentation shall strictly comply with the requirements as provided in Technical Specifications under Sections VII and in SCC under Section V. In case the packing requirements are amended due to the issue of any amendment to the contract, the same shall also be taken care of by the supplier accordingly.

7.3. Packing instructions:

Unless otherwise mentioned in the Technical Specification under Sections VII and in SCC under Section V, the supplier shall make separate packages for each consignee (in case there is more than one consignee mentioned in the contract) and mark each package on three sides with the following with indelible paint of proper quality:

a) Contract number and date
b) Brief description of goods including quantity
c) Packing list reference number
d) Country of origin of goods
e) Consignee's name and full address and
f) Supplier's name and address

8. Inspection, Testing and Quality Control

8.1. The purchaser and/or its nominated representative(s) will, without any extra cost to the purchaser, inspect and/or test the ordered goods and the related services to confirm their conformity to the contract specifications and other quality control details incorporated in the contract. The purchaser shall inform the supplier in advance, in writing, of the purchaser's programme for such inspection and, also the identity of the officials to be deputed for this purpose. "The cost towards the transportation, boarding and lodging will be borne by the purchaser and/or its nominated representative(s) for the first visit. In case the goods are rejected in the first instance and the supplier requests for re-inspection, and if the same is accepted by the Purchaser/Consignee, all subsequent inspections shall be at the cost of the supplier. The expense will be to and fro Economy Airfare, Local Conveyance, Boarding and Lodging of the inspection team for the inspection period."

8.2. The Technical Specification incorporated in the contract shall specify what inspections and tests are to be carried out and, also, where and how they are to be conducted. If such inspections and tests are conducted in the premises of the supplier or its subcontractor(s), all reasonable facilities and assistance, including access to relevant drawings, design details and production data, shall be furnished by the supplier to the purchaser's inspector at no charge to the purchaser.

8.3. If during such inspections and tests, the contracted goods fail to conform to the required specifications and standards, the purchaser's inspector may reject them and the supplier shall either replace the rejected goods or make all alterations necessary to meet the specifications and standards, as required, free of cost to the purchaser and re-submit the same to the purchaser's inspector for conducting the inspections and tests again.

8.4. In case the contract stipulates pre-dispatch inspection of the ordered goods at the supplier's premises, the supplier shall put up the goods for such inspection to the purchaser's inspector

well ahead of the contractual delivery period, so that the purchaser's inspector is able to complete the inspection within the contractual delivery period.

8.5. If the supplier tenders the goods to the purchaser's inspector for inspection at the last moment without providing reasonable time for the inspector to complete the inspection within the contractual delivery period, the inspector may carry out the inspection and complete the formality beyond the contractual delivery period at the risk and expense of the supplier. The fact that the goods have been inspected after the contractual delivery period will not have the effect of keeping the contract alive and this will be without any prejudice to the legal rights and remedies available to the purchaser under the terms & conditions of the contract.

8.6. The purchaser's contractual right to inspect, test and, if necessary, reject the goods after the goods' arrival at the final destination shall have no bearing on the fact that the goods have previously been inspected and cleared by the purchaser's inspector during the pre-dispatch inspection mentioned above.

"On rejection, the supplier shall remove such stores within 14 days of the date of intimation of such rejection from the consignee's premises. If such goods are not removed by the supplier within the period mentioned above, the purchaser/consignee may remove the rejected stores and either return the same to the supplier at his risk and cost by such mode of transport as the purchaser/consignee may decide or dispose of such goods at the suppliers risk to recover any expense incurred in connection with such disposals and also the cost of the rejected stores if already paid for."

8.7. Goods accepted by the purchaser/consignee and/or its inspector at the initial inspection and in the final inspection in terms of the contract shall in no way dilute the purchaser's/consignee's right to reject the same later if found deficient in terms of the warranty clause of the contract, as incorporated under GCC Clause 15.

8.8. Principal/ Foreign supplier shall also have the equipment inspected by a recognized/ reputed agency like SGS, Lloyd, Bureau Veritas, TUV etc. prior to dispatch at the supplier's cost and furnish the necessary certificate from the said agency in support of their claim.

9. Terms of Delivery

9.1. Goods shall be delivered by the supplier in accordance with the terms of delivery and as per the delivery period specified in the schedule of requirement. Please note that the time shall be the essence of the contract.

10. Transportation of Goods

10.1. Instructions for transportation of imported goods offered from abroad:

The supplier shall not arrange part-shipments without the express/prior written consent of the purchaser. The supplier is required under the contract to deliver the goods under CIP (Named port of destination) terms.

11. Insurance

11.1. Unless otherwise instructed in the SCC, the supplier shall make arrangements for insuring the goods against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the following manner:

i) In case of the supply of domestic goods on Free Delivery at Consignee's Site basis, the supplier shall be responsible till the entire store is contracted for arrival in good condition at the destination. The transit risk in this respect shall be covered by the Supplier by getting the stores duly insured for an amount equal to 110% of the value of the goods from warehouse to warehouse (consignee site) on all the risk basis. The insurance cover shall be obtained by the Supplier and should be valid for 3 months after the receipt of goods by the Consignee.

ii) In case of the supply of the imported goods on CIP (named port of Destination Basis), the additional extended Insurance (local transportation and storage) would be borne by the Supplier from the port of entry to the consignee site for a period including 3 months beyond the date of delivery for an amount equal to 110% of the overall expenditure to be incurred by the purchaser from warehouse to the warehouse (consignee site) on all risk basis.

If the equipment is not commissioned and handed over to the consignee within 3 months, the insurance will have to be extended by the supplier at their cost till the successful installation, testing, commissioning and handing over of the goods to the consignee. In case the delay in the installation and commissioning is due to the handing over of the site to the supplier by the consignee/End User, such extensions of the insurance will still be done by the supplier, but the insurance extension charges at actuals will be reimbursed.

12. Spare parts

12.1. If specified in the List of Requirements and in the resultant contract, the supplier shall supply/provide any or all of the following materials, information etc. pertaining to spare parts manufactured and/or supplied by the supplier:

a) The spare parts as selected by the Purchaser/End User to be purchased from the supplier, subject to the condition that such purchase of the spare parts shall not relieve the supplier of any contractual obligation including warranty obligations; and

b) In case the production of the spare parts is discontinued:

i) Sufficient advance notice to the Purchaser/End User before such discontinuation to provide adequate time to the purchaser to purchase the required spare parts etc., and

ii) Immediately following such discontinuation, providing the Purchaser/End User, free of cost, the designs, drawings, layouts and specifications of the spare parts, as and if requested by the Purchaser/End User.

12.2. Supplier shall carry sufficient inventories to assure ex-stock supply of consumables and spares for the goods so that the same are used during the warranty and CAMC period.

13. Incidental Services

13.1. Subject to the stipulation, if any, in the SCC (Section – V), List of Requirements (Section – VI) and the Technical Specification (Section – VII), the supplier shall be required to perform the following services:

(i) Installation & Commissioning, Supervision, Demonstration, Trial run etc. of the goods.

(ii) Turnkey work (if any).

(iii) Training of Consignee/End Users Doctors, Staff, operators etc. for operating and maintaining the goods.

(iv) Supplying the required number of operation & maintenance manuals for the goods.

14. Distribution of Dispatch Documents for Clearance/Receipt of Goods

The supplier shall send all the relevant dispatch documents well in time to enable the purchaser to clear or receive (as the case may be) the goods in terms of the contract. Unless otherwise specified in the SCC, the usual documents involved and the drill to be followed in general for this purpose are as follows:

Within 24 hours of dispatch, the supplier shall notify the concerned Store Officer in AIIMS Clearing Agent and others concerned, of the complete details of dispatch and also supply the following documents by air mail/courier etc. with intimation by e-mail:

a) Commercial Supplier's Invoice giving full details of the goods including quantity, value, etc.;
b) Packing list;
c) Certificate of the country of origin;
d) Bill of Lading/Airway Bill;
e) Insurance Certificate; (if applicable)
f) Manufacturer's guarantee and Inspection certificate; (if applicable)
g) Inspection certificate issued by the Purchaser's Inspector; (if applicable)
h) Any other document(s) as and if required in terms of the contract.

15. Warranty and CAMC

15.1. The supplier warrants comprehensively that the goods supplied under the contract are new, and unused and incorporate all recent improvements in design and materials unless prescribed otherwise by the purchaser in the contract. The supplier further warrants that the goods supplied under the contract shall have no defect arising from design, materials (except when the design adopted and/or the material used are as per the Purchaser's/Consignee's specifications) or workmanship or from any act or omission of the supplier, that may develop under normal use of the supplied goods under the conditions prevailing in India.

15.2. The warranty shall include all spares, labour and preventive maintenance from the date of completion of the satisfactory installation and acceptance till the warranty period.

15.3. The Comprehensive Annual Maintenance Contract shall include all spares, labour and preventive maintenance from the date of completion of the satisfactory installation and acceptance till the warranty period.

15.4. Warranty as well as Comprehensive Annual Maintenance Contract will be inclusive of all accessories and turnkey work and it will also cover the following, wherever applicable:-

- All kinds of Motors.
- Plastic & Glass Parts against any manufacturing defects.
- All kinds of sensors.
- All kinds of coils, probes and transducers.
- Printers and imagers including laser and thermal printers with all parts.
- UPS including the replacement of batteries.
- Air-conditioners

15.5. In case of any claim arising out of this warranty and CAMC period, the Purchaser/Consignee shall promptly notify the same in writing to the supplier. The period of the warranty will be as per G.C.C clause number 15.2 unless revised in SCC in Section V of the Tender Enquiry Document.

15.6. Upon receipt of such notice, the supplier shall, within 8 hours on a 24(hrs) X 7 (days) X 365 (days) basis respond to take action to repair or replace the defective goods or parts thereof, free of cost, at the ultimate destination. The supplier shall take over the replaced parts/goods after providing their replacements and no claim, whatsoever shall lie on the purchaser for such replaced parts/goods thereafter. The penalty clause for non-rectification will be applicable as per conditions laid down in the Tender Enquiry Document.

15.7. In the event of any rectification of a defect or replacement of any defective goods during the warranty period, the warranty for the rectified/replaced goods shall be up to the completion of the original warranty period of the main equipment.

15.8. If the supplier, having been notified, fails to respond to take action to repair or replace the defect(s) within 8 hours on a 24(hrs) X 7 (days) X 365 (days) basis, the purchaser may proceed to take such remedial action(s) as deemed fit by the purchaser, at the risk and expense of the supplier and without prejudice to other contractual rights and remedies, which the purchaser may have against the supplier.

15.9. During the Warranty and CAMC period, the supplier is required to visit each consignee's site at least once in 6 months commencing from the date of the installation for preventive maintenance of the goods

15.10. The Purchaser/Consignee reserve the right to enter into a Comprehensive Annual Maintenance Contract between the Purchaser and the Supplier for the period as mentioned in Section VII, Technical Specifications after the completion of the warranty period.

15.11. The supplier along with its Manufacturer, Indian Agent and CAMC provider shall ensure continued supply of the spare parts for the machines and equipment supplied by them to the purchaser for 10 years from the date of installation and handing over.

15.12. The Supplier along with its Manufacturer Indian Agent and the CMC Provider shall always accord the most favoured client status to the Purchaser vis-à-vis the other Clients/Purchasers of its equipments/machines/goods etc. and shall always give the most competitive price for its machines/equipments supplied to the Purchaser/Consignee.

16. Assignment

16.1. The Supplier shall not assign, either in whole or in part, its contractual duties, responsibilities and obligations to perform the contract, except with the Purchaser's prior written permission.

17. Sub Contracts

17.1. The Supplier shall notify the Purchaser in writing of all sub-contracts awarded under the contract, if not already specified in its bid. Such notification, in its original bid or later, shall not relieve the Supplier from any of its liability or obligation under the terms and conditions of the contract.

17.2. Subcontract shall be only for bought-out items and sub-assemblies.

17.3. Subcontracts shall also comply with the provisions of GCC Clause 4 ("Country of Origin").

18. Modification of Contract

18.1. If necessary, the purchaser may, by a written order given to the supplier at any time during the currency of the contract, amend the contract by making alterations and modifications within the general scope of the contract in any one or more of the following:

a) Specifications, drawings, designs etc. where goods to be supplied under the contract are to be specially manufactured for the purchaser,
b) Mode of packing,
c) Incidental services to be provided by the supplier
d) Mode of dispatch,
e) Place of delivery, and
f) Any other area(s) of the contract, as felt necessary by the purchaser depending on the merits of the case.

18.2. In the event of any such modification/alteration causing increase or decrease in the cost of goods and services to be supplied and provided, or in the time required by the supplier to perform any obligation under the contract, an equitable adjustment shall be made in the contract price and/or contract delivery schedule, as the case may be, and the contract amended accordingly. If the supplier doesn't agree to the adjustment made by the Purchaser

the supplier shall convey its views to the Purchaser within twenty-one days from the date of the supplier's receipt of the Purchaser's amendment/modification of the contract.

19. Prices

19.1. Prices to be charged by the supplier for the supply of goods and provision of services in terms of the contract shall not vary from the corresponding prices quoted by the supplier in its bid and incorporated in the contract except for any price adjustment authorized in the SCC.

20. Taxes and Duties

20.1. Supplier shall be entirely responsible for GST incurred until delivery of the contracted goods to the purchaser.

20.2. Further instruction, if any, shall be as provided in the SCC.

21. Terms and Mode of Payment

21.1. Payment Terms

Payment shall be made through electronic transfer in NEFT/RTGS subject to recoveries, if any, by way of liquidated damages or any other charges as per terms & conditions of the contract in the following manner:

A) Payment for Indigenous Goods (M&E) Or Foreign Origin Located Within India.

Payment shall be made in Indian Rupees as specified in the contract in the following manner:

a) On delivery: 75% payment of the contract price shall be paid on receipt of goods in good condition and upon the submission of the following documents:

(i) Original copies of supplier's invoice showing contract number, goods description, quantity, packing list, unit price and total amount;
(ii) Consignee Receipt Certificate as per Section XVII of Tender document in original issued by the authorized representative of the consignee;

b) On Acceptance: Balance 25% payment would be made against the "Installation and Acceptance Certificate" of goods to be issued by the End User subject to recoveries, if

any, either on account of non-rectification of defects/deficiencies not attended by the Supplier or otherwise. “Installation and Acceptance Certificate” need to be issued by the concerned End User after installation, commissioning, testing and successful trial run (if applicable).

B) Payment for Imported Goods(M&E): Payment for the foreign currency portion shall be made in the currency as specified in the contract in the following manner:

a) **On Shipment**: Seventy-Five (75)% of the net FCA/CIP price (i.e. FCA/CIP price less Indian Agency commission) of the despatch of the goods by Sea/Air shall be paid through irrevocable, non-transferable Letter of Credit (LC) opened in favour of the supplier in a bank in his country and upon submission of documents specified hereunder:

(i) Commercial Supplier’s Invoice giving full details of the goods including quantity, value, etc.;
ii) Packing list;
iii) Certificate of the country of origin;
iv) Negotiable clean Bill of Lading/Airway Bill;
v) Insurance Certificate; (if applicable)
vi) Manufacturer’s guarantee and Inspection certificate; (if applicable)
vii) Inspection certificate issued by the Purchaser’s Inspector; (if applicable)
viii)Any other document(s) as and if required in terms of the contract.

b) **On Acceptance**: Balance payment of 25% of the net FCA/CIP price of goods would be made against an “Installation and Acceptance Certificate” to be issued by the End User through an irrevocable, non-transferable Letter of Credit (LC) opened in favour of the Foreign Principal in a bank in his country, subject to recoveries, if any. “Installation and Acceptance Certificate” need to be issued by the concerned End User after installation, commissioning, testing and successful trial run (if applicable).

c) Payment of Consumable Imported Goods/Reagents/Kits would be made 100% against the “Installation and Acceptance Certificate” to be issued by the End User through Wire Transfer.

d) **Payment of Incidental Costs:** Incidental costs till the consignee site towards Incidental Services (including Installation & Commissioning, Supervision,

Demonstration and Training), if applicable will be paid in Indian Rupees to the Indian Agent on submission of "Installation and Acceptance Certificate" by the End User.

e) **Payment of Indian Agency Commission**: Indian Agency Commission (IAC) will be paid to the Authorised manufacturer's agent in Indian rupees indicated in the contract (as per the prevailing rate of exchange ruling on the date of Contract) and shall not be subject to further escalation/exchange variation. The agency commission payment shall be made on submission of the "Installation and Acceptance Certificate" by the End User.

C) **Payment of Turnkey Work(Civil/Electrical/Air-Conditioning Works) at the site:** The payment related to Civil/Electrical/Air-Conditioning Works at the site will be made as indicated in the contract (as per the prevailing rate of exchange ruling on the date of Contract) and shall not be subject to further escalation/exchange variation. The payment for Civil/Electrical/Air-Conditioning works shall be made on submission of the "Installation and Acceptance Certificate" by the End User.

D) **Payment for Annual Comprehensive Maintenance Contract Charges**: The consignee will enter into CMC with the supplier at the rates as stipulated in the contract. The payment of CMC will be made on a six-month basis after satisfactory completion of said period, duly certified by the End User on receipt of bank guarantee for an amount equivalent to 3 % of the cost of the equipment as per contract in the prescribed format given in Section XV of the Tender document valid till 3 months after the expiry of entire CMC period. The Performance Bank Guarantee for CMC will be applicable in case the contract value is more than Rs. 10 lakhs.

21.2. Terms of payment for imported goods

21.2.1. The supplier shall not claim any interest on payments under the contract.

21.2.2. Where there is a statutory requirement for tax deduction at source, such deduction towards income tax and other tax as applicable will be made from the bills payable to the Supplier at rates as notified from time to time.

21.2.3. Irrevocable & non-transferable LC shall be opened by the Purchaser. However, if the supplier requests specifically to open a confirmed LC, the extra charges would be borne by the supplier. If LC is required to be extended and/or amended for

reasons not attributable to the purchaser, the charges thereof shall be borne by the supplier.

21.2.4. The payment shall be made in the currency/currencies authorised in the contract.

21.2.5. The supplier shall send its claim for payment in writing, when contractually due, along with relevant documents etc., duly signed with the date.

21.2.6. While claiming payment, the supplier is also to certify in the bill that the payment being claimed is strictly in terms of the contract and all the obligations on the part of the supplier for claiming that, payment has been fulfilled as required under the contract.

21.2.7. While claiming reimbursement of duties, taxes etc. (like GST, Custom Duty etc.) from the Purchaser, as and if permitted under the contract, the supplier shall also certify that, in case it gets any refund out of such taxes and duties from the concerned authorities at a later date, the supplier shall refund to the Purchaser forthwith.

22. Delivery

22.1. The supplier shall deliver the goods and perform the services under the contract within the time schedule specified by the Purchaser in the List of Requirements and as incorporated in the contract. The time for and the date of delivery of the goods stipulated in the schedule shall be deemed to be of the essence of the contract and the delivery must be completed not later than the date (s) as specified in the contract.

22.2. Subject to the provision under GCC clause 26, any unexcused delay by the supplier in maintaining its contractual obligations towards the delivery of goods and performance of services shall render the supplier liable to any or all of the following sanctions:

(i) Imposition of liquidated damages,
(ii) Forfeiture of its Performance Security and
(iii) Termination of the Contract for default.

22.3. If at any time during the currency of the contract, the supplier encounters conditions hindering the timely delivery of the goods and performance of services, the supplier shall promptly inform the Purchaser in writing about the same and its likely duration and make a request to the Purchaser for extension of the delivery schedule accordingly. On receiving

the supplier's communication, the Purchaser shall examine the situation as soon as possible and, at its discretion, may agree to extend the delivery schedule, with or without liquidated damages for completion of the supplier's contractual obligations by issuing an amendment to the contract.

22.4. When the period of delivery is extended due to unexcused delay by the supplier, the amendment letter extending the delivery period shall, inter alia contain the following conditions:

(a) The Purchaser shall recover from the supplier, under the provisions of clause 23 of the General Conditions of Contract, Liquidated Damages on the goods and services, which the Supplier has failed to deliver within the delivery period stipulated in the contract.

(b) That no increase in price on account of any ground, whatsoever, including any stipulation in the contract for an increase in price on any other ground and, also including the statutory increase in or fresh imposition of GST levied in respect of the goods and services specified in the contract, which takes place after the date of delivery stipulated in the contract shall be admissible on such of the said goods and services as are delivered and performed after the date of the delivery stipulated in the contract.

(c) But nevertheless, the Purchaser shall be entitled to the benefit of any decrease in price on account of reduction in or remission of Custom Duty and GST which takes place after the expiry of the date of delivery stipulated in the contract.

22.5. The supplier shall not dispatch the goods after the expiry of the delivery period. The supplier is required to apply to the Purchaser for an extension of the delivery period and obtain the same before dispatch. In case the supplier dispatches the goods without obtaining an extension, it would be doing so at its own risk and no claim for payment for such supply and/or any other expense related to such supply shall lie against the purchaser.

22.6. Passing of Property

22.6.1. The property in the goods shall not pass to the purchaser unless and until the goods have been delivered to the consignee in accordance with the contract.

22.6.2. Where there is a contract for the sale of specific goods and the supplier is bound to do something to the goods for the purpose of putting them into a deliverable state the property does not pass until such thing is done.

22.6.3. Unless otherwise agreed, the goods remain at the supplier's risk until the property therein is transferred to the purchaser.

23. Liquidated Damages

23.1. Subject to GCC clause 26, if the supplier fails to deliver or install /commission any or all of the goods or fails to perform the services within the time frame(s) incorporated in the contract, the Purchaser shall, without prejudice to other rights and remedies available to the Purchaser under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% per week of delay or part thereof on delayed supply of goods, installation, commissioning and/or services until actual delivery or performance subject to a maximum of 10% of the contract price. Once the maximum is reached Purchaser may consider termination of the contract as per GCC 24.

During the above-mentioned delayed period of supply and/or performance, the conditions incorporated under GCC sub-clause 22.4 above shall also apply.

24. Termination for Default

24.1. The Purchaser without prejudice to any other contractual rights and remedies available to it the Purchaser, may, by written notice of default sent to the supplier, terminate the contract in whole or in part, if the supplier fails to deliver any or all of the goods or fails to perform any other contractual obligation(s) within the time period specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC sub-clauses 22.3 and 22.4.

24.2. The Performance Security in such cases will be forfeited.

24.3. Unless otherwise instructed by the Purchaser, the supplier shall continue to perform the contract to the extent not terminated.

25. Termination for Insolvency

25.1. If the supplier becomes bankrupt or otherwise insolvent, the purchaser reserves the right to terminate the contract at any time, by serving written notice to the supplier without any

compensation, whatsoever, to the supplier, subject to the further condition that such termination will not prejudice or affect the rights and remedies which have accrued and/or will accrue thereafter to the Purchaser.

26. Force Majeure

26.1. Notwithstanding the provisions contained in GCC clauses 22, 23 and 24, the supplier shall not be liable for imposition of any such sanction so long the delay and/or failure of the supplier in fulfilling its obligations under the contract is the result of an event of Force Majeure.

26.2. For purposes of this clause, Force Majeure means an event beyond the control of the supplier and not involving the supplier's fault or negligence and which is not foreseeable and not brought about at the instance of the party claiming to be affected by such event and which has caused the non – performance or delay in performance. Such events may include but are not restricted to, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes excluding by its employees, lockouts excluding by its management and freight embargoes.

26.3. If a Force Majeure situation arises, the supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within twenty-one days of the occurrence of such event. Unless otherwise directed by the Purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

26.4. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding sixty days, either party may at its option terminate the contract without any financial repercussion on either side.

26.5. In case due to a Force Majeure event the Purchaser is unable to fulfil its contractual commitment and responsibility, the Purchaser will notify the supplier accordingly and subsequent actions taken on similar lines described in the above sub-paragraphs.

27. Termination for Convenience

27.1. The Purchaser reserves the right to terminate the contract, in whole or in part for its Purchaser's convenience, by serving written notice on the supplier at any time during the

currency of the contract. The notice shall specify that the termination is for the convenience of the Purchaser. The notice shall also indicate inter alia, the extent to which the supplier's performance under the contract is terminated, and the date with effect from which such termination will become effective.

27.2. The goods and services which are complete and ready in terms of the contract for delivery and performance within thirty days after the supplier's receipt of the notice of termination shall be accepted by the Purchaser following the contract terms, conditions and prices. For the remaining goods and services, the Purchaser may decide:

a) To get any portion of the balance completed and delivered at the contract terms, conditions and prices; and/or

b) To cancel the remaining portion of the goods and services and compensate the supplier by paying an agreed amount for the cost incurred by the supplier towards the remaining portion of the goods and services.

28. Governing Language

28.1. The contract shall be written in the English language following the provision as contained in GIB clause 4. All correspondence and other documents pertaining to the contract, which the parties exchange, shall also be written accordingly in that language.

29. Notices

29.1. Notice, if any, relating to the contract given by one party to the other, shall be sent in writing or by Facsimile/email and confirmed in writing. The procedure will also provide the sender of the notice, the proof of receipt of the notice by the receiver. The addresses of the parties for exchanging such notices will be the addresses as incorporated in the contract.

29.2. The effective date of a notice shall be either the date when delivered to the recipient or the effective date specifically mentioned in the notice, whichever is later.

30. Resolution of Disputes

30.1. If a dispute or difference of any kind shall arise between the Purchaser/Consignee and the supplier in connection with or relating to the contract, the parties shall make every effort to resolve the same amicably by mutual consultations.

30.2. If the parties fail to resolve their dispute or difference by such mutual consultation within twenty-one days of its occurrence, then, unless otherwise provided in the SCC, either the Purchaser/Consignee or the supplier may give notice to the other party of its intention to commence an arbitration, as hereinafter provided the applicable arbitration procedure will be as per the Arbitration and Conciliation Act, 1996 of India.

30.3. In the case of a dispute or difference arising between the Purchaser and a domestic Supplier relating to any matter arising out of or connected with the contract, such dispute or difference shall be referred to the sole arbitration to be appointed by the Director, AIIMS. The award of the arbitrator shall be final and binding on the parties to the contract subject to the provision that the Arbitrator shall give the reasoned award in case the value of the claim in reference exceeds Rupees One lakhs (Rs. 1,00,000/-)

30.4. **Venue of Arbitration:** The venue of arbitration shall be the place from where the contract has been issued, i.e., New Delhi, India.

30.5. **Jurisdiction of the court** will be from the place where the Tender Document has been issued, i.e., New Delhi, India

31. Applicable Law

The contract shall be governed by and interpreted in accordance with the laws of India for the time being in force.

32. Withholding and Lien in respect of sums claimed

32.1. Whenever any claim for payment arises under the contract against the supplier the purchaser shall be entitled to withhold and also have a lien to retain such sum from the security deposit or sum of money arising out of under any other contract made by the supplier with the purchaser, pending finalization or adjudication of any such claim.

32.2. It is an agreed term of the contract that the sum of money so withheld or retained under the lien referred to above, by the purchaser, will be kept withheld or retained till the claim arising about or under the contract is determined by the Arbitrator or by the competent court as the case may be and the supplier will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention.

33. Fall Clause

The fall clause is a price safety mechanism. The fall clause provides that if the contract holder reduces its price or sells or even offers to sell the contracted goods of identical specification and terms & conditions to that of the contract, at a price lower than the contract price, to any person or organization during the currency of the Contract, the Contract price will be automatically reduced with effect from that date for all the subsequent supplies under the Contract and the contract amended accordingly.

SECTION – V

SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) will apply for this purchase. The corresponding clauses of General Conditions of Contract (GCC) relating to the SCC stipulations have also been incorporated below.

These Special Conditions will modify/substitute/supplement the corresponding (GCC) clauses.

Whenever there is any conflict between the provision in the GCC and that in the SCC, the provision contained in the SCC shall prevail.

The warranty conditions will be as mentioned in the list of requirements as per section VI of the Tender Enquiry Document.

SECTION – VI

LIST OF REQUIREMENTS

Part I

Sl. No.	Name of Equipment	Consignee	Quantity Per Dept. (No.)	Total Quantity Per Schedule (No.)	Warranty Period	CAMC Period After Warranty
1	Advanced High Energy Linear Accelerator System under buyback basis with Turnkey Work	Dr. BRAIRCH, AIIMS, New Delhi-110029	02 Sets	02 Sets	02 Years	08 Years

Part II: Required Delivery Schedule:

a) For Indigenous goods or imported goods if supplied from India:

180 days from the date of Notification of Award to delivery at the consignee site. The date of delivery will be the date by which it is to be delivered at the consignee site. Bidders may quote the earliest delivery period.

Installation and Commissioning shall be done at the earliest but not later than 45 days of delivery of goods at the site or the date of handing over the site for installation, whichever is later.

c) For Imported goods directly from foreign:

- 180 days from the date of opening of L/C. The date of delivery will be the date of the Bill of Lading/Airway bill. (Bidders may quote the earliest delivery period).
- Installation and commissioning shall be completed at the **earliest possible date**, but **not later than 45 days** from the date of delivery of the goods at the site or the date of handing over the site for installation—**whichever is later**.
- An additional **30 days**, or as otherwise applicable, shall be provided for obtaining the necessary approval from the **Atomic Energy Regulatory Board (AERB)** after the installation or prior installation of the equipment.
- For delayed delivery and/or installation and commissioning liquidated damages will be applied as per GCC clause 23.

Part III: Scope of Incidental Services:

Installation & Commissioning, Supervision, Demonstration, Trial run and Training etc. as specified in GCC Clause 13.

Part IV: Turnkey Work (if any) as per details in Technical Specification.

Part V: Warranty period as per details mentioned in technical specification and as specified in Part I above. The warranty period will start from the date of installation, commissioning and acceptance.

Comprehensive Annual Maintenance Contract (CAMC) as per details in Technical Specification as specified in part I above. A Comprehensive Annual Maintenance Contract (CAMC) will start from the date of successful completion of the warranty period.

Part Required Terms of Delivery and Destination.

a) For Indigenous goods or imported goods if supplied from India:

Free Delivery at Consignee's Site(s)

b) For Imported goods directly from abroad:

The foreign bidders are required to quote their rates on CIP (Named Port of Destination Basis) giving a breakup of the price as per the Proforma prescribed in the Price Schedule. Purchaser will place the order on CIP (Named Port of Destination basis).

Insurance (Local Transportation and Storage) would be extended and borne by the Supplier from the warehouse to the consignee site for a period including 3 months beyond the date of delivery.

SECTION – VII

TECHNICAL SPECIFICATION

🔧 **Project Overview**: Procurement of 02 Sets of Advanced High Energy Linear Accelerator (LA) Systems on a buyback basis with turnkey work at AIIMS, New Delhi.

📝 **Scope of Work Includes:**

- Supply, installation, testing, and commissioning of the Linear Accelerator systems (as per technical specifications detailed in Annexure – I).
- Complete turnkey execution of work (as detailed in Annexure–I), in accordance with the site layout map, TED documentation, and all necessary site modifications based on the reports provided by M/s Creative Design Consultants, as vetted by IIT Delhi and the Engineering Division (documents enclosed).
- Buyback of existing machines at a minimum reserve price.

🔄 **Buyback Details:**

S.No	Equipment Name	Year	Qty	Min. Reserve Price	Make & Model
1	Linear Accelerator	2001	01	₹48,86,700/-	Varian Clinac 2300/C/D
2	Linear Accelerator	2006	01	₹71,83,160/-	Elekta Synergy-S

Total Minimum Buyback Value: ₹1,20,69,860/-

☑ ***Must be quoted, or bid will be rejected.***

🛠 **Technical Conditions & Requirements:**

1. Warranty: 2 years full coverage.
2. CAMC: 8 years post warranty.
3. Free of cost: All parts (except disposables), batteries, UPS, ACs, chillers, software upgrades during warranty & CAMC.
4. Standby AC Unit: Required for patient care.
5. UPS installation: Under supervision of Electrical In-charge.
6. CPWD Guidelines: Must be followed for turnkey installation.

📅 **Important Deadlines & Notes:**

- Pre-bid Meeting: Mandatory for all prospective bidders.
- Modification Suggestions: Must be sent 48 hours before the pre-bid meeting to storeirch160@gmail.com.
- Bid Submission:
    - Scanned copies of price bids must include an item-wise price list, including prices for spares and consumables. Any item for which a price is not quoted shall be deemed to be provided free of cost.
    - Price validity: For entire lifecycle (10 years).

⚠ **Critical Eligibility Clauses:**

- Only one bid per firm and one bid per manufacturer allowed.
- The entire tender document must be signed and stamped by the authorized signatory.

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B. GENERAL POINTS

1. **Warranty:**

a) The bidders must quote for Two years Comprehensive Warranty as per the Conditions of the Contract of the Tender document for complete equipment (Including all spares, labour and third-party items) and Turnkey Work (if required) from the date of satisfactory installation, commissioning, trial run, handing over and acceptance of the goods by the User Department.

b) The warranty charges shall not be quoted separately.

c) During the Warranty period, the desired Uptime of 95% of 365/366 (Leap Year) days (24 hrs), if downtime is more than 5%, the warranty period/CAMC period will be extended by double the downtime period. **In addition,** a penalty equal to the amount of 0.25 % of the total purchase cost of equipment per day will be liveable for the excess downtime period. Complaints should be attended to properly, maximum within 8 hrs.

d) All software updates should be provided free of cost during the Comprehensive Warranty period.

2. After Sales Service:

After-sales service centre should be available at the city of the Institution on 24 (hrs) X 7 (days) X 365 (days) basis. Complaints should be attended to properly, maximum within 8 hrs. The service should be provided directly by the Bidder/Indian Agent. Undertaking by the Principals in the "Manufacturer Authorisation Form" that the spares for the equipment shall be available for at least 10 years from the date of supply of equipment.

3. Training:

Site training to Doctors/ Technicians/ staff is to be provided by the Principal/Indian Agents (if they have the requisite know-how) for the operation and maintenance of the equipment to the satisfaction of the User Department.

4. Comprehensive Annual Maintenance Contract (CAMC) of subject equipment:

a) The cost of a Comprehensive Annual Maintenance Contract (CAMC) which shall include preventive maintenance including testing & calibration as per the technical/ service /operational manual of the manufacturer, labour and all spares, after satisfactory completion of the Warranty period(two years), may be quoted for next Eight years on yearly basis for complete equipment including third party items as per Price Schedule.

b) The cost of CAMC may be quoted along with GST applicable on the date of Bid Opening.

c) The cost of CAMC will be added for Ranking/Evaluation purposes on an NPB basis.

d) Before the commencement of the CAMC period, the suppliers shall furnish a Performance Bank Guarantee for 3 % of the cost of the equipment (as per Performa given in the Tender document) valid for 3 months extra after the expiry of the entire CAMC period. The Performance Bank Guarantee for CAMC will be applicable in case of equipment cost is more than Rs.10 lakhs.

e) During the CAMC period, the desired Uptime of 95% of 365/366 (Leap Year) days (24 hrs), if downtime is more than 5%, the warranty period/CAMC period will be extended by double the downtime period. **In addition,** a penalty equal to the amount of 0.25 % of the total cost of equipment per day will be liveable for the excess downtime period. Complaints should be attended to properly, maximum within 8 hrs.

f) All software updates should be provided free of cost during CAMC. In case of failure by the supplier, the Bank Guarantee of CAMC will be forfeited.

g) The payment of CAMC will be made on a half-yearly basis after satisfactory completion of said period duly certified by the end User.

5. Uptime & Downtime Penalty Clause:

a) The firm should provide an uptime guarantee of 95% during the warranty period and CAMC period.

b) During the Warranty period and CAMC period, desired Uptime of 95% of 365/366 (Leap Year) days (24 hrs), if downtime is more than 5%, the warranty period/CAMC period will be extended by double the downtime period. **In addition**, a penalty equal to the amount of 0.25 % of the total cost of equipment per day will be liveable for the excess downtime period. Complaints should be attended to properly, maximum within 8 hrs.

6. Turnkey Work:

Turnkey Work is to be indicated in the Technical Specification wherever required. The Bidder shall examine the existing site where the equipment is to be installed, in consultation with the User Department. The Bidders are required to quote separately for the equipment and Turnkey Work as per Price Schedule/BoQ. The Turnkey Work costs may be quoted in Indian Rupee and the same will be added for Ranking Purpose.

The Turnkey Work should completely comply with AERB requirements, wherever required.

SECTION – VIII

QUALIFICATION CRITERIA

1. In case the manufacturer does not quote directly, they may authorise their authorized agent as per the Proforma of the "Manufacturer Authorization Form" as given in the Tender Enquiry Document to quote and enter into a contractual obligation.

2. The Manufacturer should have supplied and installed in the last five years from the date of Bid Opening, similar equipment meeting major parameters of technical specification which is functioning satisfactorily.

3. In support of 2, the Bidder shall furnish a Performance statement in the enclosed Proforma 'A' of Section VIII.

   The Bidder shall furnish a Satisfactory Performance Certificate in respect of the above, duly translated into English and duly signed along with the bid.

4. The Purchaser reserves the right to ask for a free demonstration of the quoted equipment after giving reasonable time to the bidder at a pre-determined place acceptable to the purchaser or at the site (in case of non-portable and heavy equipment) for technical acceptability as per the Tender Enquiry Document specifications, before the opening of the Price Bid.

PROFORMA 'A'
PROFORMA FOR PERFORMANCE STATEMENT

(For the period of last five years)

ATE No. : _____
Date of Bid Opening : _____
Name and address of the Bidder : _____
Name and address of the Manufacturer : _____

Order placed by (full address)	Order no. and date ##	Description (Model No.) and quantity	Value of order (Rs.)	Consignee	Date of Delivery Period			Have the goods have been functioning Satisfactorily (attach documentary proof)**
					Contract	Actual	Reasons for Delay if Any	
1	2	3	4	5	6	7	8	9

We hereby certify that the details of all orders received in the last 5 years of quoted equipment (including AIIMS, PGIMER, JIPMER, RML Hospital, Safdarjung Hospital, and Institute of National Importance) have been furnished. We hereby further certify that if at any time, information furnished by us is proved to be false or incorrect, we are liable for any action as deemed fit by the purchaser in addition to forfeiture of the Bid Security.

Name_____

Business Address_____

Place: _____

Signature of Bidder_____

Seal of the Bidder_____

** The scanned copy of documentary proof will be the latest certificate from the consignee/end user with a cross-reference of order no. and date that may be uploaded

The bidders are requested to upload the scanned copy of purchase order copies for the specific model quoted along with the Techno-commercial Bid.

PROFORMA 'B'

FORMAT FOR AFFIDAVIT OF SELF CERTIFICATION REGARDING LOCAL CONTENT IN A MEDICAL DEVICE TO BE PROVIDED ON RS. 100/- STAMP PAPER
(To be given by Authorized signatory duly authorized by the Board of Directors)

Date:_____

I_____S/o,D/o,W/o_____, Resident of _____do hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the policy of the Government of India issued vide Public Procurement (Preference to Make in India) order no. P-45021/2/2017-BE-II dated 15 June 2017 issued by DPIIT, Ministry of Commerce and Industry as amended from time to time and its subsequent orders, notifications issued by concerned Nodal Ministry.

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity or any authority so nominated by the Department of Pharmaceuticals, Government of India for the purpose of assessing the local content.

That the local content for all inputs which constitute the said medical device has been verified by me and I am responsible for the correctness of the claims made therein.

That in the event of the domestic value addition of the product mentioned herein is found to be incorrect and not meet the prescribed value-addition norms, based on the assessment of an authority so nominated by the Department of Pharmaceuticals, Government of India for the purpose of assessing the local content, action will be taken against me as per Order No. P45021/2/2017-B.E.-II dated 29.05.2019 and Notification No. 31026/36/2016-MD dated 18.05.2018.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority:

i) Name and details of the Domestic Manufacturer (Registered Office, Manufacturing unit location, nature of legal entity)
ii) Date on which this certificate is issued
iii) Medical devices for which the certificate is produced
iv) Procuring entity to whom the certificate is furnished
v) Percentage of local content claimed
vi) Name and contact details of the unit of the manufacturer
vii) Sale Price of the product
viii) Ex-Factory Price of the product
ix) Freight, insurance and handling
x) Total Bill of Material
xi) List and total cost value of inputs used for the manufacture of the medical device
xii) List and total cost of inputs which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached.
xiii) List and cost of inputs which are imported, directly or indirectly.

Note: Details for Sr. No. (vii) to (xiii) may not be uploaded with technical bid inadvertently.
For and on behalf of (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)

SECTION – IX
TENDER ACCEPTANCE FORM

To

The Chief(Dr. BRA IRCH),
All India Institute of Medical Sciences
Ansari Nagar, New Delhi-110 029 India.

Ref. Your ATE No. _____due for opening on _____ *insert date*

We, the undersigned have examined the above-mentioned Tender document, including amendment/corrigendum (*if any*), the receipt of which is hereby confirmed. We now offer to supply and deliver_____ *(Description of goods and services)* in conformity with your above-referred document for the sum as shown in the Price Schedules attached herewith and made part of this bid. If our bid is accepted, we undertake to supply the goods and perform the services as mentioned in the Tender documents, in accordance with the delivery schedule specified in the List of Requirements.

We further confirm that, if our bid is accepted, we shall provide you with performance security of the required amount in an acceptable form in terms of "General Conditions Contract", Section - IV read with modification, if any "Special Conditions of Contract", in Section - V, for the due performance of the contract.

We agree to keep our bid valid for acceptance as required in the "General Instruction to Bidders", read with modification, if any in "Special Instructions to Bidders", Section – III or for a subsequently extended period, if any, agreed to by us. We also accordingly confirm to abide by this bid up to the aforesaid period and this bid may be accepted any time before the expiry of the aforesaid period. We further confirm that, until a formal contract is executed, this bid read with your written acceptance thereof within the aforesaid period shall constitute a binding contract between us.

We further understand that you are not bound to accept the lowest or any bid you may receive against your above-referred advertised tender enquiry.

We confirm that we do not stand deregistered/banned/blacklisted by any Central Govt. Ministries/Departments/Hospitals/Institutes.

We confirm that we fully agree to the terms and conditions specified in above mentioned Tender document, including amendment/ corrigendum if any**.** "We hereby certify that if at any time, the information furnished by us is proved to be false or incorrect, we are liable for any action as deemed fit by the purchaser in addition to forfeiture of the bid security."

Name_____

Business Address_____

_____

Place: _____

Date: _____ **Seal of the Tenderer**_____

SECTION – X

PRICE SCHEDULE

BoQ may be uploaded as per instructions given in Tender Enquiry Document.

Price bid, list of spares, consumables and accessories may also be uploaded as PDF at the given space of price schedule.

SECTION – XI

The bidders should furnish specific answers to all the questions/issues mentioned in the Checklist detailed below:

CHECKLIST

Name of Tenderer : _____

Name of Manufacturer : _____

Sl. No.	Activity	Yes/ No/ NA	Page No. in the TE document	Remarks
1. a.	Have you enclosed the EMD of the required amount for the quoted schedules?			
b.	In case EMD is furnished in the form of Bank Guarantee, has it been furnished as per Section XIII?			
c.	In case Bank Guarantee is furnished, have you kept its validity 45 days beyond validity from the Techno Commercial Tender Opening date as per clause 19 of GIT?			
2. a.	Have you enclosed the duly filled Tender Form as per the format in Section X?			
b.	Have you enclosed Power of Attorney in favour of the signatory?			
3.	Are you an SSI unit, if yes have you enclosed certificate of registration issued by the Directorate of Industries/NSIC/MSME.			
4. a.	Have you enclosed a clause-by-clause technical compliance statement for the quoted goods vis-à-vis the Technical specifications?			
b.	In case of Technical deviations in the			

	compliance statement, have you identified and marked the deviations?			
5. a.	Have you submitted a satisfactory performance certificate as per the Proforma for the performance statement in Section--IX of TE document in respect of all orders?			
b.	Have you submitted copy of the order(s) and end-user certificate?			
6.	Have you submitted the manufacturer's authorization as per Section XIV?			
7.	Have you quoted prices of goods, turnkey (if any), CAMC etc. in the Price Schedule as per bedding documents?			
8.	Have you kept the validity of 270 days from the Techno Commercial Tender Opening date as per the TE document?			
9a.	In the case of the Indian Tenderer, have you furnished Income Tax Account No. as allotted by the Income Tax Department of the Government of India?			
9b.	In the case of a Foreign Tenderer, have you furnished the Income Tax Account No. of your Indian Agent as allotted by the Income Tax Department of the Government of India?			
10.	Have you intimated the name and full address of your Banker (s) along with your Account Number			
11.	Have you fully accepted the payment terms as per the TE document?			
12.	Have you fully accepted the delivery period as per the TE document?			
13.	Have you submitted the certificate of incorporation?			

14.	Have you accepted the warranty as per the TE document?			
15.	Have you accepted the terms and conditions of the TE document?			
16.	Have you furnished documents establishing your eligibility & qualification criteria as per TE documents?			
17.	Have you furnished Annual Report (Balance Sheet and Profit & Loss Account) for the last three years prior to the date of Tender opening?			
18.	Have you enclosed the latest purchase order copies supplied to AIIMS, PGIMER, JIPMER or the Institute of National Importance for the specific model quoted along with the price bid.			

1. All pages of the Tender should be page numbered and indexed.
2. The Tenderer may go through the checklist and ensure that all the documents/confirmations listed above are enclosed in the tender and no column is left blank. If any column is not applicable, it may be filled up as NA.
3. It is the responsibility of tendered to go through the TE document to ensure furnishing all required documents in addition to the above, if any.

(Signature with date)

For and on behalf of

(Name, address and stamp of the tendering firm)

Full name, designation & address of the person duly authorized sign on behalf of the Tenderer)

SECTION – XII
BANK GUARANTEE FORM FOR BID SECURITY

Whereas _____ (Name and address of the Bidder)
(*hereinafter called the "Bidders"*)
has submitted its Bid dated _____ for the supply of _____
(hereinafter called the "Bid")
against the purchaser's ATE No. _____

Know all persons by these presents that we _____ having our registered office at _____
(Hereinafter called the "Bank")
are bound unto AIIMS, New Delhi
(hereinafter called the "Purchaser)
in the sum of _____ for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this _____day of _____ 20____.

The conditions of this obligation are:

1) If the Bidder withdraws or amends, impairs or derogates from the bid in any respect within the period of validity of this Bid.
2) If the Bidder has been notified of the acceptance of his Bid by the Purchaser during the period of its validity:-

- If the bidder fails or refuses to furnish the performance security for the due performance of the contract or
- If the bidder fails or refuses to accept/execute the contract or
- If it comes to notice at any time, that the information/documents furnished in its Bid are false or incorrect or misleading or forged

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or more the three conditions, specifying the occurred condition(s).

This guarantee will remain in force upto _____*(insert date of additional forty-five days after Bid validity)* and any demand in respect thereof should reach the Bank not later than the above date.

…….
(Signature with the date of the authorized officer of the Bank)
…….
(Name and designation of the Officer)
…….
…….
(Seal, name & address of the Bank and address of the Branch)

SECTION – XIII
MANUFACTURER'S AUTHORISATION FORM

The 'Chief Dr. BRAIRCH '
All India Institute of Medical Sciences
Ansari Nagar, New Delhi-110029, India.

Dear Sir,

Ref: Your TE document No _____ dated _____

We, _____ who are proven and reputable manufacturers of_____(*name and description of the goods offered in the bid*) having factories at_____, hereby authorise Messrs_____(*name and address of the agent*) to submit a bid, process the same further and enter into a contract with you against your requirement as contained in the above referred TE documents for the above goods manufactured by us.

We also state that we are not participating directly in this bid for the following reason(s):
_____*(please provide reason here).*

We further confirm that no supplier or firm or individual other than Messrs. _____ (*name and address of the above agent*) is authorised to submit a bid, process the same further and enter into a contract with you against your requirement as contained in the above referred TE documents for the above goods manufactured by us.
We also hereby extend our full warranty, CAMC as applicable as per clause 15 of the General Conditions of Contract, read with modification, if any, in the Special Conditions of Contract for the goods and services offered for supply by the above firm against this TE document.

We also hereby confirm that we would be responsible for the satisfactory execution of the contract placed on the authorized agent and the spares for the equipment shall be available for at least 10 years from the date of supply of equipment.

We also confirm that the price quoted by our agent shall not exceed the price which we would have quoted directly"

Yours faithfully,

[*Signature with date, name and designation*]
for and on behalf of Messrs_____
[*Name & address of the manufacturers*]

Note: 1. This letter of authorisation should be on the letterhead of the manufacturing firm and should be signed by a person competent and having the power of attorney to legally bind the manufacturer.
2. Original letter may be sent.

SECTION – XIV

BANK GUARANTEE FORM FOR PERFORMANCE SECURITY/ CAMC SECURITY

WHEREAS _____ (Name and address of the supplier) (Hereinafter called "the supplier") has undertaken, in pursuance of Purchase Order/ Contract no_____ dated _____ to supply _____ (*insert description of goods and services*) (Hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of _____ (insert *Amount of the guarantee in words and figures)*, and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand.

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

This guarantee will remain in force upto _____*(insert date of additional Ninety days after completion of satisfactorily warranty period in case of Performance Security and additional Ninety days after completion of satisfactorily CAMC period in case of CAMC security)* and any demand in respect thereof should reach the Bank not later than the above date.

…….

(Signature with date of the authorised officer of the Bank)

…….

Name and designation of the officer

…….

…….

Seal, name & address of the Bank and address of the Branch

SECTION – XV
CONTRACT FORM - A

CONTRACT FORM FOR SUPPLY, INSTALLATION, COMMISSIONING, HANDING OVER, TRIAL RUN, TRAINING OF OPERATORS & WARRANTY OF GOODS

ALL INDIA INSTITUTE OF MEDICAL SCIENCES
(Insert Name of concerned Centre/Hospital/Department/Section)
ANSARI NAGAR, NEW DELHI-110 029

Contract No_____ dated_____

To _____
(*insert name of Supplier with address*)

This is in continuation to this office's Notification of Award No. _____ dated _____.

1. Name & address of the Supplier: _____

2. ATE No of Tender Documents: _____and subsequent Amendment No_____, dated_____ (if any), issued by the Purchaser

3. Supplier's Bid No_____ dated_____ and subsequent communication(s) No_____ dated _____ (if any), exchanged between the supplier and the purchaser in connection with this Tender Document.

4. In addition to this Contract Form, the following documents etc, which are included in the Tender Documents mentioned under paragraphs 2 and 3 above, shall also be deemed to form and be read and construed as an integral part of this contract:
   (i) General Conditions of Contract;
   (ii) Special Conditions of Contract;
   (iii) List of Requirements;
   (iv) Technical Specifications;
   (v) Quality Control Requirements;
   (vi) Tender Acceptance Form uploaded by the supplier;
   (vii) Price Schedule(s)/BoQ uploaded by the supplier in its Bid;
   (viii) Manufacturers' Authorisation Form (if applicable);
   (ix) Purchaser's Notification of Award

Note: The words and expressions used in this contract shall have the same meanings as are respectively assigned to them in the conditions of the contract referred to above. Further, the definitions and abbreviations incorporated under clause 1 of Section II – "General Instructions to Bidders" of the Tender Enquiry Document shall also apply to this contract.

5. Some terms, conditions, stipulations etc. out of the above-referred documents are reproduced below for ready reference:

(i) Brief particulars of the goods and services which shall be supplied/ provided by the supplier are as under:

Schedule No.	Brief description of of goods/services	Accounting unit	Quantity to be supplied	Unit Price	Total price	Terms of delivery

Any other additional services (if applicable) and cost thereof: _____

Total value (in figure) _____ (In words) _____

(ii) Delivery schedule:_____
(iii) Details of Performance Security required:_____
(iv) Destination and despatch instructions:_____
(v) Consignee:_____

6. Warranty clause:
7. Payment terms:

_____

(Signature, name and designation of the Purchaser authorised official**)**
For and on behalf of **Chief Dr. BRA IRCH**, AIIMS

Received and accepted this contract

(Signature, name and address of the supplier's executive duly authorised to sign on behalf of the supplier)

For and on behalf of _____
(*Insert Name and address of the supplier*)

(Seal of the Supplier)
Date: _____
Place: _____

CONTRACT FORM – B

CONTRACT FORM FOR COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC)

Comprehensive Annual Maintenance Contract No._____

Dated_____

Between

Chief Dr. BRA IRCH, *AIIMS*

And

_____

(*insert Name & Address of the Supplier*)

Reference: Contract/ Purchase Order No_____ dated_____ for supply, installation & commissioning, Training and CAMC of goods & services

a) In continuation to the above-referred Contract/Purchase Order, the Contract Comprehensive Annual Maintenance Contract is hereby concluded as under: -

1	2	3	4					5	6
Schedule No.	Brief description of goods	Quantity (Nos.)	CAMC Cost for Each Unit year-wise in Rs					GST Value in Rs. (___ %)	Total CAMC Cost for 5 Years with GST (3) X [(4a+4b+4c+4d+ 4e) + (5)]
			1st	2nd	3rd	4th	5th		
			a	b	c	d	e		

Total value (in figure) _____ (In words) _____

b) The CAMC commence from the date of expiry of all obligations under Warranty i.e. from_____ (date of expiry of Warranty) and will expire on _____ (date of expiry of CMC)

c) The cost of the Annual Comprehensive Maintenance Contract (CMC) which includes preventive maintenance, labour and spares, after satisfactory completion of the Warranty period as contained in the above-referred contract on a yearly basis for complete equipment as per contract including Turnkey Work(if any).

d) There will be a 95% uptime warranty during the CAMC period on a 24 (hrs) X 7 (days) X 365 (days) basis, with the penalty, of extending the CAMC period by double the downtime period and other penalties as per contract.

e) During the CAMC period, the supplier shall visit each consignee's site for preventive maintenance including testing and calibration as per the manufacturer's service/ technical/ operational manual.

The supplier shall visit each consignee site as recommended in the manufacturer's manual, but at least once in 3 months commencing from the date of the successful completion of the warranty period for preventive maintenance of the goods.

f) All software updates should be provided free of cost during the CAMC period.

g) The Bank Guarantee is valid till _____ [(fill the date) 3 months after the expiry of the entire CAMC period] for an amount of Rs. _____ [(fill amount) equivalent to 3 % of the cost of the equipment as per contract] shall be furnished in the prescribed format given in Section XIV of the Tender Document, along with the signed copy of CAMC within a period of 21 (twenty-one) days of start of CAMC failing which the Performance Security (3% of the contract value) submitted shall be encashed payable to the Purchaser/Consignee.

h) If there is any lapse in the performance of the CAMC as per the contract, the proceeds Annual CAMC Bank Guarantee shall be forfeited and their bad performance will be considered while awarding future contracts.

i) Payment terms: The payment of CAMC will be made against the bills raised by the supplier on six monthly bases after the satisfactory completion of said period, duly certified by the concerned User Department. The payment will be made in Indian Rupees.

_____

(Signature, name and designation of the Store Officer/ASO of the Purchaser**)**

_____

(Signature, name and designation of the F&CAO of the Purchaser)

For and on behalf of **Chief Dr. BRAIRCH**, AIIMS

(Seal of the Purchaser)
Date: _____
Place: _____

Received and accepted this contract

_____

(Signature, name and address of the supplier's executive duly authorised to sign on behalf of the supplier)

For and on behalf of _____
(*Insert Name and address of the supplier*)

(Seal of the Supplier)
Date: _____
Place: _____

Note: - The contract will be prepared on Non-judicial Stamp paper (currently of the value of Rs.100).

SECTION – XVI

CONSIGNEE RECEIPT CERTIFICATE

(To be given by the consignee's authorized representative)

The following store(s) has/have been received in good condition:

1) Contract/Purchase Order No. & date:_____

2) Supplier's Name:_____

3) Consignee's Name & Address :_____

4) Name of the item supplied:_____

5) Quantity Supplied:_____

6) Date of Receipt by the Consignee:_____

7) Signature of Authorized Representative of Consignee with date:_____

8) Name and designation of Authorized Representative of Consignee:_____

9) Seal of the Consignee:_____

SECTION – XVII
CONSIGNEE ACCEPTANCE CERTIFICATE

(To be given by the consignee's authorized representative)

This is to certify that the goods as detailed below have been received in good condition along with all the standard and special accessories in accordance with the contract. The same has been installed and accepted.

1) Contract/Purchase Order No. & date:_____

2) Supplier's Name:_____

3) Consignee's Name & Address :_____

4) Name of the item Supplied:_____

5) Quantity Supplied:_____

6) Date of Receipt by the Consignee:_____

7) Date of Receipt by the Consignee:_____

8) The supplier has fulfilled its contractual obligations satisfactorily

OR

The supplier has failed to fulfil its contractual obligations with regard to the following:
i)
ii)
iii)
iv)

9) The amount of recovery on account of the failure of the supplier to meet his contractual obligations is_____ (here indicate the amount).

10) Signature of Authorized Representative of Consignee with date:_____

11) Name and designation of Authorized Representative of Consignee:_____

12) Seal of the Consignee:_____

MODEL CERTIFICATES ARE TO BE SUBMITTED BY THE BIDDER ON COMPANY LETTERHEAD

(To be given by Authorized signatory duly authorized by the Board of Directors)

MODEL CERTIFICATE FOR TENDERS

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered.

[**Where applicable, evidence of valid registration by the Competent Authority shall be attached**!'

MODEL CERTIFICATE FOR TENDERS FOR WORKS INVOLVING THE POSSIBILITY OF SUB-CONTRACTING

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless the such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered.

[Where applicable, evidence of valid registration by the Competent Authority shall be attached.]"

MODEL CERTIFICATE FOR GEM

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this vendor/ bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this vendor/ bidder fulfils all requirements in this regard and is eligible to be considered for procurement on GeM.

[Where applicable, evidence of valid registration by the Competent Authority shall be attached]"

ANNEXURE - I

ALL INDIA INSTITUTE OF MEDICAL SCIENCES
DR. B.R. AMBEDKAR INSTIUTE ROTARY CANCER HOSPITAL
DEPARTMENT OF RADIATION ONCOLOGY

Item Name - Procurement of Advanced High-Energy Linear Accelerator Systems with Turnkey Facility and Site Modifications on a Buyback Basis – 02 Sets

Sealed tenders (with the "Technical Bid" and the "Price Bid" submitted separately, each in duplicate) are invited directly from manufacturers or their authorized representatives for the supply, installation, and maintenance of two (02) state-of-the-art Medical Linear Accelerators for the Department of Radiation Oncology at Dr. B.R. Ambedkar Institute Rotary Cancer Hospital (Dr. B.R.A. IRCH), All India Institute of Medical Sciences (AIIMS), New Delhi.

The purpose of these Linear Accelerators (LINACs) is to provide basic, advanced, and specialized radiation therapy techniques for cancer treatment using megavoltage X-rays and electron beams for External Beam Radiotherapy (EBRT). The procurement includes the LINAC system, Treatment Planning Systems (TPS), Oncology Information Systems (OIS), dosimetry and quality assurance equipments, as well as patient positioning and immobilization devices. The scope of work also includes turnkey site modifications under a buyback arrangement.

System Overview

The procurement involves two advanced, high-energy medical linear accelerators (LINACs) of the latest model, designed to deliver both photon and electron beam radiation. Each LINAC shall be equipped with:

- A multileaf collimator (MLC)
- An electronic portal imaging device (EPID)
- A kilovoltage cone-beam CT (KV-CBCT)
- Flattening-Filter-Free (FFF) beam technology

.The system must support various precise radiation treatment delivery techniques, including:

- Three-Dimensional Conformal Radiotherapy (3D-CRT)
- Intensity-Modulated Radiation Therapy (IMRT)
- Volumetric Modulated Arc Therapy (VMAT)
- Image-Guided Radiotherapy (IGRT)
- Surface-Guided Radiotherapy (SGRT)
- Stereotactic Radiosurgery and Radiotherapy (SRS/SRT)
- Stereotactic Body Radiotherapy (SBRT)
- Four-Dimensional Radiotherapy (4D-RT)

- Offline Adaptive Radiotherapy (ART)

General Equipment Requirements, Safety, and Standards

- The offered linear accelerator model must be **FDA (USA)/CE (Europe)/equivalent** certified.
- The model must be **type-approved by the Atomic Energy Regulatory Board (AERB),** the national regulatory authority for radiation safety in India.
- The system must comply with all **IEC standards** for LINAC coordinates and scales as specified in **IEC-61217** nomenclature and standards. It must also adhere to **international basic safety standards** applicable to medical equipment producing ionizing radiation.
- The system must be capable of integrating with standard **networking protocols and PACS systems** available on the market.

Technical Specifications

The system should contain the following components of the System along with Tunkey Scope, the technical specifications and Site Modifications Details are enclosed and as under:-

1. Advanced High-Energy Linear Accelerator Systems (LINAC)
2. Treatment Planning System (TPS)
3. Oncology Information System (OIS)
4. Dosimetry and Quality Control (D&QC)
5. Patient Positioning and Immobilization Devices (PP&ID)
6. Turnkey Scope of Work for Facility Site Modifications

I. Advanced High-Energy Linear Accelerator Systems (LINAC)

S. No	Features	Technical Specification
I. Photon beam Characteristics		
1	Photon Beam Energies	The machine shall be capable of delivering three photon energies of 6, 10 and 15MVX-ray beams.
2	Flattening-Filter-Free Beams	The machine shall be capable of delivering two photons of 6 MV and 10MV with flattening filter-free (FFF) mode.
3	Dose Rate	• Dose Rate in conventional mode: Range from 100 to 500 MU/min or more at a depth of the dose maximum for TSD 100cm for 10x10 cm^2 • High Dose Rate in FFF mode: Minimum of 1000 or more MU/min for 6MV and 2000MU/min or more for 10MV. • **Dose rate in Arc mode:** It shall have a continuously variable dose rate. Specify the range in terms of MU/deg
4	Beam Quality-FF Beams	Specify the beam penetrative quality parameters for all offered photon beam energies with FF: • depth of maximum dose (dmax) • percent depth dose at 10cm depth (D10) or • quality index, TPR 20,10
5	Beam Quality-FFF Beams	Specify the beam penetrative quality parameters for all offered photon beam energies with FFF: • depth of maximum dose (dmax) • percent depth dose at 10cm depth (D10) • field intensity at 10cm depth (measurement at three points from the central axis for 10X10 cm^2 and 30x30 cm^2 or above).
6	Beam Profile, Beam Flatness, Beam Symmetry and Beam Penumbra	• The field flatness is defined as the maximum variation from the x-ray dose delivered within the central 80%FWHM region, normalized to the dose output at beam center line. • The beam flatness shall be within ±3%. Specify the same. • The field symmetry is defined as the maximum difference between the x-ray dose delivered to any two points that are equidistant and symmetrical about the central axis and within the central 80% FWHM region, at 10cm depth. • The beam symmetry shall be within±2%. Specify the same for both FF and FFF beams. • The field penumbra is defined as the width between the 20% and the 80% isodose lines measured for 10 X 10 cm^2 at depth of 10 cm at 100 cm SSD. • The beam penumbra shall be within 10mm. Specify the same.
7	Radiation Leakage Limit	Radiation leakage limits shall be within appropriate national and international regulatory agency guidelines as follows: • Photon leakage: The photon leakage rate at any point one meter from the target outside the cone defined by the primary x-ray collimator shall be less than 0.1% of the absorbed dose at the isocenter.

		• Collimator transmission: The movable collimators shall not permit transmission of radiation exceeding 0.5% of the central axis dose at Dmax measured in air for both photon energies • Neutron leakage: The neutron leakage rate should not exceed 0.2% expressed in neutron dose equivalent (Sivert) when added to the photon leakage for a 10 x 10 cm field at the isocenter at any point one meter from the target when the jaws are closed
II. Electron Beam Characteristics		
1	Electron Beam Energies	The machine shall be capable of delivering at least five electron beam energies ranging from 4 or 6 to 20MeV.
2	Dose Rate	• Conventional dose rate mode: The variable dose rate range from 100 to 600 MU/min shall be available. • High dose rate mode: A high dose rate electron mode for total skin electron therapy shall be provided with a minimum dose rate of 2500 MU/min or above for the 4 or 6 MeV electron beam.
3	Field Size	• The electron beam field size is defined by the inside dimensions of the electron beam applicators projected geometrically to a plane surface at 100 cm SSD. • A minimum of five applicators with variable sizes range from 6 x 6 cm to 25 x 25 cm shall be provided.
4	Beam Quality	Specify the electron beam quality specification parameter such R50 depth of ionization all offered electron beam energies.
5	Beam Flatness	The maximum percent variation of the electron intensity at 100 cm SSD at D_{max} shall not exceed 5% (within the central 80% of the longitudinal and transverse axes relative to the central axis) for field sizes from 10 x 10 cm to 25 x 25 cm and for all the electron beam energies.
6	Beam Symmetry	• The maximum percent variation in the average electron intensity to the longitudinal and transverse halves of the electron field at D_{max} for a 10 x 10 and 25 x 25 cm field at 100 cm SSD shall not exceed $\pm$ 2% at gantry angles of 0, 90, 180 and 270 degrees. • The average electron intensity is the average of the maximum and minimum points within the central 80% of the field for each of the axes.
7	Beam Penumbra	Specify the penumbra (distance between 80%-20% isodose level at the depth of 0.5x R90). The maximum penumbra shall not exceed 1.75cm for all offered energies.
8	X-ray Contamination	The x-ray contamination of the electron beam shall be less than 5% of the maximum dose for all energies specified.
III. Dose Monitoring System		
1	Dose Monitoring System	i) An independent system of two or three internal ionization chambers with built-in digital electrometers shall be equipped for monitoring dose, dose rate, beam symmetry and beam steering, with associated interlocks. ii) In radiation beams the beam symmetry shall be less than or equal to 2% and the flatness less than or equal to 3%.

		iii) An independent backup timer to indicate accumulated monitor units (MU) if any power failure occurs shall be equipped. iv) The reproducibility tolerance for the dose monitoring system with various measurements such as dose output versus dose rate & dose output versus gantry angle shall be better than 1% or 1 MU.
IV. Linear Accelerator		
1	Magnetron or Klystron	The system must provide either Magnetron or Klystron as the radiofrequency (RF) micropower source.
2	Standing/ Travelling Wave Guide	Standing or travelling type of wave-guide along with the bending magnet, target assembly, and vacuum ion pump shall be offered
3	Target Type & Materials	Specify the target type and materials in detail.
4	Flattening Filter	Specify the flattening filter materials in detail.
5	Electron Gun & Focal Spot	Electron guns shall be offered and the beam focal spot should be within 3 mm diameter.
V. Mechanical Features		
1	Isocenter	The accuracy of the mechanical isocentre shall be less than or equal to 1 mm in diameter for all three rotation axes (collimator, gantry and treatment couch).
2	Gantry	A motorized gantry with an Isocentric design, 100 cm SAD, isocentre clearance greater than 30 cm, and gantry rotation shall be within ±180°.
3	Collimator & Field Size	A collimating head with motorized rotation of at least ±90°. The maximum photon beam field size shall be 40 cm × 40 cm (50% isodose level) at the isocentre.
4	Asymmetric jaw	Asymmetric jaws shall be capable of independent movements of all jaws. At least one set of jaws to cross the central axis over 10 cm shall be possible. Specify the jaw positional accuracy, jaw speed and travel range.
5	Light/Radiation Field	A light field to indicate the radiation field aperture and a reticule to indicate the principal axes and collimator axis of rotation shall be possible. The light/radiation field coincidence shall be less than or equal to 2 mm.
6	Optical Distance Indicator	An optical distance indicator with a range of at least SAD of ± 20 cm shall be possible.
7	Multileaf Collimator (MLC)	i) An integrated multileaf collimator (MLC) with at least 60 pairs to provide a maximum field size of 40x40 cm^2. Shall be provided. ii) The MLC leaf width resolution of not more than 5 mm at the isocentre for a central field size of 20x40 cm^2 and 10mm for the remaining outer area shall be possible. iii) The MLC interleaf leakage shall be less than 4% and the leaf position accuracy less than or equal to 1 mm at the isocentre plane. iv) Specify all other physical characteristic parameters of the offered MLC.
8	Wedge System	The system shall be equipped with internal, physical or dynamic wedges providing wedge angles up to 60°. Interlocks shall be provided so that the operator has to positively confirm that the correct wedge has been selected. Specify the maximum possible wedged field size.
9	Optical Front and Back Pointer	A front pointer to locate the mechanical isocentre and an optical back

		pointer shall be provided.
10	Treatment Table/Couch System	• A treatment table/couch with motorized lateral, longitudinal and vertical movements with iso-centric table rotation up to ±90° shall be possible. • Treatment couches with 6-degree-of-freedom (6DOF) in translational and rotational movements capability and accessories used for image-guided radiation therapy shall be provided. • The table top shall be of carbon fibre, free of metal or other radio-opaque materials. • The couch top shall be indexed to allow reproducible placement of immobilization equipment and also to provide the interface for mounting the quality assurance equipment at the head of the couch. • The lateral range of the couch shall be at least ±20 cm. The longitudinal range of the couch shall be greater than 70 cm. The vertical motion of the couch shall range from the isocenter to at least 55 cm below the isocenter. • The sag of the couch top shall be less than 2 mm with a patient of 135 kg weight. The couch shall be able to take a maximum weight of at least 180 kg.
11	Hand Pendants	Hand pendants in the treatment room to allow control of linear accelerator and treatment couch movements shall be provided.
12	Patient Alignment Laser System	Green, remote-controlled, fixed lasers mounted on the treatment room walls having two lateral cross lasers, one ceiling cross laser and one sagittal line laser shall be provided.
VI. In-room Image Guidance System		
1	Electronic Portal Imaging System	• Integrated amorphous silicon-based electronic portal imaging device (EPID) panel mounted on a motorized arm for digital portal imaging shall be provided. • System shall be capable of performing on-line and offline 2D MV IGRT corrections strategies. • The motorized arm holding the panel shall allow retraction of the panel and allow positioning of the panel at various positions at and below the mechanical isocentre with a range of lateral and longitudinal offsets. • The panel shall include an anti-collision system. • Specify the system active imaging area, spatial and contrast resolution, image acquisition rate, lateral and longitudinal travel range. • Necessary image quality assurance and maintenance tools shall be provided. • EPID-based 2D portal dosimetry system for IMRT and VMAT patient pretreatment verification for all available energies including FFF beams shall be provided.
2	Cone-Beam CT Imaging System	• The system shall have an integrated amorphous silicon-based flat panel detector and kilovoltage (KV) x-ray source/tube for generating radiographic, fluoroscopic 3D and 4D cone beam computed tomography (CBCT) imaging for 2D,3D and 4D IGRT treatment verification with 3D and 6D correction strategies and also

		suitable for adaptive planning. • The system shall be capable of acquiring images such as 3DCBCT, pretreatment interfraction 4D-CBCT, either during treatment intrafraction 4D-CBCT or Triggered Imaging, Gated CBCT and Extended Length CBCT etc. • The system shall be capable of performing reconstruction methods of either the Feldkamp back projection (FDK) algorithm and/or iterative algorithm. • The system shall be capable of manual registration, automated bone registration, automated soft tissue registration or grey value-based registration methods. • All Advanced image registration methods such as region of interest registration and deformable image registration if commercially available shall be provided. • The offered 3DCBCT image quality shall be sufficient to delineate target and critical structure volumes for adaptive planning dose calculations. • The system shall be able to transfer images to (from) EPID/CBCT from (to) treatment planning system (TPS). • Specify the KV generator KV, MAs and exposure time ranges and their accuracy. • Specify the KV x-ray tube source/focal spot size, collimation minimum and maximum field sizes, maximum anode heat capacity heat dissipation rate etc. • Specify CBCT imaging FOV, HU accuracy and uniformity, spatial resolution, low contrast resolution and slice thickness range as available.
VII. Surface Image Guided Radiotherapy System		
1	System Overview	An optical surface imaging system for surface-guided radiotherapy (SGRT) shall be provided for the application of patient setup, intra-fraction patient position and target motion monitoring, respiratory gated treatments, frameless cranial radiosurgery and patient safety with the following specifications.
2	Optical Camera System	• The system shall have a minimum of three optical camera pods in the treatment room and one in the simulation room and shall have a combination of a projector and camera units to capture and reconstruct a real-time 3D surface of the patients. • The optical surface imaging system shall have technologies of either stereo vision or structured light and laser scanners. • The vendor shall specify the scan volume (field of view coverage), image resolution (pixel size) and the scan speed (frame rate) of the offered imaging system.
3	Software Application System	• The vendor shall provide one software application system inside the treatment room and one in the treatment control console with the necessary interface connectivity with the treatment system to perform the surface image-guided treatment. The system shall have the following functionalities: • Use the reference surface image relative to the treatment isocenter

		position to calculate the necessary correction of the patient position in automatic 6DOF of translational and rotational directions. • Real-time motion monitoring of the patient's surface throughout the treatment session. • Shall have either real-time coaching tools or audio-video feedback goggle systems for better patient breathing pattern reproducibility. • Provide guidance for correcting patient postures, such as chin and arm position for better-improved patient positioning. • The automatic beam holds capability if the patient moves out of a predefined threshold. • Able to perform either rigid or deformable image registration. • Able to perform either prospective gated treatment at DIBH or retrospective gated treatment in free-breathing conditions. • Specify motion management interface compatibility with commercially available linear accelerators' top-end models for prospective and retrospective gated treatment. • Capable of imaging with bolus accessories. • The positioning accuracy shall be less than or equal to 1mm/1° for frameless SRS. • Capable of having integrity with existing if applicable and relevant. • Capable of automatic DICOM RT import/export and network-based data storage.
4	Calibration, Commissioning and Quality Assurance System	The vendor shall provide and supply the required phantoms, accessories, tools system (software) for calibration, commissioning, and periodic quality assurance (QA) and also for end-to-end QA phantom for clinical validation and implementation of the offered SGRT system.
5	Safety Features	The system shall have the capability of patient identification for safety. Specify the patient identification method(s).
VIII. Respiratory Motion Management System		
1	Respiratory Monitoring, Control and Gating System	i) An active breathing control system to perform both active breath-hold image acquisition and treatment and also for automated respiratory-gated treatment including gated VMAT shall be provided with the necessary gating system and gating interface system. ii) The vendor shall provide two portable systems and the same should allow it to be used in treatment and CT simulation imaging room. Or i) Respiratory synchronized system for respiratory synchronized image acquisition and prospective and retrospective gated treatment shall be provided. ii) The system shall be of the latest, advanced model commercially available with an audio-visual coaching device monitor for better breathing pattern reproducibility. iii) The vendor shall provide two portable systems and the same should allow it to be used in treatment and CT simulation imaging room.
IX. Image Guided Adaptive Radiotherapy System		
1	The image-guided offline	Image-guided adaptive radiotherapy (IGART) system shall comprise (i) CBCT imaging system (ii) automatic segmentation and deformable

	adaptive radiotherapy system	image registration system for image and dose-guided adaptive radiotherapy and (iii) shall be capable of deformable dose accumulation of EBRT, SRS/SBRT and HDR brachytherapy plans & doses. **CBCT Imaging System:** The offered CBCT volumetric imaging quality shall be able to be used for delineating target and critical structure volumes for adaptive planning dose calculation. **Auto Segmentation and Deformable Registration System:** The system shall be capable of the following functionalities: i) Auto-contouring and AI-based auto-segmentation system for targets and OARs. ii) Deformable image registration (DIR) using multimodality imaging such as CT, MRI, PET and SPECT images shall provide all commercially available algorithms. iii) Generating maximum intensity projection, minimum intensity projection, average projection, and mid-ventilation position reconstruction from 4D scans and also capable of 4D dose accumulation over all phases of respiration for evaluating the actual dose delivered to moving target. iv) Automate phase-based and amplitude-based 4D binning to generate automatic ITV. v) RT plan review and evaluation with radiobiological models for assessment of treatment response shall be possible.
X. Treatment Delivery Techniques		
1	2D, 3DCRT and DCAT	• The machine shall be capable of delivering 2D treatment with open, rectangular fields, where the field size and beam angle can be determined at the time of treatment delivery, inside the treatment room (i.e. manual planning-based treatments). • Ability to perform standard 3D conformal radiotherapy and dynamic conformal arc therapy (DCAT) treatments.
2	IMRT and VMAT	• The machine shall be capable of delivering static and dynamic intensity modulated radiation therapy (IMRT) and also volumetric modulated arc therapy (VMAT). Specify how VMAT delivery is achieved. • Capable of delivering high-quality intensity-modulated fields using fractions of MU. • Specify the linac performance for small MU delivery.
3	SRS/SRT/SBRT	The machine shall be capable of performing frameless image-guided stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT).
4	4D and Respiratory Gated Radiotherapy	The machine shall be capable of delivering Deep Inspiration breath-hold (DIBH) and also respiratory-gated treatment to account for the phase of respiration of all moving tumours.
5	Adaptive Radiotherapy	Adaptive radiation therapy (ART) is a radiation therapy process, where treatment is adapted to account for internal anatomical changes. The system offered shall be capable of performing offline- adaptive treatments/solutions with integrated image management and the following features:

		i) The solution offered shall be part of the TPS or if offered in a separate system, it should integrate with TPS to avoid import & export of the data. ii) It shall be vendor-neutral and multi-modality independent with automated dataset display across a longitudinal treatment timeline. iii) Advanced deformable registration algorithms shall be offered to perform the adaptive planning which matches the structures with HU correction capabilities. iv) The offered solution shall have the capability to perform offline adaptive planning workflow without taking Re-CT which creates a synthetic CT using Deformable image registration (DIR). v) The system shall be capable of performing dose deformation on re-treats to assess dose toxicity which should include both BED & EQD2 modelling capabilities (for SBRT, SRS, & Brachytherapy) vi) The system shall have a tool to view multi-modality fused images on one screen that are registered to the primary volume & also it should be able to contour onto planning CT by viewing targets on all modality images at the same time simultaneously.
6	Total Body Irradiation	The machine shall be capable of delivering photon beams with total body irradiation (TBI) mode and the vendor shall provide necessary accessories for delivering TBI treatment.
7	Electron Beam Therapy	The machine shall be capable of delivering electron beam treatment for superficial tumours.
8	Total Skin Electron Therapy	The offered Linac shall be able to deliver total skin electron therapy (TSET) with 4 MeV or 6 MeV. Vendor should provide all necessary accessories such as lead-shielded eye goggles, gloves with lead plates for fingernail shielding, and toenail covers with lead, scatter to deliver uniform dose to sclap etc., In case, if the vendor provides Linac with 6 MeV for TSET, the necessary energy degrader system and other accessories shall be provided.
9	Beam Matching of two Linear Accelerators	The vendor shall provide Linacs such that both linacs shall have the beam matching features at the factory itself.
XI. Treatment Control Console, Display and Accessories		
1	Treatment Control Console	i) All the functions and modes of the accelerator shall be controlled via software, computerized control console system outside the treatment room. ii) The console shall allow activation of the controls so that the accelerator is operational in its various forms. iii) The most important parameters shall be visible in the control console and treatment room. iv) The console shall have a dual login system with various hierarchical modes, including clinical, physics and service modes. v) The console shall interface with an OIS for record and verification of patient treatments. vi) The vendor shall provide a Patient Calling System for the treatment control console area which includes a high-quality microphone for clear communication, durable wall/ceiling-mounted speakers in the waiting area, and a central control unit with volume.
2	CCTV System	i) A closed-circuit colour television system (CCTV) system for viewing the treatment room from the console shall be provided.

		ii) There shall be at least two in-room cameras at different locations in the treatment room and the in-room cameras shall have pan and zoom capability.
3	In-Room Monitor	The vendor shall provide an in-room monitor with a display of treatment parameters shall be provided inside the treatment room.
XII. Radiation Safety Features		
	The following radiation safety features shall be provided: i) Beam-on and beam-ready illuminated signs at the entrance and within the treatment room. ii) Ionizing radiation warning sign at the entrance. iii) Facility access interlocks. iv) Last person out button/last man out switch. v) Emergency-off buttons in the treatment room and control room. vi) Audio-visual communication between the treatment room and control room. An integrated intercom for bi-directional speaker communication between operator and patient inside the treatment room.	
XIII. Utility Requirements		
1	Power supply	i) The vendor shall specify the total electrical power consumption load requirements for the complete LINAC system that includes LINAC and associated equipments like the Chiller system, TPS, OIS, lighting for the treatment room, LINAC control console room and chiller room and other critical systems. ii) The vendor shall specify the total AC tonnage requirements for HVAC systems for the LINAC room, control console room, chiller room, UPS room and TPS room. iii) The main power supply line shall be provided by the institute up to one point within the radiotherapy facility. The vendor shall provide the mains panel and distribution panel for LINAC, HVAC, UPS, and lighting. A few lights in LINAC, console rooms, and UPS rooms shall be connected to the UPS to provide emergency lighting. iv) The vendor shall provide a UPS with integrated power conditioning, designed with an appropriate power rating to ensure voltage regulation, spike protection, and seamless operation during power disturbances. The UPS must deliver a backup power supply for at least 45 minutes, supporting the LINAC and associated equipments, including the chiller, TPS, OIS, lighting for the treatment room, control console, and TPS room. For added safety, the UPS should be equipped with a resettable over-current breaker for effective protection against overloads. Specify the power rating the UPS offered.
2	Water Chiller System	i) The vendor shall provide a fully automatic water chiller system for sufficient cooling of the linear accelerator. ii) The water chiller system shall incorporate automatic backup facilities, remote control and alarm panel with warning facilities. The automatic backup facilities that include the backup compressor, backup pump, backup valves and other critical components in the

		chiller system ensure continuous operation even if the primary components fail. iii) The water chiller system shall be provided along with the machine by the principals or international standard system.
3	Air Conditioning	Specify temperature, relative humidity and air conditioning or air changes required per hour for the offered system.
4	Environmental Requirements	As the LINAC is housed in a concrete bunker to provide radiation protection for staff and members of the public, the vendor shall provide the recommendation for operation and storage conditions. The environment inside the linac shall be climate-controlled, with appropriate temperature and humidity control systems, including monitoring to avoid premature material disintegration and/or device failure.
XIV. Equipment Warranty and Maintenance Contract		
1	Warranty (02 Years)	The vendor shall give a mandatory on-site warranty for the first two (02) years from the date of commissioning of the entire Linac system including all locally supplied items: UPS and its batteries, Chiller system and AC system from the principals, except for the waveguide, beam-bending magnet assembly, electron gun, X-ray tube & RF system, which shall carry a guarantee for 10 years. During the warranty period, all software updates/upgrades should be provided without incurring any change in the hardware configuration supplied free of cost.
2	Comprehensive Annual Maintenance Contract (08 Years)	i) The vendor shall provide a comprehensive annual maintenance contract (CAMC) rate year-wise for the quoted machine and other accessories for the next 8 years after the warranty period. ii) Spare parts kit shall be available for a minimum of 13 years and price must be included in the offer. iii) Minimum 95% uptime warranty/guarantee during warranty and CAMC period shall be provided.
XV. Staff Training and Documentation		
1	On-Site Training	On-site application training shall be provided for a minimum of four weeks to all staff members in the department.
2	Linac Beam Data	The vendor shall provide the Golden data or representative beam data of linear accelerator photon and electron central axis, profile dose curves, as well as flatness and symmetry profiles measured at the manufacturer's place to verify the measured data at the time of clinical commissioning.
3	Manuals	User/Technical/Maintenance manual to be supplied in English.

2. Treatment Planning System (TPS)

System Overview

The treatment planning system (TPS) is a software application used for the planning of radiotherapy treatment of cancer. The treatment planning system (TPS) shall be capable of performing conventional 2D planning, conformal 3D planning, inverse treatment planning for IMRT and VMAT, 4D-treatment planning and adaptive treatment planning for clinical application of various standard and advanced treatment delivery techniques in radiotherapy. The TPS shall have modules of (i) imaging and registration (ii) contouring/segmentation (iii) planning optimization and dose calculation (iv) plan review and evaluation (v) beam modelling with necessary hardware systems. The TPS offered shall be configured at two LINAC locations to ensure seamless integration and operation across both LINAC locations at DRBRAIRCH and Main RT, AIIMS.

General Requirements

The TPS shall include:

1. **Six treatment planning workstations** with dose calculation licenses and **Six virtual simulation workstations** without dose calculation licenses shall be provided and configured at two LINAC locations at DRBRAIRCH and Main RT, AIIMS:
    a. **Three treatment planning workstations and three virtual simulation workstations shall be provided for LINAC-1** at at DRBRAIRCH, AIIMS and
    b. **Three treatment planning workstations and three virtual simulation workstations shall be provided for LINAC-2 at Main RT**, AIIMS.
2. The system shall have the latest technology of hardware and software features commercially available at the time of delivery.
3. Treatment planning workstations, including 23-inch monitors, printer, keyboard, and mouse with network capability.
4. The system shall be integrated with CT-Simulator, MRI, PET and linear accelerators, oncology information system, dosimetry equipment and hospital PACS system.
5. Display of all relevant planning and treatment system parameters shall be in accordance with the IEC 61217 scale and coordinate convention.
6. The vendor shall provide each unit price of both TPS and workstations offered.

The system offered shall have the following technical specifications.

S.No.	Features	Technical Specification
1	Imaging and Image Registration	i) The system shall enable the import of patient data sets from

		various imaging modalities that are used to facilitate target definition using the DICOM standard. ii) Image import shall be achieved through direct connectivity and also provision to be used through CD/DVD media. iii) Networking with picture archiving and communication system (PACS) system. iv) The system shall support CT, MRI, CBCT, and PET registration. v) The system shall use both rigid and deformable image registration vi) Specify the type of DIR methods available in the offered system. vii) Deformable image registration shall be capable of fusing CT and CBCT images.
2	Contouring/ Segmentation	i) Contouring tools shall allow the definition in 3D of structures, including target, organs at risk and patient outline. ii) Automated tools shall allow the expansion of the clinical target volume (CTV) to a planning target volume (PTV) with non-uniform margins in three dimensions. iii) The system shall have the ability to add bolus structures to the patient data set of various shapes and densities. iv) System shall be capable of 3D visualization of patient data display, beam display and dose distribution display. v) The system shall have the following advanced contouring and segmentation functionalities: a) Multi-modality contouring b) 4D image dataset support- MIP, AIP, and minIP image creation c) Auto PET SUV contouring d) Advanced Boolean operations e) AI-based auto-segmentation system for targets and OARs
3	Planning, Optimization and Dose Calculation	The system offered shall have the following basic and advanced planning and optimization functionalities: i) A comprehensive "forward planning" environment shall allow

		the user to modify beam weights, beam positioning, jaw position, wedges and blocks, or MLC to optimize the treatment plan. ii) 2D, 3D, electron planning and composite planning iii) Field-in-field forward IMRT planning iv) Dynamic conformal arc planning v) Static and dynamic IMRT and VMAT planning vi) 4D treatment planning vii) Adaptive re-planning viii) SRS/SBRT treatment planning ix) Automated planning using Scripting application-based planning or protocol-driven template-based planning. x) Physical DVH based optimization, biological optimization and xi) The photon beam algorithm shall use advanced kernal methods such as convolution/superposition, Boltzmann transport ACUROS or Monte- Carlo based. xii) The electron beam algorithm shall be based on Monte Carlo methods. xiii) Photon beam and electron beam algorithms shall calculate the dose to the patient considering the 3D nature and heterogeneity of the patient data set. xiv) The dose calculation grid shall be user-adjustable for desired, better dose calculation accuracy. xv) The system shall allow the dose prescription to a point, volume or isodose line.
4	Plan Review and Approval	i) The system shall have basic and advanced plan review and evaluation tools such as dose volume histograms (DVHs), dose statistics, 2D and 3D dose visualization, and plan addition and plan comparison. ii) The system shall also have Radiobiological model-based treatment response evaluation tools such as BED/EQD or TCP and NTCP. iii) The system shall be able to generate, view and transfer DRRs. iv) User and password security shall allow approval/locking of

		treatment plans and different levels of access to the functionality of the TPS based on the user's profile, e.g. administrator, planner, medical physicist, radiation oncologist. v) Shall be possible for electronic/auto plan approval, if commercially available
5	Beam Modeling	i) A comprehensive beam modelling module shall allow the configuration of complete geometric and dosimetric models for treatment units with photon and electron beams. ii) The module shall have the following features: 1. Ability to import measured beam profiles and output factors. 2. Ability to model dynamic, fixed and internal wedges. 3. Tools to allow the comparison of the beam model and measured data. iii) Security features that protect beam data and beam models from modification. iv) A module shall allow the creation of CT number to mass density or electron density data for various CT scanners for use by the photon and electron beam algorithms.
6	Plan Output and Networking Connectivity	i) A laser printer for A3/A4 output of isodose distributions, beam shapes and treatment plan parameters shall be provided. ii) The system shall allow the export of approved treatment plans and DRRs to an oncology information system (OIS). iii) System shall have HL-7 and IHE-RO-compliant capability.
7	TPS Hardware Specification	The system shall have the latest technology of hardware and software features having vendor-recommended specifications of the system commercially available at the time of delivery, not minimum specification.

8	Date Storage and Back-up Facility	i) Vendor shall provide Rack-mounted single server having the storage capacity of 200TB along with integrated oncology information system. ii) Specify the strategies for storage back-up, archive and retrieval of the data.

3. Oncology Information System (OIS)

System Overview

The oncology information system (OIS) is a software application that manages the workflow and storage the electronic information, including patient data in the radiation oncology department. The OIS is useful as it (i) records and verifies the system (ii) transfers treatment plan information and images from the TPS to the treatment unit (iii) records detailed dose delivery information and images for each treatment session (iv) image review module (v) manage the patient care pathway (vi) electronic patient record and manage staff workflow through defined tasks (vii) treatment unit schedules and appointments. The OIS offered shall be configured at two LINAC locations to ensure seamless integration and operation across both LINAC locations at DRBRAIRCH and Main RT, AIIMS.

General Requirements

1. The offered OIS shall be compatible with existing OIS, Linac and TPS in the radiation oncology department at Dr.B.R.A.IRCH.
2. The system shall be integrated with CT-Simulator, MRI, PET and linear accelerators, treatment planning system, dosimetry equipment and hospital PACS.
3. The OIS shall use the DICOM RT standard for transferring radiation oncology-specific electronic information and shall comply with IEC 62274:2005 standards.
4. A single server having a data storage capacity of 200TB and Six (06) OIS workstations with concurrent licenses shall be provided.
5. The OIS shall include secure, servers and workstations with at least 23-inch monitors, printers, keyboards, mouse with network capability.
6. An UPS, including an automated daily backup system to an external hard drive (or equivalent) with auto detect and auto-shutdown after 30 minutes in the event of a power failure.

The system offered shall have the following technical specifications.

S.No	Items/Features	Technical Specification
1	OIS Software Workstation	OIS workstations shall be capable of: i) Manual data entry of 2D cases, clinical mark-ups and emergencies. ii) Approval and entry of prescriptions and free text setup instructions. iii) Upload of photographic images. iv) Electronic chart checks. v) Image review of DRRs and treatment images (portal and setup) vi) Networking to the TPS to allow the import of the patient administration data, beam delivery parameters and DRRs of graphically planned patients. vii) The importation of data should be customized to correctly download and translate the TPS information to the scales and graduations of the department treatment units. viii) A fully integrated workstation shall be provided for each of the treatment units, including all interfaces to fully operationalize

		the system for automated download and verification of the treatment parameters as well as capture and storage of portal and setup images. ix) The workstations should include an alternative in-room monitor to facilitate patient identification and viewing of the setup instructions, including digital images. The system should be supported by a local UPS such that there is no loss of data in the event of a power failure to the treatment unit.
2		**Software shall have the following functionalities:** i) Hierarchical security features, including the requirement for authorized approval of the dose prescription and field parameters prior to treatment. ii) Complete log of activities and users. iii) Generation of statistical data according to user-defined fields, e.g. diagnosis and managing consultant. iv) Library of Diagnoses according to the WHO *International Classification of Diseases*, (ICD-10). v) Ability to correctly log cumulative dose in the event of a treatment interruption or termination. vi) Patient appointment scheduling.
3	OIS Hardware specification	• The system shall have the latest technology of hardware and software features having vendor recommended specification of the system commercially available at the time of delivery, not minimum specification. The vendor shall provide a Rack-mounted server having storage capacity of 200TB along with TPS.

4. Dosimetry and Quality Control (D&QC) Systems

System Overview

Dosimetry and quality assurance equipment are required for the measurement of radiation beam output, central axis depth dose and beam profiles and isodose curves for characterizing modelling and commissioning the LINAC beam in the treatment planning. In addition, the same equipment shall also be used for clinical validation, end-to-end quality assurance of the treatment process, patient treatment quality assurance and also for periodic machine quality assurance and quality control procedures as required for national regulatory safety compliance.

General requirements:

The quantities mentioned for dosimetric items here is for two Linear accelerators.

1. All dosimetry and quality assurance equipment offered shall have FDA (USA) and CE (Europe) certified medical device categories.
2. The vendor shall quote the separate price for dosimetry and quality control equipment and also the unit price of each item.

S. No	Name Of Item/Feature	Technical Specification	Quantity For Linac-1	Quantity For Linac-2
		I. Reference Dosimetry Equipment		
1	Farmer-type ionization chamber	Waterproof Farmer-type ionization chamber for reference dosimetry with graphite wall material. Active volume approximately 0.6 cm^3 with TNC or BNC connector. SSDL or PSDL calibration in terms of absorbed dose to water in conjunction with an electrometer.	01 No.	01 No.
		Build-up cap of PMMA based for cobalt-60 and brass based for 6MV, 10MV and 15MV X-ray beams shall be provided.	01 No.	01 No.
2	Plane parallel ionization Chamber	Plane parallel chamber volume with approximately 0.4cm^3 or equivalent. for electron beam reference dosimetry with BNC or TNC connector	01 No.	01 No.
3	Reference class electrometer	Single channel electrometer for radiotherapy dosimetry reference class, BNC or TNC connector including carry case.	01 No.	01 No.
4	Small field dosimetry system	The small size 0.07 cm^3 or equivalent ion-chamber having high spatial resolution for measurements in small field and FFF fields for absolute and relative and beam commissioning dosimetry.	01 No.	01 No.
5	Solid Slab phantom	Set of plates manufactured of water equivalent material consisting of at least one plate of 0.1 cm thickness, two plates of 0.2 cm thickness, one plate of 0.5 cm thickness and 29 plates of 10 mm thickness. Plate outer dimensions: 30 cm x 30 cm. Adapter plates for all supplied chambers should be provided.	01 Set	01 Set

	II. Relative Dosimetry Equipment			
1	Radiation Beam Data Acquisition System	3D scanning water phantom of square /rectangular/cylindrical shape for linear accelerator beam commissioning dosimetry and annual QA. The system shall have automatic setup for beam canter adjustment and field alignment capability. The system shall consist of 3D scanning water tank, lift table, water reservoir, electrometer/controller, beam data acquisition software with the latest laptop computer, two approximately 0.125cm^3 or equivalent water-proof ionization chambers, diode detectors and all associated holders and cables.	01 Set	01 Set
	(a) 3D water scanning square/rectangular/ cylindrical phantom (b) Detectors-waterproof two ion chambers with holders. (c) Built-in dual electrometer with control unit. (d) Software system with the latest high end configuration laptop system.	i. Water tank scanning square/ rectangular/ cylindrical phantom dimensions of at least 480 x 480 x400 mm^3. ii. Detector position accuracy of ±0.1 mm and position reproducibility of ±0.1 mm. iii. Water tank with motorized scanning capability in the X, Y and Z planes for ionization chambers or diode detectors. iv. A lift table with vertical travel range of 400 mm or more and rotation in the XY plane of ±5 degrees. v. A dual electrometer system and control unit with bias range of 50–400 V, minimum resolution of 10 fA, and leakage current <250 fA. vi. A control unit to control the movement of moving mechanisms and interface with an electrometer. vii. Water reservoir with bi-directional water transport to and from the water tank and volume capacity of 180 litres or more. viii. One portable latest high-end model laptop computer with Windows operating system with connectivity to the control unit. ix. Software for data acquisition with scan optimization, data handling and analysis and TPS transfer environment. x. A software feature to allow the export of beam profile data or depth dose data in text format to Microsoft Notepad or Excel is desirable. xi. Software modules should allow the transfer of beam data to any commercially available TPS. xii. Two waterproof thimble chambers of active volume approximately 0.125 cm^3 or equivalent. xiii. Connector cables between the computer, controller and water tank.	01 Set	01 Set
2	Radiochromic films	i. Self-developing radiochromic film with sensitivity up to 20 Gy for radiotherapy dosimetry and QA applications shall be provided for initial commissioning time and also as and	25 Sheets each	25 Sheets each

		when the department demands the same. ii. EBT3 or latest Gafchromic film size: 14 x 17 inch EBT3 or latest Gafchromic film size: 8 x 10 inch		
III. Quality Assurance and Control Equipment/System				
1	Machine QA Equipment/System Daily QA	The vendor shall provide the ion chamber-based standalone daily QA device /system to perform X-ray and electron output, flatness and symmetry of beam profile, beam energy constancy test etc. for field sizes ranging from 10x10 to 20x20 cm^2. It shall be suitable for FFF beams. The vendor shall provide appropriate software for analyzing, reporting and QA data management.	01 No.	01 No.
2	Patient-Specific IMRT and VMAT Verification QA Equipment/System	The systems shall consist of (a) 3D cylindrical/elliptical phantom and (b) a 2D ion Chamber or diode array-based detector with a minimum of 1400 ion chambers with software system for IMRT and VMAT FFF beams having advanced comparison and evaluation tools including local and global gamma volume analysis as per AAPM TG-218 recommendations.	01 Set	01 Set
3	Dedicated SRS Patient-specific QA system	The vendor shall provide the dedicated SRS patient-specific QA system. The system shall consist of (a) 3D cylindrical phantom (b) suitable 2D ion chamber or CMOS solid-state sensors array detector with film-class digital resolution or diode array-based detector and software system for SRS /SBRT patient plan QA including FFF beams with advanced comparison and evaluation tools and also local and global gamma volume analysis tool as per AAPM TG-218 recommendations.	01 Set	01 Set
4.	CBCT & IGRT commissioning and quality assurance tools/phantoms/instruments	Vendor shall supply the following necessary CBCT & IGRT commissioning and quality assurance tools/phantoms/instruments: a) Image quality phantom (Catphan 600) for HU water calibration and CBCT Image quality measurement, b) CBCT electron density phantom for CBCT HU-calibration, c) MV-KV isocenter alignment QA phantom with analysis software system d) kVp multi-meter that can measure peak tube voltage (kV), exposure time and tube current (mA) and exposure of kV X-ray tube for CBCT e) Focal Spot Test Patterns (Type 9 1.5° 360) for measuring focal spot size of cone-beam CT imaging unit associated with LINAC, f) Lux Meter for measurement of optical field	01 Set	01 Set

		intensity of LINAC.		
		Radiation Safety Equipment		
1	Photon survey meter	A portable ionization chamber-based survey meter capable of detecting X-ray and gamma radiation above 25 keV, integrated display, dose rate and integrated dose modes, dose rate range of 0.5 µSv/hr – 50 mSv/hr, energy dependence less than 20% in the range of 50 keV–1 MeV, calibration certificate shall be provided.	01 No.	01 No.
2	Neutron survey meter	A spherical rem-counter probe that can be used for measurement of ambient dose equivalent rate (Sv/hr) for neutrons according to the International Commission on Radiological Protection (ICRP) Publication 60. Measuring range of 30 nSv/hr–80 mSv/hr shall be covered, and the energy dependence shall be around ±30% of 50 keV–10 MeV. The sensitivity shall be less than 3 counts per nSv. The probe shall have a calibration that is traceable to primary standards.	01 No.	-

5.Patient Positioning and Immobilization Devices Specification

System Overview

Patient positioning and immobilization devices are accessory tools which are used to prevent patient movement during radiation treatment with a linear accelerator. The patient positioning and immobilization system shall consist of base plate, thermoplastics masks, vacuum bags and other additional support systems for anatomical site-specific tools.

General requirements

1. Vendor shall provide **Five sets** of the Universal treatment Base Plate to immobilise and treat All Region of Interest (ARI) shall be made of true carbon Fibre having a total solution to treat Paediatric to Adult in Head, Head & Neck, Breast, Oesophagus, Thorax. Abdomen, Pelvic and Extremities and with suitable attachments. [Two (2) sets for High Energy two LINACs, 1set for CT machine, 1 set for Mould Room and one additional spare having total of 5 sets universal solutions].

2. All offered imported items should have USA-FDA, EU-CE and **CDSCO Indian MDR Registration** of all products and all certificates to be provided. Additionally, if any validation approval by the Linac vendors can also be provided.

3. As the patient positioning and immobilization devices such as fixation materials, couch top and thermoplastics masks alter the patient dose of radiation significantly as per the AAPM TG-176 findings, the product of vendors who will provide with FDA endorsed data of dosimetric properties of all offered devices are only eligible for the bidding.

4. The vendor shall the freeze price as a rate contract for **5 years** for supplying the thermoplastics masks suitable for the offered system with unit price.

5. Vendor shall provide the cabinet storage in two Linacs for all offered items.

6. The quantities mentioned for Patient Positioning and Immobilization items here are for two linear accelerators.

Technical Specifications

Product	Specification	Qty
Universal Base plate in Carbon Fibre	i. A long base plate to accommodate Head, Head and Neck, Breast and Lung, abdomen, and Pelvis patients on the same base plate for treatment. ii. The base plate should be constructed of Carbon Fibre iii. The base plate should allow fixing of various accessories to position the patient on it to radiotherapy treatment. iv. The length of the baseplate should be more than 130cm. v. The thickness of the base plate should not exceed 2.5cm vi. The base plate should have slots for clamp type sheet for Head, Head/Neck, Breast and Pelvis masks. vii. The base plate should be usable as a couch extension for Brain treatments. viii. There should be markings and scale on the baseplate. ix. The baseplate should index to the couch with the dedicated locking mechanism.	5 sets
	Support accessories	
	Head and Neck Immobilization supports	
Head Supports	i. A set of 6 head supports to be provided. ii. These supports should be low density materials that should be radiolucent and does not attenuate the beam.	6 sets
Blocks and Wedges	i. A set of 2 blocks should be provided of Carbon fibre/low density material for compensation of height of neck position for the patient. ii. Also, a set of Carbon fibre wedges/low density material to be provided for flexion and extension of neck. iii. They should be of minimum two angulations	5 sets
Head thermoplastic masks	• Low temperature thermoplastic 3 point clamp type masks	200

Head and Neck thermoplastic masks	• Low temperature thermoplastic 4 or 5 point clamp type masks	200
	Breast & Lung Immobilization supports	5 sets
Breast and Lung Board support systems (MRI Compatible)	i. A breast immobilization solution should be provided of low density material so that it does not attenuate the beam. ii. It should consist of at least 3 angulations iii. The whole system should be of such a design that it should fit into a larger bore CT unit. iv. The system should have provision to attach the head supports and breast masks. v. It should have a thigh support to prevent sliding of the patient. vi. The system should be able to fix on the universal base plate. vii. Set of arm rest to be provided.	5 sets
Breast thermoplastic masks	• 2 point breast clamp type masks	200
	Prone Breast Immobilization solution	3 sets
Prone Breast Solution	i. Prone breast immobilization should be provided such that it can allow patient breast treatment in prone position. ii. The system should have a provision to increase the height if needed. iii. The system should be able to fix on the universal baseplate.	
	Pelvic Immobilization Supine and Prone supports	
Leg separator	i. A leg separator device should be provided to fix the 6 clamp sheet. ii. This attachment should fix on the universal baseplate to accommodate the pelvic patient on the same.	5 sets
Prone Belly Board	i. The prone belly board with the provision position the patient in prone position so as to have better soft tissue reproducibility in the pelvic area. ii. This board should also be able to be fixed on the universal base plate iii. The patient should be able to immobilize with a pelvic sheet	3 sets
Pelvic thermoplastic Masks	**6 Clamp Pelvic thermoplastic Mask**	200

	4 Clamp Pelvic thermoplastic Mask	200
	Knee and Foot Immobilization supports	5 sets
	i. An adjustable knee and foot support solution to be provided. ii. This should also attach to the universal baseplate iii. The foot support should also allow for indexable rotation at foot.	
	Frameless SRS Immobilization solution	3 sets
Frameless SRS immobilization solution	i. The SRS immobilization should be made of Low density materials ii. It should fix on the universal baseplate iii. It should be have provision to make a customised posterior support of head and a multilayer mask anteriorly. iv. This should restrict the movement to less than 1mm. v. Should be compatible with SGRT open mask	
Open face mask for SGRT based SRS	Open face mask for SGRT based SRS	100
Frameless SRS thermoplastic masks		200
Custom head rest		200
	SBRT immobilization solutions	**5 sets**
Abdominal Compression	i. A mechanical compression arch should be able to be fixed on the universal baseplate to provide compression of diaphragm to restrict anatomical movement during SBRT treatment. ii. Vendor should provide complete set of all accessories. iii. Additionally a pneumatic compression system should also be provided. (MRI Compatible)	
	Vacuum Cushions/Bag Immobilization solution	
	There should be a provision for indexing the vacuum cushions/bags on the universal baseplate	
	Extremities Immobilization	
Immobilization for Arms and foot	A Carbon Fibre base plate with Multiple holes to fix thermoplastic sheet to be provided	1 set
Vacuum Pump	Vacuum pump should have capability to inflate or deflate vacuum. It should be an oil free pump	03 Qty
	Vacuum Cushions with following sizes	
	70X100cm	100
	80X100cm	50
	80X150cm	50

	80X200cm	25
	70X50cm	25
	T shape head/neck cushion	25
	Accessories	
	Additional MRI Compatible Immobilization	
Universal Base plate	i. A long base plate to accommodate Head, Head and Neck, Breast and Lung, abdomen, and Pelvis and also for extremities patients on the same base plate for treatment. ii. The base plate should be constructed of Glass Fibre so that it is MRI compatible. iii. The base plate should allow fixing of various accessories to position the patient on it to radiotherapy treatment. iv. The length of the baseplate should be more than 120cm. v. The thickness of the base plate should not exceed 2.5cm vi. The base plate should have slots for clamp type sheet for Head, Head/Neck, Breast and Pelvis masks. vii. The base plate should be usable as a couch extension for Brain treatments. viii. There should be markings and scale on the baseplate. The baseplate should index to the couch with the dedicated locking mechanism.	2 Qty
Head Supports	iii. A set of 6 head supports to be provided. iv. These supports should be low density materials that should be radiolucent and does not attenuate the beam and should be MR compatible	1 set
Blocks and Wedges	iv. A set of 2 blocks should be provided of Glass fibre material for compensation of height of neck position for the patient. v. They should be of 2 cm and 4 cm in thickness vi. Also, a set of Glass fibre wedges to be provided for flexion and extension of neck. vii. They should be of 9 degree and 18 degree angulation respectively	1 set
MRI Compatible Pin bar		2
CT Fiducial Marker	Non Attenuating material	500
Testicular shielding	• Vendor shall provide testicular shielding to minimize radiation exposure to the testicles during radiation	

	treatment of pelvic or abdominal areas. • Specify the shielding characteristics of the device for all supplied energies.	
Eye Fixation device	• Vendor shall provide Eye Fixation for keeping the eye steady during CT scans and treatment sessions	4 sets
Bolus	Bolus: The bolus build-up materials made up of a solid, homogenous, uniform, tissue equivalent oil gel with a density of 1.03 g/cc approved by FDA for human contact is encased in a tough layer of thin plastic. • Size: 30 x 30 cm^2 • Thickness: 0.5, 1.0, 1.5, 2.0 cm	20 Nos. for each thickness
Scissors (sharp)	Scissors (sharp) capable of cutting thermoplastic sheets.	6 sets
Tungsten Eye Shields	1. Vendor shall provide both 2 mm and 3 mm thick Tungsten eye shields for 6MeV and 9Mev electron eye shielding 2. Each tungsten eye shield offered shall be included with both 0.5 mm and 1 mm thick anodized aluminium cap to reduce electron backscatter. Sixes of 2mm and 3mm tungsten eye shields shall be in five sizes: extra-small, small, medium, large & extra-large	4 sets each size and energy
Cross Markers	Cross Markers for isocentre marking on patients.	600 Nos.
CT Markers	CT Makers: Non-metallic fiducial CT markers (2.0 mm to 2.5-mm dia.)	600 Nos.
Mould Room Couch with green colour patient positioning lasers	i) Electronically height adjustable based on lockable castors with fully indexed carbon fibre top. Specify the couch height adjustable range. ii) It should be trolly type and mobile. iii) Both sagittal and transverse green lasers for Mould Room Couch.	1 Set
Water bath system	Water bath system: Digital stainless steel-based water bath system with LED display to handle the largest immobilization sheets available, shall be provided.	2 Qty
Heat Gun	With temperature control	02 Qty
Electron Block casting system	Electron Block casting system set	01 Qty
2 Pin Bar	2 Pin Bar set	04 Qty
Shoulder retractor	Shoulder retractor set	5 sets
Body Caliper	60cm	5 sets

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6. Turnkey Scope of Work for Facility Site Modifications:

General Requirements

1. The Scope of Turnkey Work for Facility Site Modifications for supply, installation and commissioning of two Advanced High-Energy Linear Accelerator Systems under buyback basis shall comprise:
   i) Decommissioning and disposal of two existing old linear accelerators (Varian Clinac 2300C/D LINAC and Elekta Synergy S LINAC) on a buyback basis, and
   ii) Complete turnkey work for Facility Site Modifications at two different LINAC bunker sites (DRBRAIRCH and Main RT) for installation of two proposed Advanced High-Energy Linear Accelerator Systems.
   iii) The necessary AERB permissions for the decommissioning and disposal of the two existing old LINCS shall be obtained by the institute with the assistance of the vendor/supplier if needed.
2. The vendor shall be responsible for carrying out the turnkey works for two different sites (Main RT & IRCH) for two linear accelerators. The vendor is requested to visit the sites for correct measurements.
3. The Supplier shall inspect the proposed site wherein the LINAC has to be installed. They are required to prepare and submit site and room layout plan for the project. The scope of turnkey work includes complete Civil, Electrical, Air-conditioning and Plumbing for the proper functioning of the LINAC. The supplier shall assist the user by facilitating necessary documentation/technical data for regulatory clearances and approvals from AERB.
4. The AERB-approved proposed site and room layout plans for both LINAC Bunker facilities at DR. BRAIRCH and Main RT are attached herewith as **Enclosure-1**. The bunker/facility shielding work requirement is entirely the vendor's responsibility. The successful vendor shall do the necessary shielding works as per the AERB-approved layout drawing provided in the tender. The cost of the facility site modification work should be quoted separately, and this cost shall be considered for L1 calculation.
5. **Structural Modifications for Existing LINAC Bunker Rooms at DR. BRAIRCH and Main RT:** As per the AERB-approved site and room layout plans, structural modifications are required for the existing LINAC bunker rooms at DR. BRAIRCH and Main RT. A detailed structural assessment was carried out by M/s CCEPL (Creative Design Consultants & Engineers Pvt. Ltd., Ghaziabad) through the Civil Engineering Department, IIT Delhi. The key findings and recommendations are as follows:

   DR. BRAIRCH LINAC Bunker Room:
   - The proposed modifications to the walls are viable with cement grouting in the existing structure.
   - Minimum reinforcement is required within the additional thickness of the proposed RCC layer.
   - The existing slab system needs to be replaced with a new concrete slab.

   Main RT LINAC Bunker Room:
   - The proposed modifications to the walls are feasible with the existing structure.
   - Minimum reinforcement is required within the additional thickness of the proposed RCC layer.

   The detailed structural assessment reports, methodology for site modifications, and BOQ for structure strengthening have been provided by M/s CCEPL and are attached as Enclosure-2 & Enclosure-3. These reports have also been certified and endorsed by the Engineering Service Department of our institute.

   The cost for strengthening the modified structure for both LINAC bunkers will be payable by the vendor.

6. The Chiller and UPS room for the Linac bunker at Room No 9, Main RT, is the room on the first floor above the maze area as shown in sectional drawing (A-A) of the attached layout drawing. The TPS room is situated above the control console room of the proposed bunker. For an open-air chiller system, the space for installation of the chiller system shall be located above the ceiling adjacent to the TPS room.
7. The Chiller and UPS room for the Linac bunker at Room No 33, Ground Floor, DRBRAIRCH, are shown in the room layout plan of the attached layout drawing. The TPS room is situated at room number 34 & 37, Ground Floor, DRBRAIRCH. For an open-air chiller system, the space for installation of the chiller system shall be located above the ceiling of the UPS room.
8. The quantity of storage and cupboard for the LINAC room, control console room, and TPS rooms are attached as a Bill of Quantity (BOQ) of Turnkey Work.
9. The vendor will have to quote Unit Rates for the following components of Site Modification work.
   i. Electrical work
   ii. Air conditioning (HVAC)
   iii. Flooring
   iv. Wall Finishing & Painting
   v. False Ceiling
   vi. Plumbing.
10. The payment for site modification work shall be based on the Unit Price quoted by the supplier applied to the actual measurement of Site Modification work executed by the supplier at the site.
11. Bidder should clearly mention the break-up price of each component of Site Modification work separately.
12. The system should be installed and handed over in working condition with all necessary electrical, wall finishing, air conditioning, flooring and plumbing work undertaken by the vendor in consultation with the user dept.
13. Air conditioning of the LINAC facility should be available in the LINAC treatment room, LINAC control console room, UPS room, TPS room and Chiller room, if applicable, and the price quoted for 30 TR HVAC is included for the L1 calculation of the bids.
14. The LINAC Facility shall consist of the following rooms:
    a. LINAC Treatment Room
    b. LINAC Control Console room
    c. UPS room
    d. TPS room
    e. Chiller room/area
15. The supplier shall be required to specify the total electrical power load requirements for the LINAC facility including the load of the LINAC system, TPS, OIS, chiller, HVAC, lighting for LINAC, TPS rooms and for the accessories if any. The supply line will be provided by the Institute up to one point within the LINAC facility. The main panel and distribution panel for LINAC, HVAC, and LIGHTING should be provided by the supplier. A few lights in LINAC, CONSOLE ROOMS, and UPS ROOM shall be connected to the UPS to provide emergency lighting.
16. The bidder may quote the unit rates of any other site modification work activity which is not mentioned in the list below.

THE ELECTRICAL WORKs:

1. Wiring: All internal electrical wiring, including the main distribution panel board, necessary MCBs, distribution boards (DB), junction boxes, switch boxes, and other required components, should be completed. The wiring must use high-quality copper conductors of appropriate capacity based on the load requirements and sourced from renowned manufacturers as listed below.
2. Networking: All necessary network cabling, including LAN, DICOM, and PACS, should be provided to enable seamless data interfacing between the TPS, OIS, and LINAC, as well as between the CT-Simulator and TPS. The cabling should include an adequate number of terminals to ensure efficient connectivity.
3. For the two LINAC Bunker facilities at DRBRAIRCH and Main RT, the vendor shall lay DICOM network cable from the TPS rooms at DRBRAIRCH and Main RT to the CT-Simulator room at DRBRAIRCH for seamless DICOM data transfer between and TPS and CT-Simulator for both LINAC bunker facilities.
4. All internal wiring/cabling, including telephone, LAN, DICOM, and PACS connections, shall be of the concealed type.
5. **Vendor shall do the necessary electrical earthing:**
   i) Double earthing with copper plate for the LINAC and associated equipment including UPS, Chiller, and HVAC. The earthing cable/wire shall be routed end-to-end through an insulated conduit.
   ii) Double earthing is to be provided with G.I. plate for the body of all the electrical accessories related to LINAC and the associated equipments.
   iii) The necessary earthing locations will be provided by the institute in consultation with our Engineering Service Department.
6. Switches light and power points should be of modular type and of standard make as listed below.
7. General lights: Mirror optical type 1X28 W or 2X28 W/CFL fittings 2X36, 3X36 W with electronic ballasts to be provided in all areas. The light dimming facility should be provided wherever it is necessary.
8. All wires used must be FRLS (Fire Retardant with low smoke) type only.
9. Specification and Conditions for Electrical Works:
   i) The electrical work shall be carried out as per the Central Public Works Department (C.P.W.D) specifications for Electrical Works 2023.
   ii) No sub-standard work will be accepted in any case and no payment will be made for the sub-standard work.
   iii) The watch and wand of electrical installations and accessories shall be the responsibility of the contractor till these are handed over after testing to the institute.
   iv) After the completion of work the installation shall be tested in the presence of the Engineer-in-charge or his representative as per relevant rules per C.P.W.D specifications and results in writing shall be confirmed.

AIR CONDITIONING WORKs:

1. The designated areas for Site Modification including the LINAC treatment room, LINAC control console room, TPS room, UPS room, and indoor chiller room, require air-conditioning to maintain optimal temperature and humidity conditions. Package Air Conditioners may be utilized based on the specific room requirements and suitability. To ensure proper moisture control, humidity regulation should be incorporated to prevent condensation on equipment. Additionally, the air-conditioning system should be designed with standby units to ensure continuous, uniform air conditioning around the clock (24/7)."

2. In the case of the chiller system of the LINAC being placed indoors, the Air-conditioning system should be able to provide adequate ventilation and heat exchange for the same.
3. The outdoor units of HVAC should have grill coverings to prevent theft and damage.
4. Stand-alone Room Dehumidifiers of adequate capacity for LINAC Room, Console Room and TPS Room to ensure a condensation- free atmosphere for the high-value equipment.
5. **Environment specifications:**
   i) Humidity range: Relative humidity is 60% and 80% in all areas except the equipment room which shall be as per the requirement of the equipment.
   ii) Temperature ranges: 22 ± 2° C in all areas throughout the year, except the equipment room which shall be as per the requirement of the equipment.
   iii) **Air conditioning load:** The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the supplier.

FLOORING WORKs:

1. The vendor shall provide and lay 600 x 600 mm vitrified tiles with 100 mm matching tile skirting in the LINAC room and LINAC control console room and associated rooms (TPS, UPS). The vitrified tiles (Marbonite or Granamite, with thickness as specified by the manufacturer) should be of approved quality, colour, design, and shade. The tiles must be fully homogeneous and conform to IS code 15622, with a water absorption rate of less than 0.08%. The tiles will be laid in the specified pattern, grouted with a matching colour, approved quality ready-made grout, and the flooring will be finished with proper curing and cleaning. All work will be completed to the full satisfaction of the institute. Additionally, a 2-3mm thick POP protection layer will be provided over a polythene covering sheet to protect the flooring areas until the project is handed over. Cleaning and final finishing will be completed as per the drawings and specifications.
2. Providing and laying 50 mm thick cement concrete flooring, finished with 3 mm vinyl flooring in the UPS Room and Equipment Room.
3. Floor leveling if required to be done by the supplier. All installation-related floor modification nonstructural) like Turntable pit, trench etc. to be done by supplier.
4. The LINAC room, Console Room & UPS Room will be made rodent /pest-proof.
5. Mode of measurement (finished surface area of the tiles shall be measured and paid. The rate shall be Inclusive of providing and laying levelling course, PVC spacers, providing and applying epoxy grout and no additional payment shall be made for wastage. Tiles will be placed up to ceiling level.

WALL FINISHING & PAINTING

1. Two coats of Plastic Emulsion Paint over 2 coats of wall putty including primer in all areas not covered by wall tiles. Colour to be approved by the institute.
2. Wall Tiles: High-quality density Vitrified Tiles clad on the side walls up to a uniform height of 1200mm in all rooms; except UPS & equipment rooms. Colour to be approved by the institute. The vendor shall provide all tools, tackles, materials, and manpower for applying plastic enamel paint over.
3. Application of coats of wall putty, including primer, in all areas, using an approved brand, manufacturer, and shade. The finish will be applied with a roller to wall and ceiling surfaces in two coats over a coat of approved quality primer on plastered/POP surfaces, POP board/Gypsum board surfaces. The scope includes scaffolding,

surface preparation, sanding, light sanding, work platforms, and painting equipment/apparatus required for an interior-grade finish. All work will be completed at all heights and levels in accordance with the drawings and specifications.

FALSE CEILING

- The false ceiling panels should be from reputed brands. A virtual skylight facility, measuring 3m x 3m, shall be provided on the treatment room roof-top (ceiling), complete with interior decoration. The ceiling will be finished with acoustic tiles or mineral fiber, matching the virtual skylight, and incorporating high-quality lightweight insulating material. The ceiling will be supported on a grid or finished seamlessly with appropriate support above the ceiling."

MISCELLANEOUS:

1. The LINAC room shall be provided with wall-mounted storage cupboards within the LINAC room; to store: Dosimetry & QA Items, and LINAC accessories.
2. Enough Open Racks of high-quality vendors should be provided to house the immobilization materials, within the LINAC room.
3. Vendor shall provide LED X-ray film viewer with adjustable brightness; capable of holding 3 films of 14"x17" size in TPS rooms - 2 Nos.
4. The vendor shall provide wall-mounted storage cupboards with MDF laminate shutters to be fixed on the wall above the workstation in the LINAC control console room.
5. The vendor shall supply revolving chairs with height adjustable, medium-back with handrests for the LINAC control console room and TPS room - 20 Nos for the two LINAC facilities.
6. Workstation tables for the LINAC control console room & TPS rooms:
   The vendor shall provide suitable workstations(s) of reputed brands in the LINAC control console room & TPS rooms to accommodate the various workstations including OIS, TPS, etc. A sufficient number of electrical power points, switches, sockets, LAN sockets etc. shall be provided in the LINAC treatment room, control console room & TPS rooms to enable the smooth functioning of the LINAC system and TPS.

MANIFOLD SYSTEM for Medical Gas Pipeline System (MGPS):

- The vendor shall provide a Medical Gas Pipeline System (MGPS) (including oxygen, nitrous oxide, air and suction pipelines) to the LINAC room and the same should be connected from the nearest port outside the LINAC treatment room. Central pipelines of MGPS lines up to the LINAC area (nearest point) will be provided by the hospital authorities.

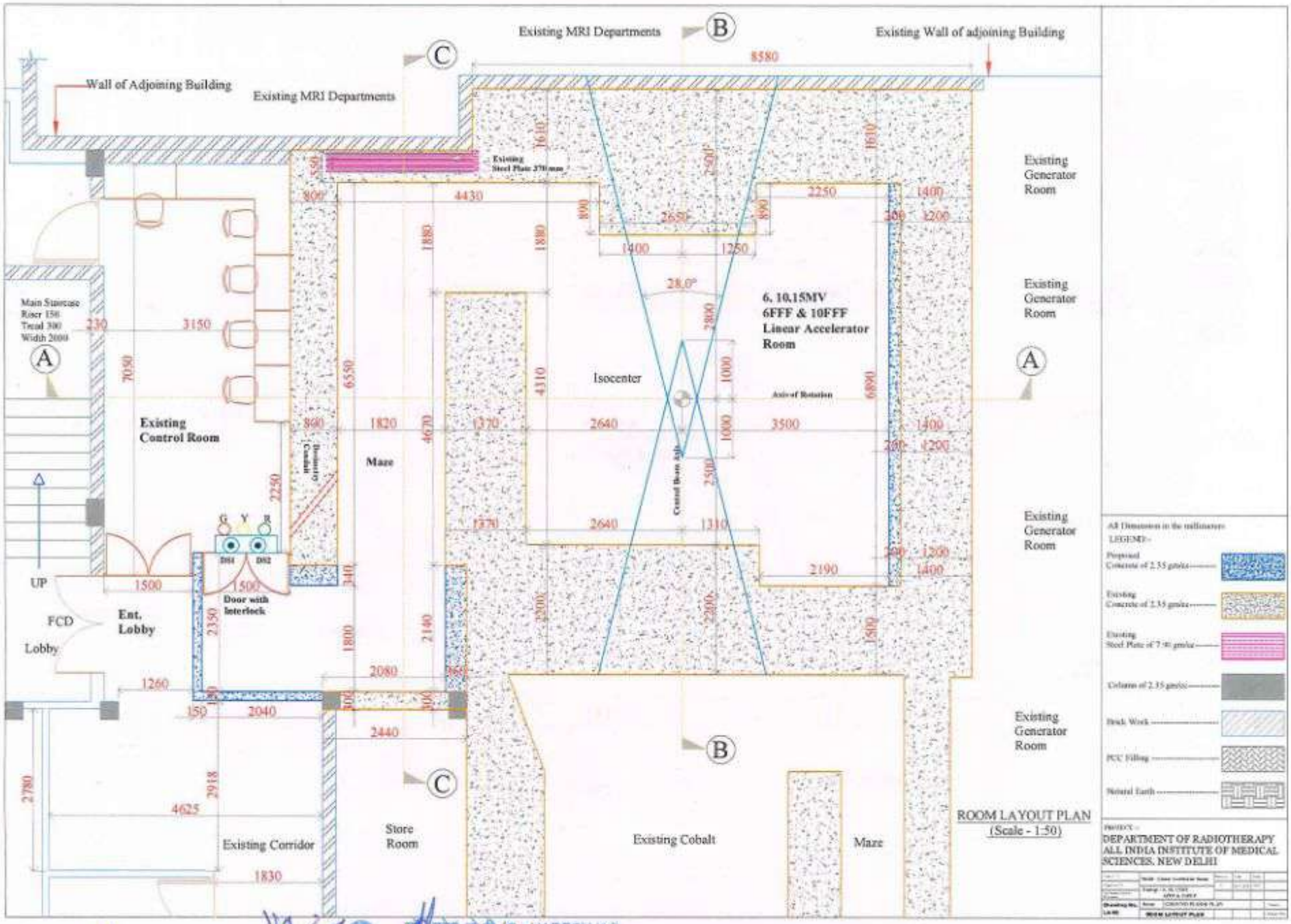
LIST OF ITEMS AND SUGGESTED MANUFACTURERS.

A. **ELECTRICAL**
   1. **CABLES**: Polycab, Havells, Skytone, with ISI mark.
   2. **WIRES**: Finolex, Havells, and Polycab with ISI mark.
   3. **SWITCHES**: Legrand, L&T, Crabtree, Roma, MK, Crabtree.
   4. **DISTRIBUTION BOX, MCB**: Legrand, L&T, Siemens, Havells.

5. **LIGHT FITTINGS**: Philips/Crompton/Wipro.
6. **Electrical Specifications:**
   i) Earthing requirement as per machine requirements.
   ii) Fire Alarm work should be addressed with Apollo make and shall be integrated with the existing fire alarm system.
   iii) UPS make: Emerson/Pegasus/ACP/E-Ton.
   iv) UPS SMF Battery Make: Amara Raja (Quanta)/Excide/Panasonic
   v) Electrical panels should be CPRI (Central Power Research Institute) approved manufacturer. Some of the approved electrical panel manufacturers are:
      a. Tricolite/Adlec/Expert Engineers/Zeta/Precision System Control/Schnieder

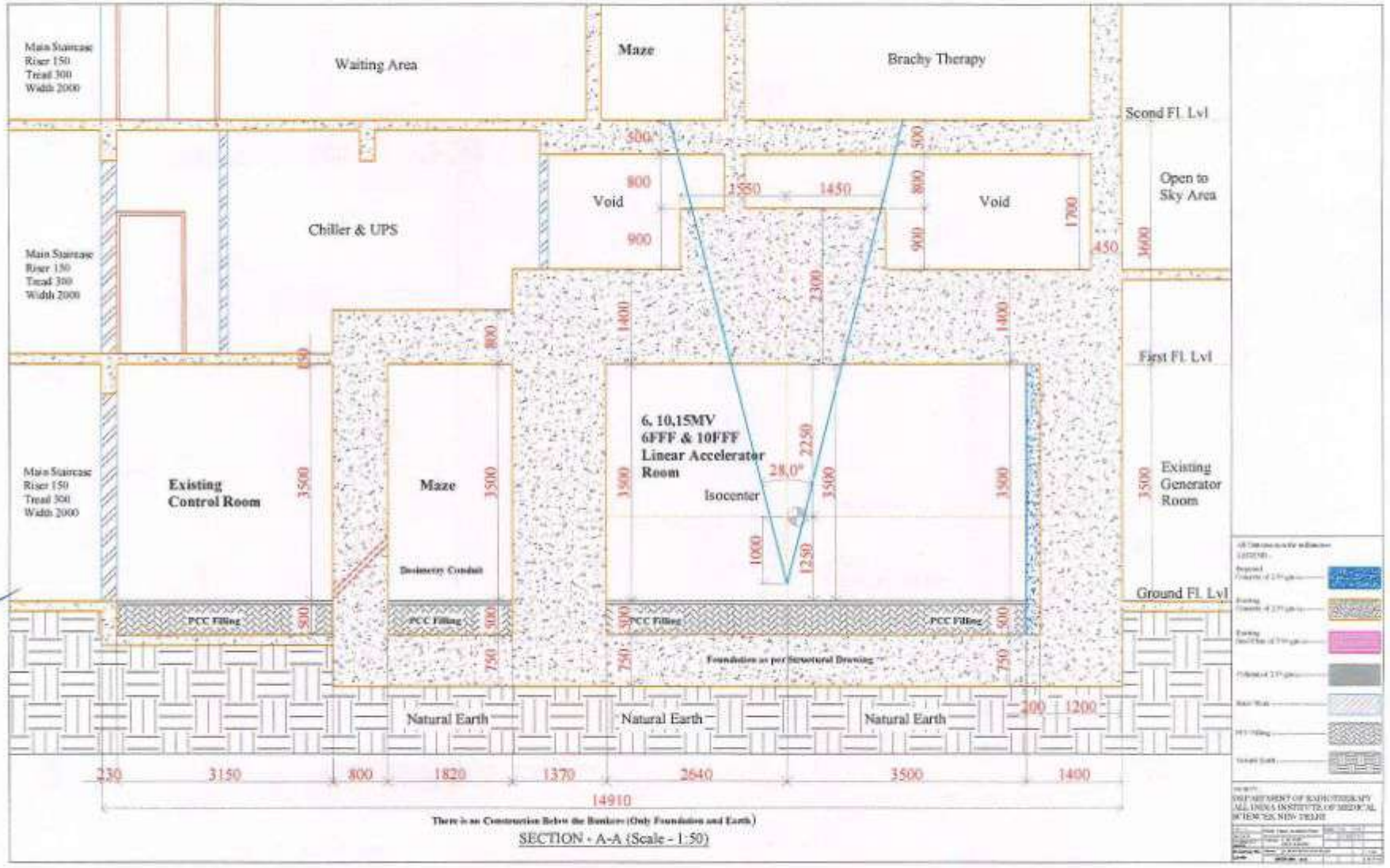
B. **AIR CONDITIONING**: Daikin, Hitachi, Blue Star, Voltas
C. **FURNITURE**: Hermen Miller, Godrej, Featherlite, Wipro
D. **FALSE CEILING** - Armstrong, Saint Gobain, Luxalon.

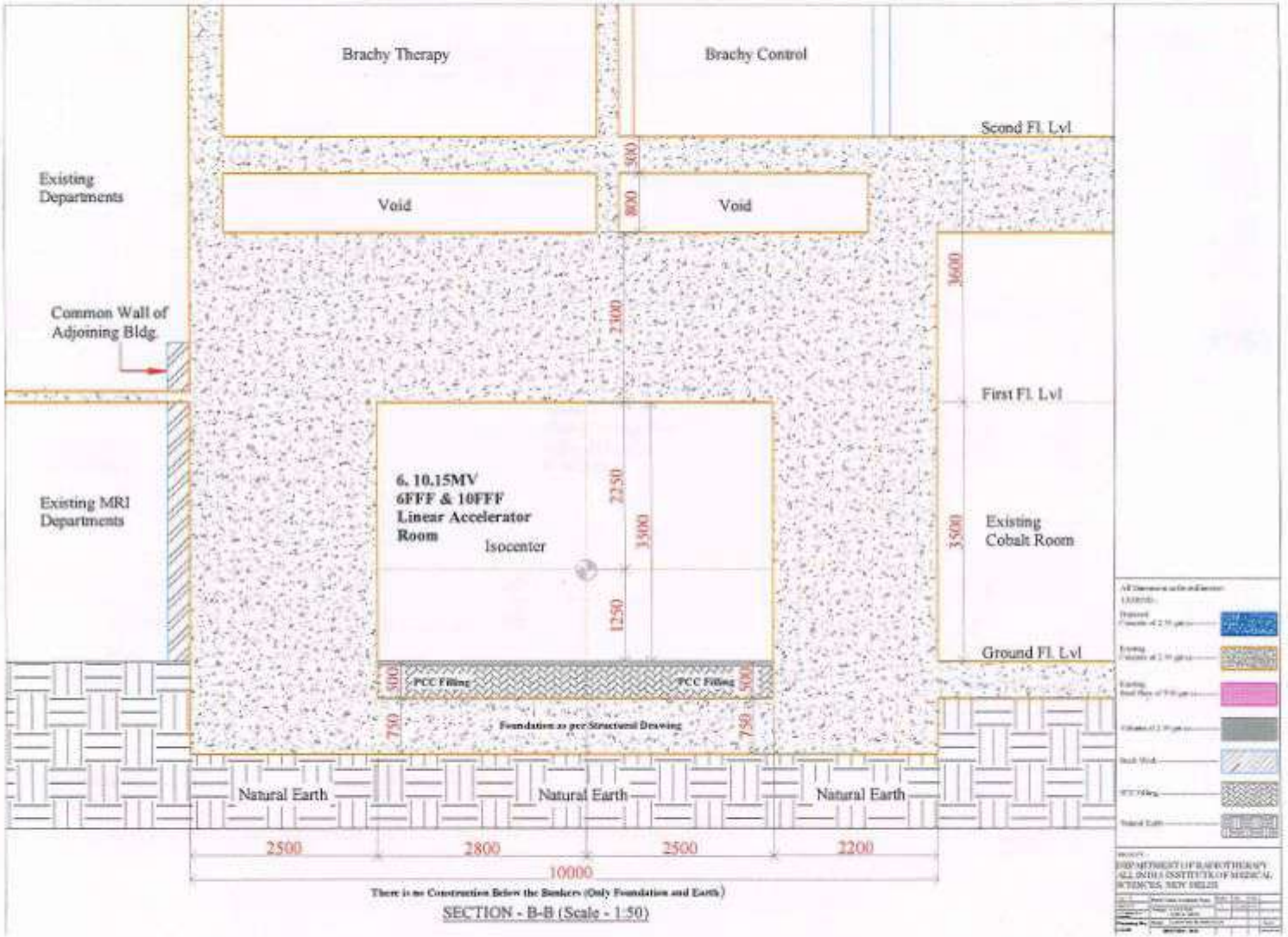
****



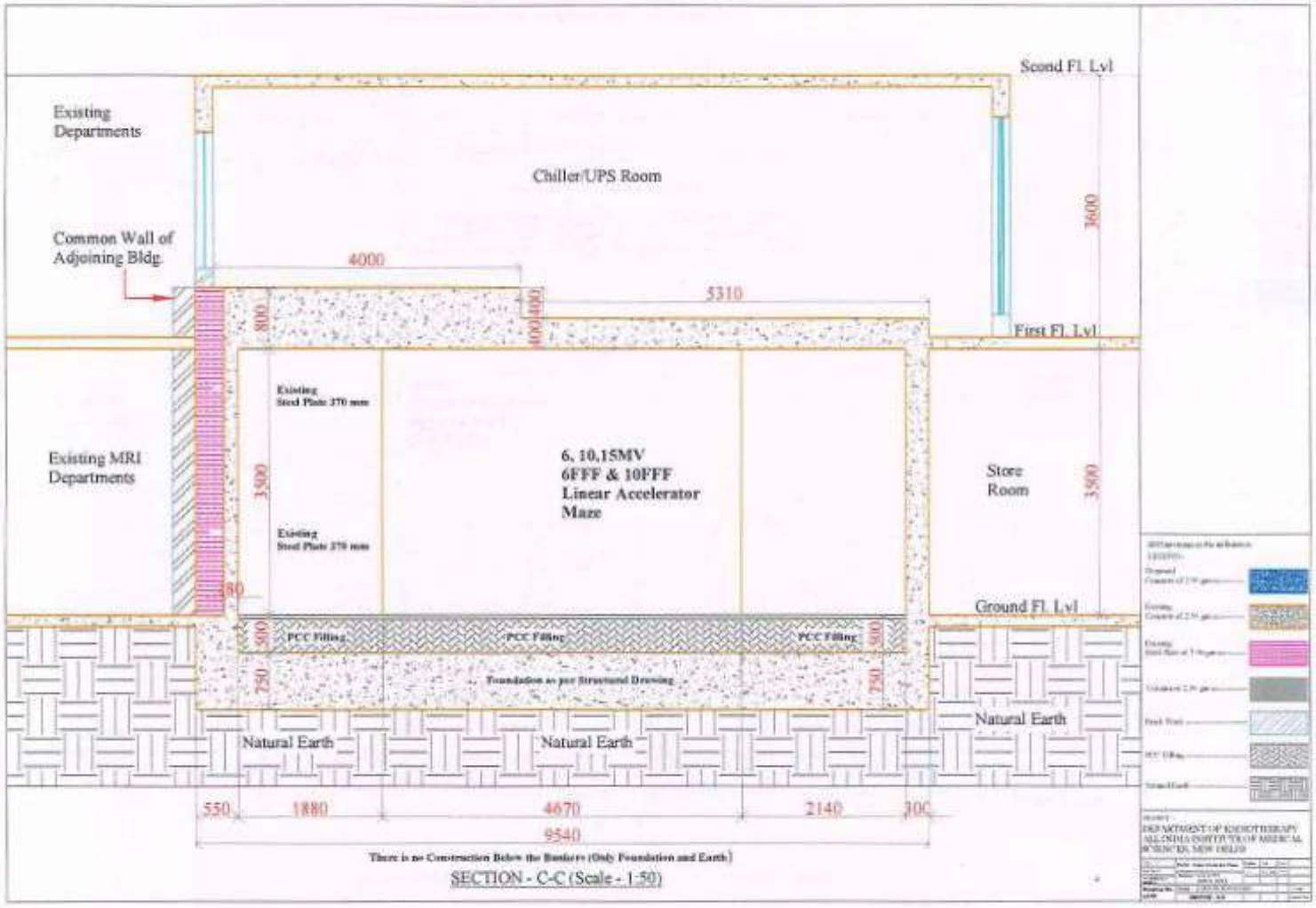
22/03/2025

डॉ हरीश के पी/Dr. HARESH K.P
प्रोफेसर/Professor
विकिरण अंकोलॉजी विभाग/Deptt. of Radiation Oncology
डॉ.बी.आर.अ.अं.रो.कैंसर अस्पताल/Dr. B.R.A., IRCH


Main Staircase
Riser 150
Tread 300
Width 2000
Waiting Area
Maze
Brachy Therapy
Scond Fl. Lvl
Open to
Sky Area
Chiller & UPS
Void
Void
Main Staircase
Riser 150
Tread 300
Width 2000
First Fl. Lvl
Main Staircase
Riser 150
Tread 300
Width 2000
Existing
Control Room
Maze
6, 10,15MV
6FFF & 10FFF
Linear Accelerator
Room
Isocenter
28.0°
Existing
Generator
Room
Dosimetry Conduit
Ground Fl. Lvl
PCC Filling
PCC Filling
PCC Filling
PCC Filling
Foundation as per Structural Drawing
Natural Earth
Natural Earth
Natural Earth
230
3150
800
1820
1370
2640
3500
1400
14910
There is no Construction Below the Bunkers (Only Foundation and Earth)
SECTION - A-A (Scale - 1:50)

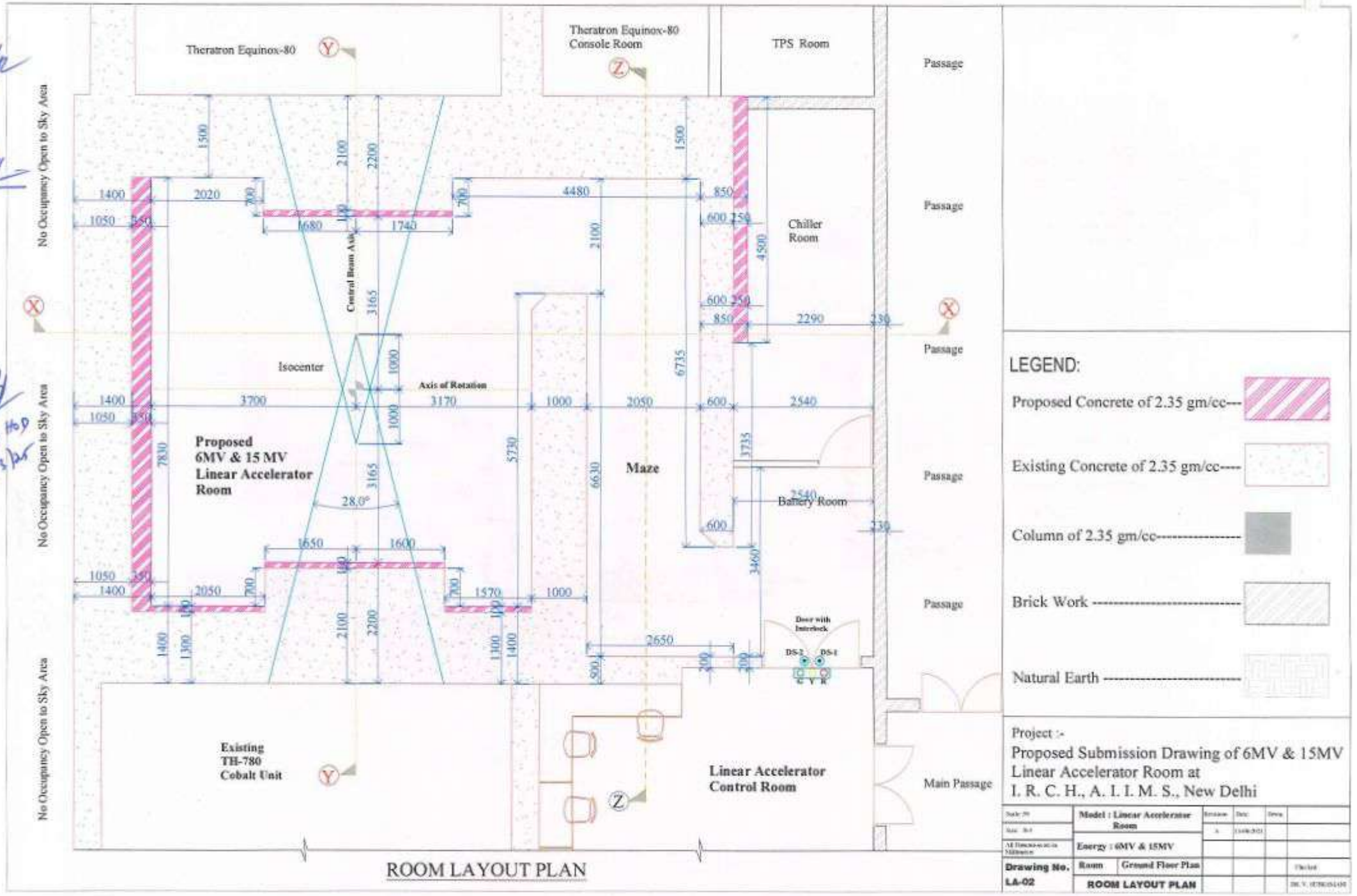


SECTION - B-B (Scale - 1:50)



SECTION - C-C (Scale - 1:50)

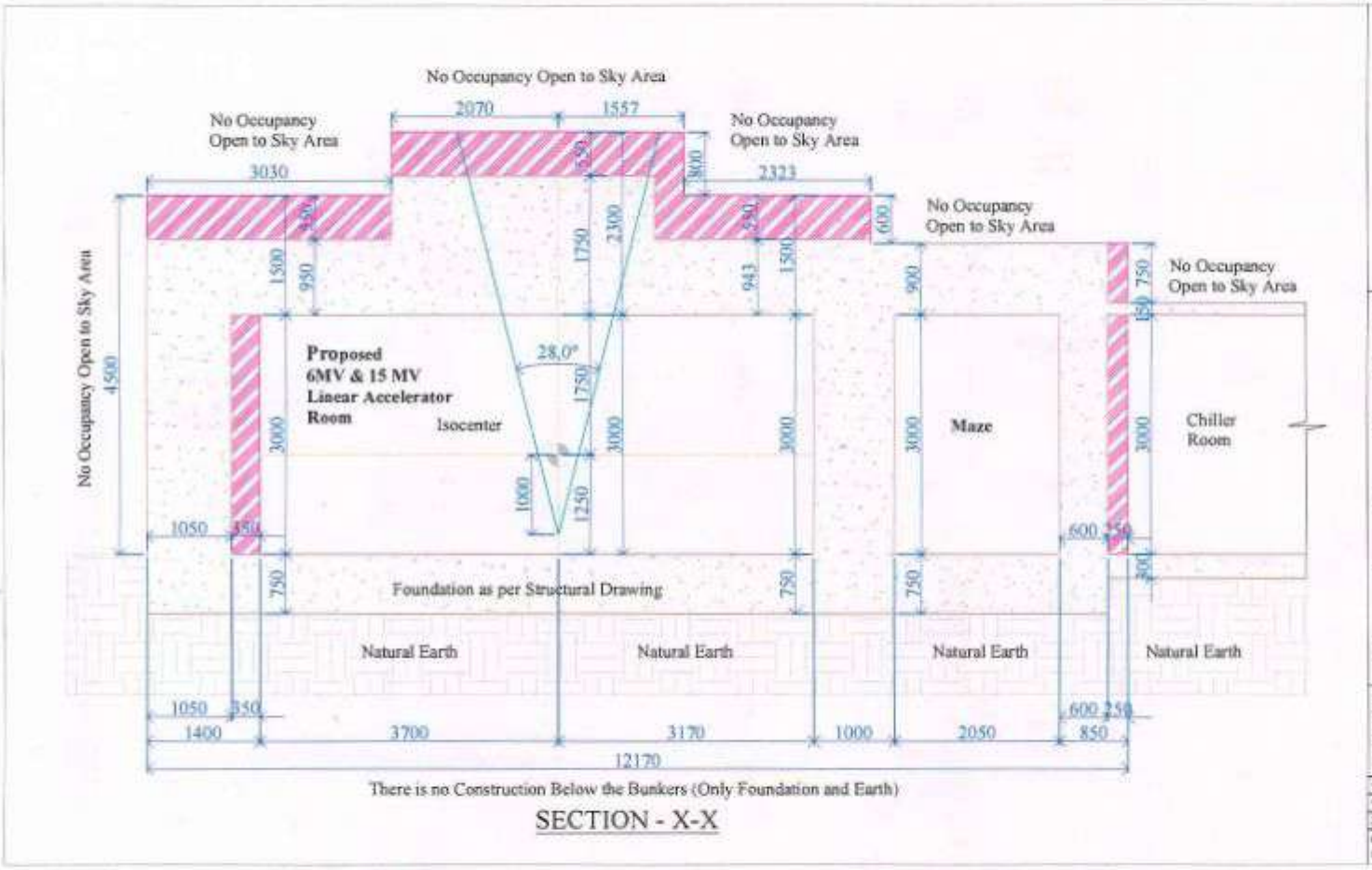

HOSPITAL PLOT BOUNDARY WALL DISTANCE IS - 100 M.
HOSPITAL PLOT BOUNDARY WALL DISTANCE IS - 140000 M.
HOSPITAL PLOT BOUNDARY WALL DISTANCE IS - 74.96M.
20000
SERVICE ROAD 45M WIDE
All Dimension in the millimeters
LEGEND :-
Proposed Concrete of 2.35 gm/cc
Existing Concrete of 2.35 gm/cc
Existing Steel Plate of 7.90 gm/cc
Column of 2.35 gm/cc
Brick Work
PCC Filling
Natural Earth
PROJECT :-
DEPARTMENT OF RADIOTHERAPY
ALL INDIA INSTITUTE OF MEDICAL SCIENCES, NEW DELHI
SITE PLAN (GROUND FLOOR PLAN) - SCALE - 1:1200



ROOM LAYOUT PLAN

Project :-
Proposed Submission Drawing of 6MV & 15MV Linear Accelerator Room at
I. R. C. H., A. I. I. M. S., New Delhi

	Model : Linear Accelerator Room				
	Energy : 6MV & 15MV				
Drawing No. LA-02	Room	Ground Floor Plan			
	ROOM LAYOUT PLAN				



SECTION - X-X

LEGEND:

Proposed Concrete of 2.35 gm/cc----

Existing Concrete of 2.35 gm/cc----

Column of 2.35 gm/cc----------

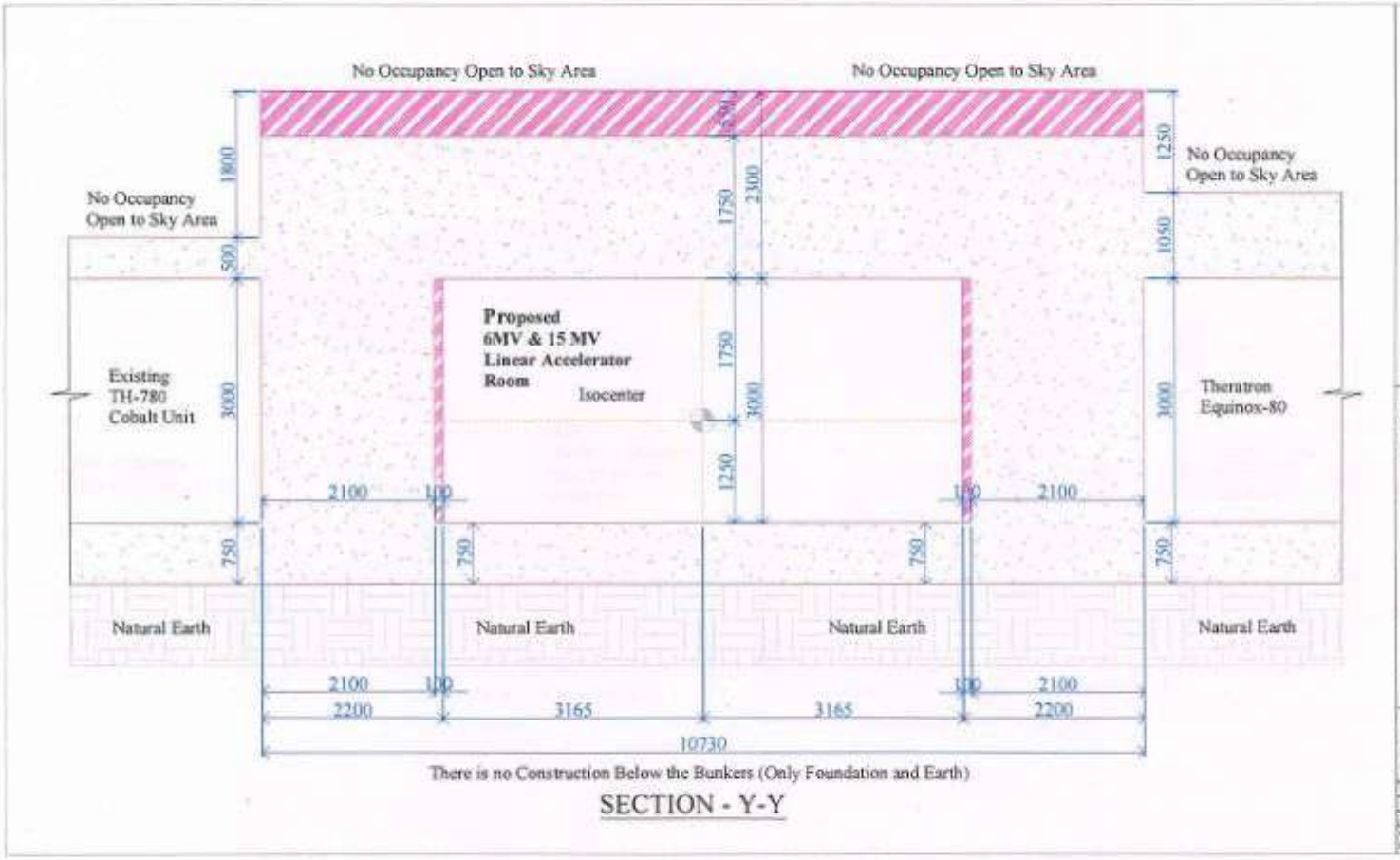
Brick Work ----------

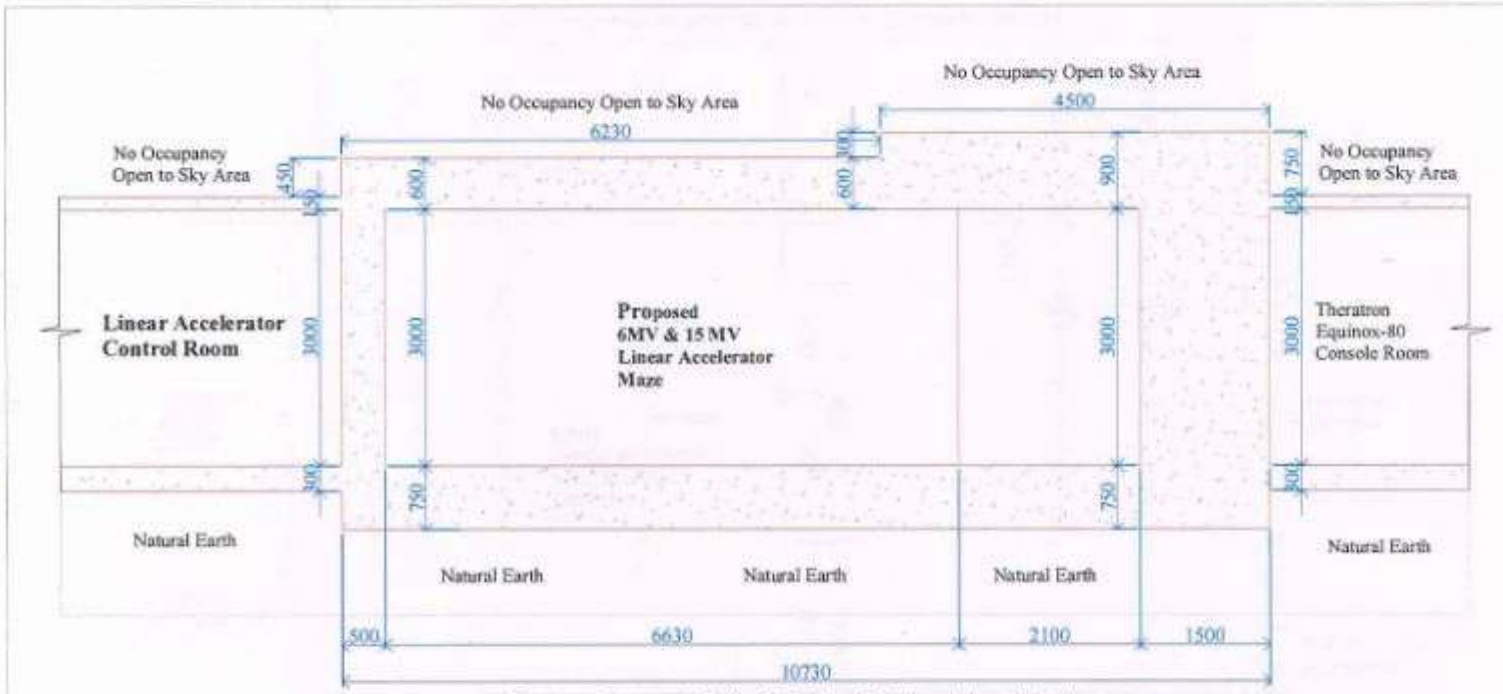
Natural Earth ----------

Project :-
Proposed Submission Drawing of 6MV & 15MV Linear Accelerator Room at
I. R. C. H., A. I. I. M. S., New Delhi

	Shield : Linear Accelerator Room				
	Energy : 6MV & 15MV				
Drawing No. LA-03	Room	Ground Floor Plan			Checked
	SECTION - X-X				

Ady HOD 22/3/25


No Occupancy Open to Sky Area
No Occupancy Open to Sky Area
No Occupancy Open to Sky Area
No Occupancy Open to Sky Area
Proposed
6MV & 15 MV
Linear Accelerator
Room
Isocenter
Existing
TH-780
Cobalt Unit
Theratron
Equinox-80
1800
500
3000
750
1750
2300
1750
3000
1250
1250
3000
750
2100
100
100
2100
750
750
750
Natural Earth
Natural Earth
Natural Earth
Natural Earth
2100
100
100
2100
2200
3165
3165
2200
10730
There is no Construction Below the Bunkers (Only Foundation and Earth)
SECTION - Y-Y
LEGEND:
Proposed Concrete of 2.35 gm/cc
Existing Concrete of 2.35 gm/cc
Column of 2.35 gm/cc
Brick Work
Natural Earth
Project :-
Proposed Submission Drawing of 6MV & 15MV
Linear Accelerator Room at
I. R. C. H., A. I. I. M. S., New Delhi



There is no Construction Below the Bunkers (Only Foundation and Earth)

SECTION - Z-Z

LEGEND:

Proposed Concrete of 2.35 gm/cc

Existing Concrete of 2.35 gm/cc

Column of 2.35 gm/cc

Brick Work

Natural Earth

Project :-
Proposed Submission Drawing of 6MV & 15MV Linear Accelerator Room at I. R. C. H., A. I. I. M. S., New Delhi

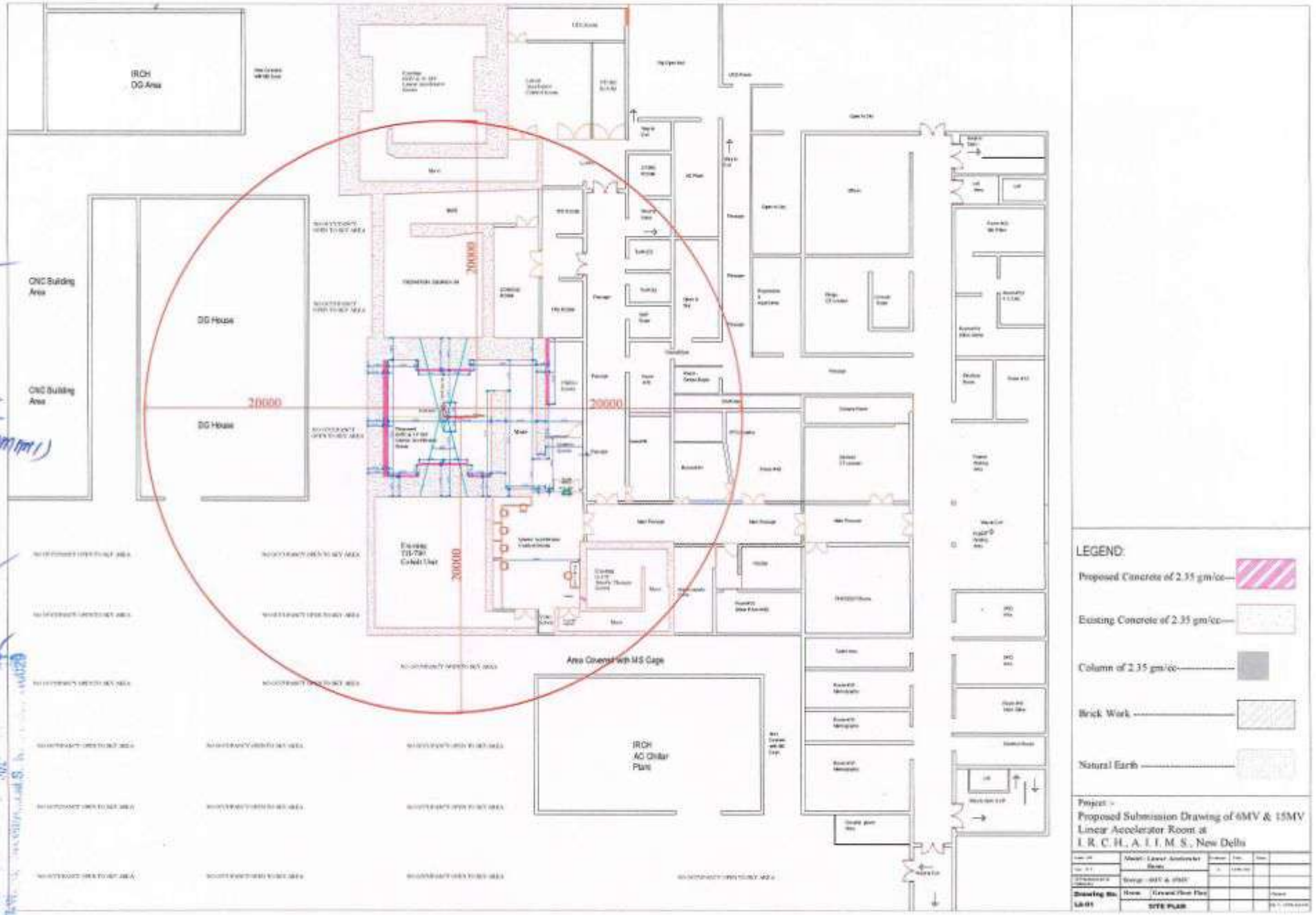
Drawing No. LA-01

Sheet : Linear Accelerator Room

Group : 6MV & 15MV

Drawing : Ground Floor Plan

SECTION - Z-Z


IRCH
OG Area
CNC Building
Area
OG House
CNC Building
Area
OG House
20000
20000
20000
Existing
T35-T61
Cobalt Unit
Area Covered with M.S Cage
IRCH
AC Chiller
Plant
LEGEND:
Proposed Concrete of 2.35 gm/cc
Existing Concrete of 2.35 gm/cc
Column of 2.35 gm/cc
Brick Work
Natural Earth
Project :-
Proposed Submission Drawing of 6MV & 15MV
Linear Accelerator Room at
I. R. C. H., A. I. I. M. S., New Delhi
Drawing No.
GR-01
Name
Ground Floor Plan
SITE PLAN

ANNEXURE - II

Subject:- Structural Stability Assessment of Advanced High Energy Linear Accelerator Under Turnkey Work.

1. General Requirements:

(1) The unit is to be installed on full turnkey basis with Civil Works (Interior & Structural design Build), facade works, plumbing (Internal & External), and Electric works, HVAC Works, Communications, MGPS and Furniture etc. Structural works likes site modification, dismantle and removal of the existing slab system will be carried out by Consignee along with all regulatory/statutory approvals.

(2) All the site hindrances like underground & overlay HT/LT line, water supply lines or sewage lines, communication, or data lines, etc. In case any of the utility service above is encountered during working, removal/relocation will be the responsibility of the consignee.

(3) Removal of plantation/trees from the area under scope will be arranged by consignee with required NOC from MOEF.

(4) Any PCPNDT/ Statutory/Regulatory approval will be responsibility of consignee.

(5) During the executing of structural work like RCC wall ,Column, Slab, Beam & its modification & expansion which is required as per site requirement a structural engineer has been appointed by the consignee , So that they looks the work during execution as per structural drawing given by the IIT Delhi.

(6) After Completion of the structural work it should be dully vetted by IIT Delhi/Govt. Institute which is arranged by the consignee.

AE (Civil)
09.04.25

IITD

2. **Civil Works:** Turnkey will include the Civil Construction work as under mentioned and shall be as per applicable IS codes & CPWD specification:

(1) Preparation of all structural and architectural working drawing, clearing of the site excavation of foundation trenches, construction of foundation footings and superstructure brick walls. Any other regulatory guidelines and duly vetted by the Consignee.

(2) Construction should be RCC frame structure/columns/beams to facilitate modifications and expansion later. Foundations of the building should be designed for two floors for future construction. Mixing & use of plain and reinforced concrete shall be in accordance with the provisions of IS : 456:2000.

(3) Waterproofing of the roof is to be done with as per DSR 2023 code 22.6 method.

(4) Flooring in the other areas will be Italian Marble.

(5) Floor cable trenches with stainless steel & or Tile covers will be provided for the cables in the bunker room and Equipment rooms.

(6) Complete plumbing operations including laying of sanitary lines, manholes, wash basins, geysers, white vitreous EWC etc will be provided and shall be Jaquar/ Kohler/Grohe.

(7) Arrangement of water supply lines for drinking and general use will be made of with CPVC pipe of supreme/Prakash make.

(8) All water pipes shall be of high-density CPVC of Supreme/Prakash make . The bathroom fixtures shall be brass chrome plated.

(9) The washing and drainage lines should be made of chemical resistant material as per DSR 2023 code 17.35.1.2

AE (Civil)
09.04.25

(10) All LED lights and smoke detectors to be accommodated integrated in the false ceiling. All the internal wiring including that of telephone, LAN etc will be concealed.

(11) All rooms will have vitrified flooring 600X600 mm and wall tiles 600 X600 mm

(Orient/ Kajaria/ Somany) upto false ceiling, except main Bunker Room which will have

PVC conductive flooring and laminated paneling.

(12) External finish white cement based wall putty and water proof paint like Apex Ultima/equivalent

(13) Bunker Room 600x600 mm Acoustical tile Supported on Aluminum suspension and cove with light and other area should have 600x600 mm . Acoustical tile Supported on GI suspension Skylight of size 1200x1800mm should be provided in Bunker Room.

(14) Fire safety measures a fire alarm system of reputed make with smoke detector indicator panels, call boxes, electronic sirens and wiring will be installed.

(15) All the rooms in the complex will be signposted. Sun film or venation Blinds will be put-up in all windows.

(16) The entire complex will be made rodent/ Pest resistant.

(17) Color aesthetics will be kept in mind while matching the paint with the furniture.

(18) False ceiling should have 2.00 mm thick aluminium powder coated/Gypsum/perforated G.I 600X600 mm as per site requirement.

(19) All dismantling works are included before execution of work.

AE (Civil)
09.04.24

STRUCTURAL ASSESMENT REPORT

For

BUNKER ROOM

(In IRCH Department)

at

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

Ansari Nagar, East, New Delhi - 110029

Submitted By:

CREATIVE DESIGN CONSULTANTS & ENGINEERS PVT. LTD.
408, SG Alpha Tower-1, Sector 9, Vasundhara, Ghaziabad

www.ccepl.co.in

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CCEPL_2024-25_AIIMS _IRCH_SAR – R.1	For Approval	16.12.2024	R1	21.12.2024

25/12/24

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Delhi NCR (U.P.) India

PROJECT TEAM

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Dr. Ankur Gupta	General Manager (Structural Audit and Retrofitting)
Er. Anshul Sharma	Manager Structures
Er. Satyam Chaturvedi	Manager (Civil & Retrofitting Works)
Er. Nitish Kumar	Asst. Structural Engineer
Er. Abhishek Raghav	Asst. Structural Engineer

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EXECUTIVE SUMMARY

The existing bunker room in the IRCH Department required structural modifications as per the drawings and specifications available with the IRCH AIIMS. These modifications involved adding structural elements, such as slabs and walls, to accommodate the installation of new updated Linear Accelerator machines in the existing bunker room. To assess the feasibility of these structural modifications in the existing bunker rooms, Institute Rotary Cancer Hospital (IRCH) AIIMS, Ansari Nagar, East, New Delhi (110029) has engaged M/s CCEPL to undertake detailed structural assessment of these existing bunkers.

In line with the desired scope of the work, CCEPL team has carried out a critical visual inspection along with some confirmatory testing of the existing bunker structures at the site to evaluate their current condition.

During the visual inspection, a level difference of approximately 0.6m in the height of the slab in the maze area was observed in the IRCH bunker as compared to its height specified in the as-built drawings provided by client. The roof top of this bunker is also covered with a brick bat Coba layer, probably for waterproofing.

The inspection revealed the presence of dampness at multiple locations is in the ceiling of slab and the walls, mainly in the IRCH bunker. The Rebound Hammer, Ultrasonic Pulse Velocity, Carbonation and core compressive strength results indicate the M10 grade of concrete in the walls and slab of the IRCH bunker room. The current report provides a detailed structural assessment of the bunker room in the IRCH Department, including a critical visual inspection, confirmatory testing, and structural analysis.

Based on the findings of the basic on site/lab testing and input drawings received, Finite element analysis was performed. Through analysis and design it was found that the proposed modifications for wall are viable with Cement grouting in the existing structure and addition minimum reinforcements within the addition thickness of proposed RCC layer. The existing slab system have to be replace by New concrete slab .

Er. AMANDEEP
Managing Director
Creative Design Consultants & Engineers P. Ltd.
408, SG Alpha Tower, Sector-9
Vasundhara, Ghaziabad-201012
Delhi NCR (U.P.) India

1 INTRODUCTION

1.1 General

Based on the client's requirements, the upgrading of the existing bunker rooms, in the IRCH Department involves the addition of new structural elements, including walls and slab. These modifications are designed to accommodate the installation of new updated Linear Accelerator machines in the existing bunker room. A slab system has been incorporated into the roof of the IRCH bunker, and additional walls have been added as per the drawing specifications provided by the client IRCH AIIMS, Ansari Nagar, East, New Delhi (110029), the client engaged M/s CCEPL for a structural assessment to evaluate the feasibility of these modifications and to recommend suitable remedial measures where necessary.

The CCEPL team visited the site to perform the critical visual inspection and the testing for structural assessment. During the site inspection, the bunker room in the IRCH department was found to be non-operational. Structural assessment testing in the IRCH department's bunker room was performed on November 28, 2024.

1.2 Scope of Work

The scope of work includes a structural assessment to check the feasibility of the modifications required in the structural elements, considering the additional loads introduced by the proposed structural modifications, as outlined in the drawings, received from the client, for the existing bunkers.

1.3 Objectives

The various objectives of the study are as follows:

a) Study of all the relevant drawings as received from the client to understand the structural system of the existing bunker building.
b) Verification of the as built structural dimensions and configuration with the available drawings.
c) Conducting critical visual inspection along with some basic on-site/Lab testing.
d) Structural Analysis for the bunker buildings.

1.4 Inputs Received from the Client

The following drawings for the IRCH department, as mentioned in Table1 below, are provided by the client for the structural assessment.

Table 1 Drawing inputs received from the client

S.N.	Name of Drawing	Drawing Type
1	IRCH Room Layout Plan Room33 along with sections	Modified Drawing
2	IRCH Room Layout	Original Construction Drawing

2 STRUCTURAL ASSESSEMNT FINDINGS

2.1 Findings from Structural Drawings

A detailed review of the structural drawings provided by the client was conducted to gain a thorough understanding of the structural system of the existing bunker building. The client proposed modifications to the structural elements, considering slab and walls in the existing bunker room at the IRCH department.

2.2 Assessment of As-Built Structural Elements

Following a review of the structural drawings provided by the client, the as-built structural dimensions and configuration of the bunker room were verified. The assessment revealed that the maze slab in the bunker room at the IRCH Department has a measured height of 3.6 m, compared to the 3 m indicated in the as-built drawings.

2.3 Findings of Critical Visual Inspection

A detailed investigation was done in bunker at the IRCH department to establish the in-site condition of the structure. The investigation included a preliminary visual survey and collection of data on the prevailing environment, its geometry, and the presence of signs/ details of distress and deterioration, if any.

i) Bunker Room at IRCH Department

The bunker room at the IRCH Department was on the ground floor of the building which has a configuration of single floor system.

Following are the findings of the critical visual Inspection:

a) Dampness in the structure was observed on the ceiling of the maze slab of the bunker room which is evident from the photographs attached below in Figure1, Figure2, Figure3, and Figure4.

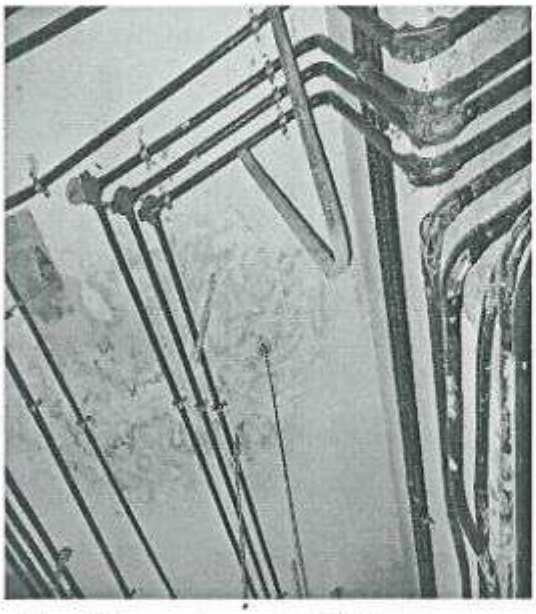

Figure 1 Dampness in maze slab of Bunker room

Figure 2 Dampness in Maze slab of Bunker room

Figure 3Dampness in Maze slab

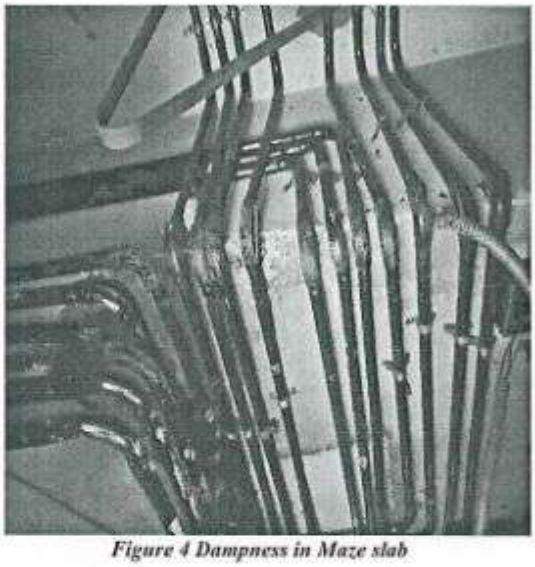

Figure 4 Dampness in Maze slab

b) The bunker room was found to have only a single floor. On the roof of the bunker room in the IRCH department, a brick bat Coba waterproofing system was observed. As depicted in Figure 5 below.

Figure 5 Brick bat Coba waterproofing over bunker roof

2.4 Findings of basic On-site/Lab Testing

On-site testing including rebound hammer test, ultrasonic pulse velocity test, ferro scanning, carbonation test and core extraction were conducted to assess the general quality of the concrete and the location of reinforcement in the walls and slabs of the bunker rooms. The extracted cores were tested in the laboratory for estimating the equivalent cube compressive strength of the concrete in the structural elements of the bunker rooms.

i) Bunker Room at IRCH Department

Testing results indicate that the concrete strength is approximately equivalent to an M10 grade. High rebound numbers indicate increased surface hardness, which might be because of carbonation. The absence of color change in the carbonation test results indicates that carbonation has penetrated beyond the concrete cover, revealing moisture ingress into the cement matrix, likely due to the presence of voids. This observation is further verified by Ultrasonic Pulse Velocity (UPV) test results, which reveal the presence of voids and a honeycombed structure within the concrete matrix. Additionally, ferro-scanning results confirm the presence of reinforcement bars in the walls of the bunker room. A detailed report for the basic on site/lab testing attached in Annexure-I of this report.

2.5 Findings of Structural Evaluation

2.5.1 Structural analysis Methodology

Based on the finding of the On-site/Lab Testing, Finite element model of the bunker room was developed in ETABS to check the stresses in the bunker room walls and slabs. A detailed design parameter and findings are given below:

The bunker room at the IRCH Department was modeled in ETABS, as shown in Figure 6, and the following load and strength parameters were considered:

- Self-Weight of RCC Elements
- Floor Finish = 4 KN/sqm (considering brick Coba)
- Imposed load as per IS875 part 2 requirements
  Roof Accessible = 1.5 KN/sqm

- As per IS 456 load combination considered for the analysis purpose is 1.5(D. L+L.L) where D.L = Dead Load, L.L = Live Load
- Core Tests indicate the probable strength of column concrete to be 10 N/mm^2. Core Strength correlation with the existing concrete gives us equivalent M10 grade concrete for walls.
- The building was constructed approximately 40 years ago. Considering the age of the structure, the age degradation factor of 0.7 was applied to the reinforcement grade Fe250. Accordingly, a yield strength of 175 N/mm^2 was adopted for walls.
- For slab system Grade of M25, and Fe500 considered.

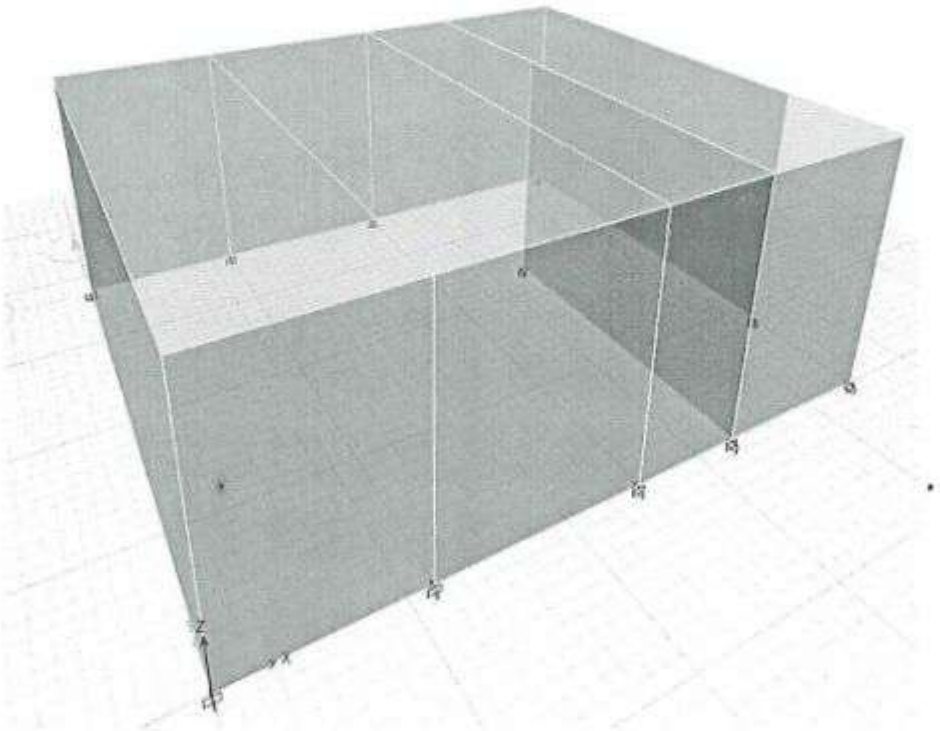

Figure 6 3D Model of Bunker at IRCH Department

After applying the loads, a finite element analysis was performed, as shown in Figure 7, and the moment values for the slab and wall were captured from the ETAB model. Based on these

moments, the minimum required reinforcement was calculated shown in Figure 10 for Slab and for walls shown on Figure 12.

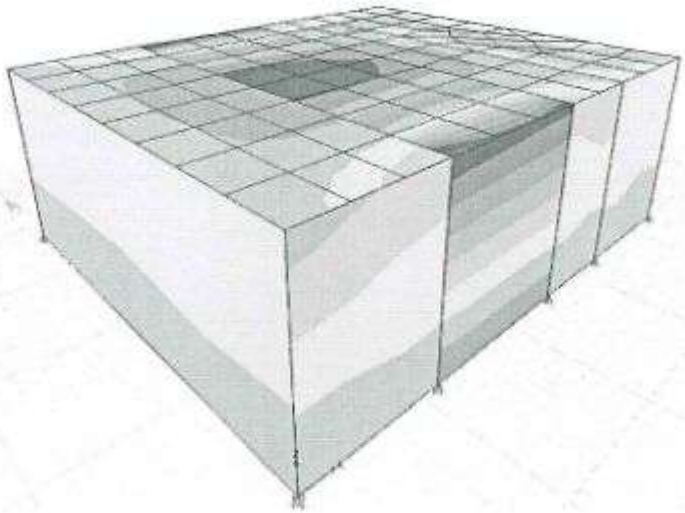

Figure 7 Finite Element analysis model

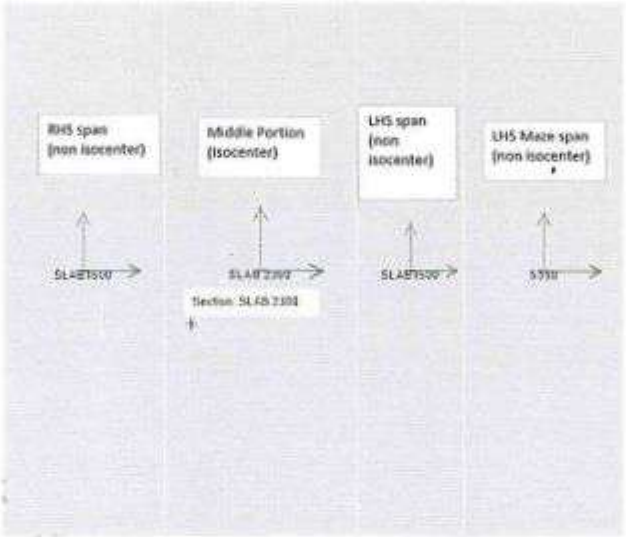

Figure 8 Slab Location

a) Design calculation check for Slab

Design Calculation Check for RCC Slab

SNO	Design Parameters:		
1	Self weight of Flat Slab	Modelled As/actual in ETABS	
2	Floor Finish Load	4	KN/m2
5	Total Dead Load	4	KN/m2
6	Imposed Load for Office Building as per IS 875 (Part2)	1.5	KN/m2
7	Concrete strength considered in the design (fck)	25	N/mm2
8	fy	500	N/mm2
9	Thickness of slab at middle portion (Isocenter span) (D) with addition of 550 mm thk slab	2300	mm
10	Thickness of slab at (RHS-LHS) side portion (Non-Isocenter span) (D) with addition of 550 mm thk slab	1500	mm
11	Thickness of slab at maze portion (Non-Isocenter span) (D)	350	mm

SNO	Location	Bending moment as per ETAB Analysis(T-m)	Depth(D) of slab	Ast required (mm^2)	Minimum steel provided (0.12%) at bottom face for sagging moment	CHECK
1	At Middle Portion of slab in X direction(Isocenter span) .For Sagging moment	17	2300	170.2520501	2760	safe
3	At RHS Span of Slab (Non-Isocenter span) in X direction. For Sagging moment	6	1500	92.11313105	1800	safe
4	At RHS Span of Slab (Non-Isocenter span) in X direction. For Hogging moment	14	1500	215.284633	provide minimum face rf.	
5	At LHS Span of Slab (Non-Isocenter span) in X direction. For Sagging moment	15	1500	230.7096928	1800	safe
6	At LHS Span of Slab (Non-Isocenter span) in X direction. For Hogging moment	7	1500	107.4873805	provide minimum face rf.	
7	At LHS Maze are Span of Slab (Non- Isocenter span) in X direction. For Sagging moment	0.8	350	52.73031348	420	safe
8	At LHS Maze are Span of Slab (Non- Isocenter span) in X direction. For Hogging moment	1	350	65.96292039	420	safe

9	At Middle Portion of slab in Y direction(Isocenter span) .For Sagging moment	42	2300	421.5452206	2760	safe
10	At Middle Portion of slab in Y direction(Isocenter span) .For Hogging moment	51	2300	512.282025	2760	safe
11	At RHS Span of Slab (Non-Isocenter span) in Y direction. For Sagging moment	13	1500	199.865952	1800	safe
12	At RHS Span of Slab (Non-Isocenter span) inY direction. For Hogging moment	14	1500	215.284633	1800	safe
13	At LHS Span of Slab (Non-Isocenter span) inY direction. For Sagging moment	13	1500	199.865952	1800	safe
14	At LHS Span of Slab (Non-Isocenter span) in Y direction. For Hogging moment	21	1500	323.394453	1800	safe
15	At LHS Maze are Span of Slab (Non- Isocenter span) in Ydirection. For Sagging moment	0.7	350	46.12155416	420	safe
16	At LHS Maze are Span of Slab (Non- Isocenter span) in Y direction. For Hogging moment	1	350	65.96292039	420	safe

Figure 9 Slab calculations

a) Design calculation check for Walls

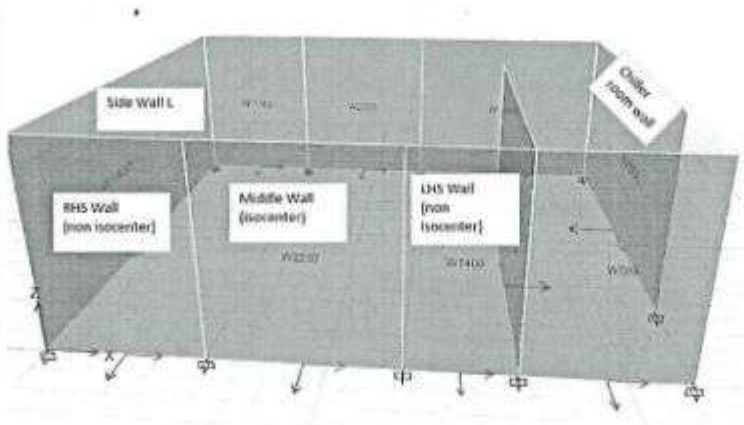

Figure 10 Wall Locations

SNO	Location	Bending moment as per ETAB Analysis(T-m)	Existing Width of Wall	Width of wall with addition of new concrete	Ast required (mm^2)	Assuming Minimum steel provided (0.15%) at	Strengthening requirement
1	Middle wall at (Isocenter area) in X direction.For Sagging moment	2.8	2100	2200	83.6920802	3150	Safe
2	Middle wall at (Isocenter area) in X direction.For Hogging moment	7	2100	2200	209.439836	3150	Safe
3	RHS walls (Non- Isocenter area) in X direction.For Sagging moment	1.2	1300	1400	56.366245	1950	Safe
4	RHSwalls (Non- Isocenter area) in X direction.For Hogging moment	2.7	1300	1400	126.936104	1950	Safe
5	LHS walls (Non- Isocenter area) in X direction.For Sagging moment	0.9	1300	1400	42.2672294	1950	Safe
6	Side LHSwalls (Non-Isocenter area) in X direction.For Hogging moment	2	1300	1400	93.9879728	1950	Safe
7	Side Wall Length =7.8 m in X direction.For Sagging moment	0.4	1050	1400	18.7799188	1575	Safe
8	Side Wall Length =7.8 m in X direction.For Hogging moment	0.9	1050	1400	42.2672294	1575	Safe
9	Chiller Room Wall l=4.5 in X direction.For Sagging moment	0.4	600	850	30.9440837	900	Safe
10	Chiller Room Wall l=4.5 in X direction.For Hogging moment	0	600	850	0	900	Safe
11	Middle wall at (Isocenter area) in Y direction.For Sagging moment	13	2100	2200	389.51859	3150	Safe
12	Middle wall at (Isocenter area) in Y direction.For Hogging moment	35	2100	2200	1054.20635	3150	Safe
13	RHS walls (Non- Isocenter area) in Y direction.For Sagging moment	6	1300	1400	282.631158	1950	Safe
14	RHSwalls (Non- Isocenter area) in X direction.For Hogging moment	16	1300	1400	758.206369	1950	Safe
15	Side LHS walls (Non-Isocenter area) in Y direction.For Sagging	5	1300	1400	235.386462	1950	Safe
16	LHSwalls (Non- Isocenter area) in X direction.For Hogging moment	11	1300	1400	519.702666	1950	Safe
17	Side Wall Length =7.8 m in Y direction.For Sagging moment	2	1050	1400	93.9879728	1575	Safe
18	Side Wall Length =7.8 m in Y direction.For Hogging moment	4	1050	1400	188.197833	1575	Safe
19	Chiller Room Wall l=4.5 in Y direction.For Sagging moment	1	600	850	77.4343731	900	Safe
20	Chiller Room Wall l=4.5 in Y direction.For Hogging moment	0.4	600	850	30.9440837	900	Safe

Figure 11 Walls Calculations

The minimum reinforcement details for the walls and slab have been detailed in the drawings given in Annexure-II of this report.

3 CONCLUSION AND RECCOMENDATION

Based on the structural assessment conducted, the following conclusions can be drawn:

1) The review of the structural drawings revealed proposed modifications to the bunker room, including the addition of a RCC slab and walls in the existing bunker room
2) The assessment of the as-built structural dimensions revealed that the height of the maze slab in the IRCH department bunker room is approximately 0.6m less than that given in the as built drawings.
3) The IRCH bunker room is a single-story structure with a Brick Bat Coba waterproofing system. The visual inspection of the bunker room revealed dampness in the slab of the maze area in the IRCH department bunker room.
4) The onsite and lab test results revealed that the RCC walls and slab of IRCH bunker room has an equivalent cube compressive strength of approximately 10 MPa. This low strength is further supported by poor pulse velocities and high carbonation depths. Ferro scan tests confirmed the presence of reinforcement bars in the walls of existing bunker room
5) The structural analysis revealed that the walls of the IRCH department are safe for additional concreting. Cement grouting in the existing walls is recommended. Additional reinforcement shall be provided in the proposed additional concrete layers for the modification of the bunker room given in Annexure-II of this report. The detailed methodology for the execution works is given in Annexure-III of this report.
6) The existing slab needs to be replaced with new concrete of grade M25, with required reinforcement as detailed in Annexure-II of this report. And the detailed execution methodology is provided in Annexure-III of this report.

25/3/25

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ANNEXURE-I

(SITE TESTING DETAIL AND LOCATIONS)

(Non-Destructive Test Results)

A. REBOUND HAMMER TEST:

A Schmidt hammer, also known as a Swiss hammer a rebound hammer or concrete hammer test, is a device to measure the elastic properties or strength of concrete or rock, mainly surface hardness and penetration resistance.

1. **Objective:** The rebound hammer method could be used for:
   a. Assessing the likely compressive strength of concrete with the help of suitable correlations between rebound index and compressive strength,
   b. Assessing the uniformity of concrete
   c. Assessing the quality of the concrete in relation to standard requirements
   d. Assessing the quality of one element of concrete in relation to another.

2. **Principle:** When the plunger of the rebound hammer is pressed against the surface of the concrete, the spring-controlled mass rebounds and the extent of such rebound depends upon the surface hardness of concrete. The surface hardness and therefore the rebound are taken to be related to the compressive strength of the concrete. The rebound is read off along a graduated scale and is designated as the rebound number or rebound index.

Figure I (a) Rebound Hammer Test Equipment

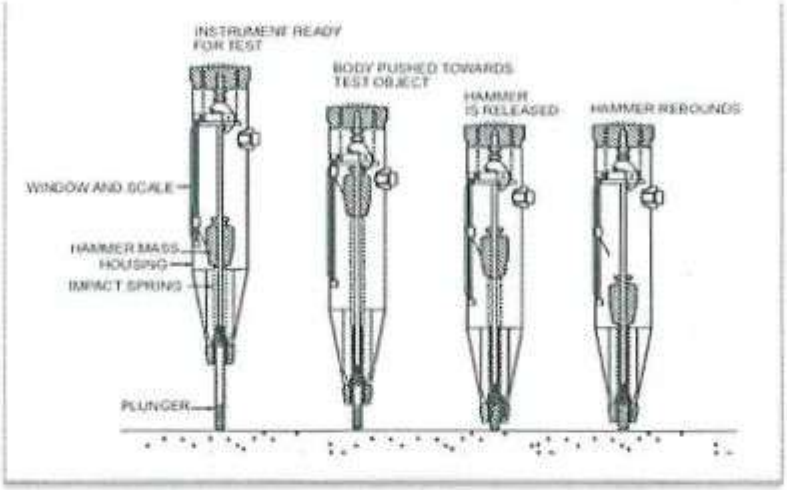


Figure I (b) the procedure of Rebound Hammer Test

The rebound Hammer test measures the surface hardness of concrete with approximate correlations to estimate the compressive strength of the structure. **A total No. of 8 tests** has been conducted in accordance with **IS 516 (Part 5/Sec 4):2020**.

REBOUND HAMMER TEST											
SI NO.	Location	Structural element	Rebound values								
			1	2	3	4	5	6	Direction	Average value	Corrected value
1	BUNKER ROOM IR-1	WALL	26	27	26	28	24	25	→	26	26
2	BUNKER ROOM IR-2	WALL	32	31	37	35	30	35	→	33	33
3	BUNKER ROOM IR-3	WALL	31	29	28	28	30	30	→	29	29
4	BUNKER ROOM IR-4	WALL	28	28	23	29	24	28	→	27	27
5	BUNKER ROOM IR-5	WALL	28	26	27	29	30	27	→	28	28
6	BUNKER ROOM IS-1	SLAB	34	34	37	32	33	30	→	33	33

7	BUNKER ROOM IS-2	SLAB	27	26	28	23	27	25	→	26	26
8	BUNKER ROOM IS-3	SLAB	32	34	34	30	34	31	→	33	33

❖ **Snapshots of Rebound Hammer Test:**

Figure 1.1 Rebound Hammer Test

Figure 1.2 Rebound Hammer Test

Figure 1.1 Rebound Hammer Test

Figure 1.2 Rebound Hammer Test

B. ULTRASONIC PULSE VELOCITY TEST:

Ultrasonic Pulse Velocity (UPV) testing is used to determine the integrity and quality of structural concrete or stone (up to 6 feet thick) by measuring the speed and attenuation of an ultrasonic wave passing through the element being tested.

1. **Objective:** The ultrasonic- pulse velocity test method could be used for:
   - **a.** The homogeneity of a material
   - **b.** The presence of voids, cracks, or other internal imperfections or defects
   - **c.** Changes in the concrete may occur with time (i.e., due to cement hydration) or damage from fire, frost, or chemical attack.
   - **d.** The strength or modulus of a material
   - **e.** The quality of the concrete in relation to specified standard requirement.

2. **Principle:** The ultrasonic pulse is generated by an electro acoustical transducer. When the pulse is induced into the concrete from a transducer, it undergoes multiple reflections at the boundaries of the different material phases within the concrete. A complex system of stress waves is developed which includes longitudinal (compressional), shear (transverse), and

surface (Raleigh) waves. The receiving transducer detects the onset of the longitudinal waves, which is the fastest. Because the velocity of the pulses is almost independent of the geometry of the material through which they pass and depends only on its elastic properties, the pulse velocity method is a convenient technique for investigating in-situ concrete. The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity, and uniformity is good. In case of poorer quality, lower velocities are obtained. If there is a crack, void or flaw inside the concrete that comes in the way of transmission of the pulses, the pulse strength is attenuated and it passes around the discontinuity, thereby making the path length longer. Consequently, lower velocities are obtained. The actual pulse velocity obtained depends primarily upon the materials and mix proportions of concrete. Density and modulus of elasticity of aggregate also significantly affect the pulse velocity.

The pulse velocity is determined by the equation:

Pulse Velocity = Path Length / Transit Time

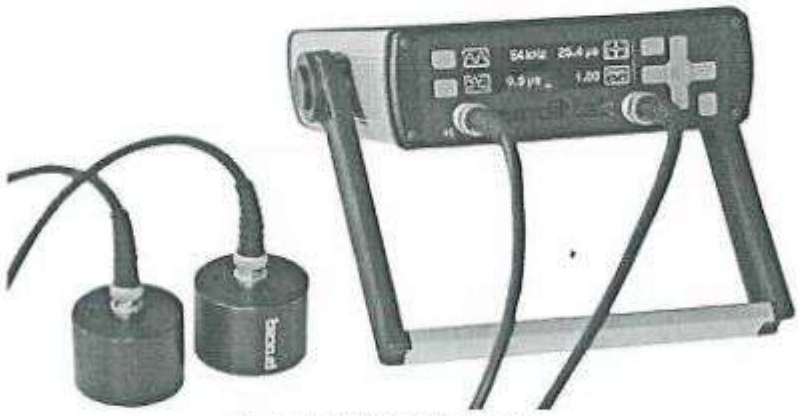


Figure II UPV Test Equipment

Ultrasonic Pulse Velocity (UPV) Test involves the transmission of ultrasonic pulses through the structural member and computing the wave velocity in it. Thus, computed velocity is indicative of the quality of concrete and if the member is suffering from any structural flaw like honeycombing, voids etc. **Total 8 No. of UPV tests** have been conducted according to **IS 516 (Part 5/Sec 1):2018.**

Table: Velocity Criterion for Concrete Quality Grading [Ref: IS 516 (Part 5 / Sec 1):2018 Amendment No.1- Nov 2019]		
Sl. No.	**Average Value of Pulse Velocity by Cross-Probing (Km/s)**	**Concrete Quality Grading**
i)	For concrete (≤ M25):	
a)	Below 3.5	Doubtful
b)	3.5 - 4.5	Good
c)	Above 4.5	Excellent
ii)	For concrete (>M25):	
a)	Below 3.75	Doubtful
b)	3.75 – 4.5	Good
c)	Above 4.5	Excellent

UPV TEST RESULTS

Date of Testing: 27-09-2024 & 28-09-2024

SI NO.	Location	Structural element	Method of Testing	Distance (mm)	Time (microseconds)	Velocity (km/s)	Final Corrected Velocity calculated (km/s)	Quality
BASEMENT								
1	IR-1	WALL	Indirect	510	284.0	1.80	1.80	Doubtful
2	IR-2	WALL	Indirect	510	268.3	1.90	1.90	Doubtful
3	IR-3	WALL	Indirect	410	344.5	1.19	1.19	Doubtful
4	IR-4	WALL	Indirect	400	181.1	2.21	2.21	Doubtful
5	IR-5	WALL	Indirect	590	341.8	1.73	1.73	Doubtful
6	IS-1	SLAB	Indirect	400	150.6	2.66	2.66	Doubtful
7	IS-2	SLAB	Indirect	740	516.0	1.43	1.43	Doubtful
8	IS-3	SLAB	Indirect	640	236.3	2.71	2.71	Doubtful

***NOTE: In surface probing (Indirect Transmission) method, the pulse velocity may be increased by 0.5 km/s, for values > 3.0 km/s.**

❖ **Snapshots of Ultra-Sonic Pulse Velocity Test:**

Figure 1.5 UPV Test

Figure 1.6 UPV Test

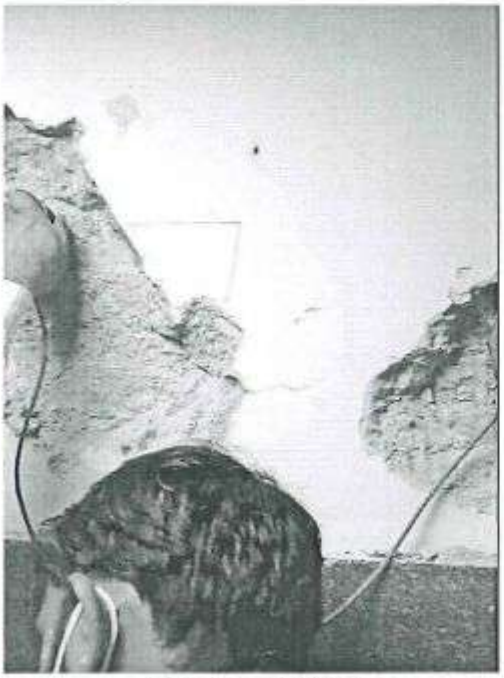


Figure 1.7 UPV Test

C. CONCRETE CORE TEST

Compressive Strength Test on Drilled Concrete Cores is required to determine the strength of hardened concrete in structure.

1. **Objective:** The core test method is used for:

The quality of the concrete provided to a construction (potential strength).

a. The quality of the concrete in the construction (in-situ strength), known as actual strength.
b. The ultimate capacity of the structure to carry the imposed loads; actual loads, design loads, and new additional loads.
c. The deterioration in a structure due to overloading, fatigue (bridge structures, machine base, etc.), chemical reaction (ASR or chemical spillage, etc.), fire or explosion, and weathering.

2. **Principle:** In the Concrete Core test, the sample or core is collected from the hardened concrete and extracted using the core cutter machine and then these cores are used to determine the compressive strength of the concrete. After preparing the ends, a compressive axial load will be applied to the samples at a continuous rate until failure occurs. The compressive strength will be determined by dividing the maximum load by the cross-sectional area of the sample, calculated from the mean dimensions of the section, and shall be expressed to the nearest N/mm2. The product of the correction factor for core diameter (cores having a diameter less than 100 mm) is given below, and the measured compressive strength shall be known as the corrected compressive strength:

Diameter of Core Sample	Correction Factor
75 ± 5	1.03
< 70	1.06

A correction factor according to the l/d ratio of the core specimen after capping shall be obtained from by this formula as given below:

F = 0.11N+0.78

where,

F = correction factor, and

N = length / diameter ratio.

The product of this correction factor and the measured compressive strength or the corrected compressive strength for diameter, shall be known as the corrected cylinder strength, this being the equivalent strength of a cylinder having a height/diameter ratio of two. The equivalent cube strength of the concrete shall be determined by multiplying the corrected cylinder strength by 5/4. **Total No. of 2 Core tests** have been conducted according to **IS 516(Part 4):2018**.

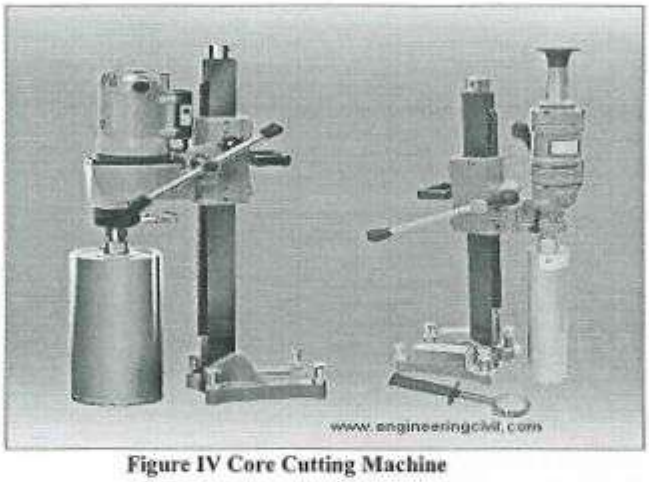


Figure IV Core Cutting Machine

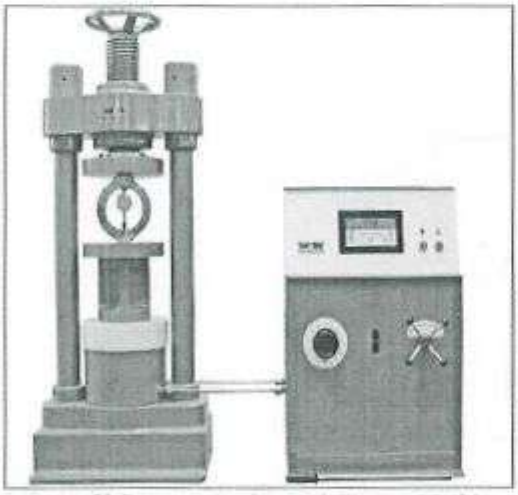


Figure V Compressive Strength Testing Machine

Figure VI Testing of Concrete Core

Concrete Core Test

Sl NO.	Description/ Sample Id	Dia (mm)	Length after capping of Core (mm)	Area (mm2)	Ratio (L/D)	C.F	Load (KN)	Direct C.S. (N/mm2) (Lx1000/Area)	Corrected Strength N/mm2) (Direct C.S.X1.06	Corrected Strength N/mm2) (Direct C.S. X C. F.)	Equivalent Cube Strength (N/mm2) (Corrected C. S. X 1.25)
Date of Testing 27/09/2024 & 28/09/2024											
1	IR-S1	93.15	128.22	6811	1.38	0.946	63	9.25	9.53	9.01	11.26
2	IRCH-RW-1	66.18	90.40	3438	1.37	0.944	36	10.47	11.09	10.47	13.09

NOTE RW – RCC WALL, S1- SLAB.

❖ **Snapshots of Concrete Core Test:**

Figure 1.8 Core Test

Figure 1.9 Core Test

Figure 1.10 Core Test

Figure 1.11 Core Test

E. The Carbonation Test:

Carbonation testing provides a means with which the inspector can determine the extent of carbon dioxide infiltration into the concrete. The process is like chloride ion testing where a sample is either removed, either by coring or drilling and the sample is tested by the application of a revealer.

1. **Objective:** Carbonation is a process in which carbon-di-oxide from the atmosphere diffuses through the porous cover concrete and may reduce the pH to 8 or 9, at which the passivating/oxide film is no longer stable. Carbonation process involves the following two stages: First, the atmospheric carbon dioxide (CO_2) reacts with water in the concrete pores to form carbonic acid (H_2CO_3). This is followed by reaction of the carbonic acid with calcium hydroxide [$Ca(OH)_2$] to form calcium carbonate ($CaCO_3$). This process leads to a reduction in the pH value of the pore solution from 12.5 to 13.5 to around 8 to 9, which causes de-passivation of protective layer of the reinforcement bars and initiates their corrosion.

2. **Principle**: Carbonation testing provides a means with which the inspector can determine the extent of carbon dioxide infiltration into the concrete. The process is similar to chloride ion testing where a sample is either removed, either by coring or drilling and the sample is tested by the application of a revealer. The revealer commonly used is phenolphthalein. When

phenolphthalein comes into contact with high pH (>10) concrete the solution shows as bright pink. When the solution comes into contact with low pH (<10) the solution shows no color change and the concrete can be considered carbonated.

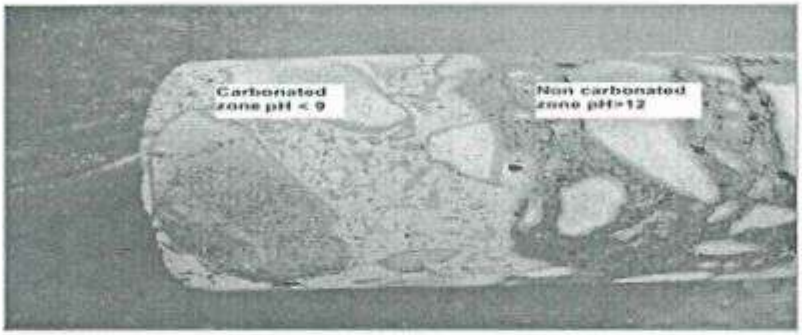


Fig. VII Carbonation of core

The carbonation test is performed by extracting the cores of in-situ concrete. The carbonation test is also performed by drilling a hole on the concrete surface to the different depth up to concrete cover. **Total No. of 2 Carbonation tests** have been conducted according to **IS 516 (Part 5/Sec 3): 2021.**

CARBONATION TEST				
Date of Testing: 27/09/2024 & 28/09/2024				
SI. NO.	**Structural Element**	**Location**	**Test Result**	**Depth of Carbonation (mm)**
1	RCC WALL	IRS1	No Colour observed	152
2	RCC WALL	IRCH-RW1	No Colour observed	104

NOTE-: RW= RCC WALL, S= SLAB

❖ **Snapshots of Carbonation Test:**

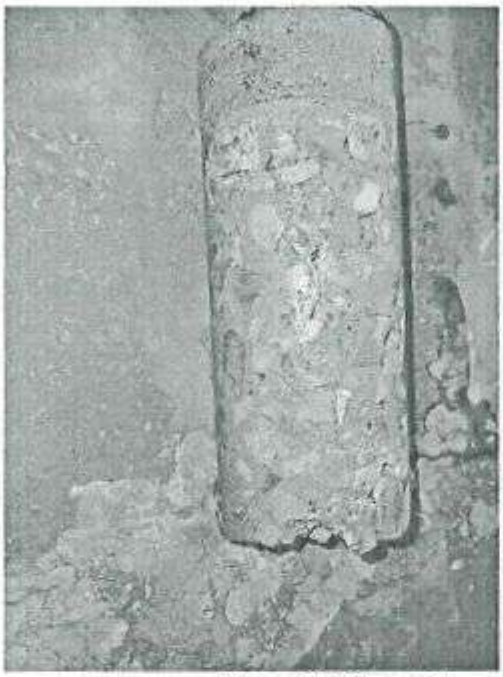


Figure 1.12 Core Test

Figure 1.13 Core Test

F. PS – 300 FERROSCAN

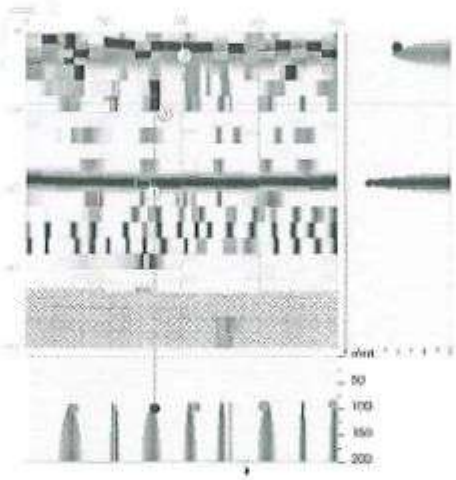
Concrete detector for rebar localization, depth measurement and size estimation in structural analysis

- Verification and analysis for 1st layer rebar
- Checking concrete cover over large areas for structural repair work.
- Building acceptance inspections and quality control
- Generation of structural assessment reports including statistics and visual presentation in 2D/3D views of areas
- Max. detection depth for object localization: 200 mm
- Localisation accuracy: 1% +/-3mm mm
- Minimum distance between two neighbouring objects: 30mm

Figure VIII PS-300 Ferro-scan

FERRO SCAN REPORT NO.1

Client:	**IRCH AIIMS, NEW DELHI**
Element location:	**Bunker Wall**
Date / Time:	2024-09-28 14:56:37
Comment:	REINFORCEMENT DETAILS: VERTICAL L BARS =1NOS OF 20 MM Dia @ 130-202 C/C HORIZONTA BARS =1NOS OF 12MM & 1 NOS OF 20MM Dia VERTICAL BARS= 1NOS OF 20 MM Dia MINIMUM COVER TO REINFORCEMENT WITH PLASTER 38-89 MM



x: 248 mm y: 135 mm z: 0 mm Thickness: 200 mm

Overlay: - mm

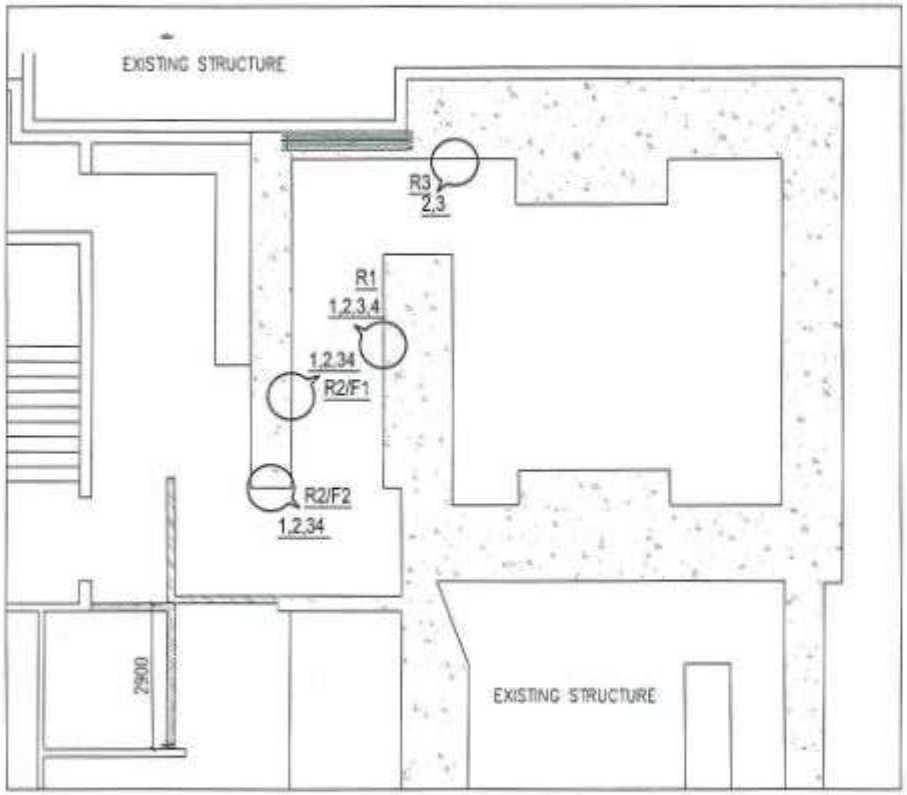
Project name:	- BUNKER ROOMS IRCH DEPARTMENT	IN Element:	: Wall
Address:	- AT ALL INDIA INSTITUTE OF MEDICAL SCIENCES, ANSARI NAGAR, EAST, NEW DELHI, 110029	Scan Area:	400x600

Ø Horizontal:	14 mm +/- 6 mm	Type:	Input
Ø Vertical:	14 mm +/- 6 mm	Type:	Input

Recorded measurements:	x:	y:	Cover:	Ø:	Orientation:	Quality:
1.	225 mm	286 mm	38 mm	12 mm	Horizontal	High
2.	285 mm	24 mm	89 mm	20 mm	Horizontal	High
3.	248 mm	135 mm	89 mm	20 mm	Vertical	High

Snapshots of Ferro scan Test:

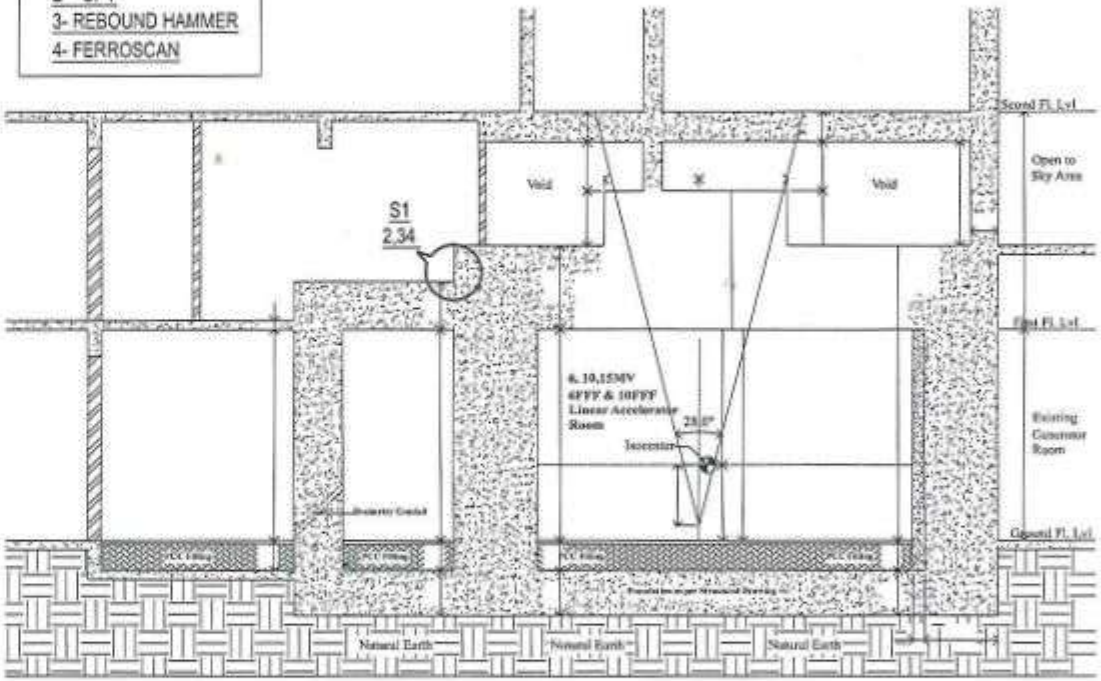
TESTING LOCATIONS



TESTING LOCATION RADIOTHERAPY DEPARTMENT BUNKER ROOM

LEGENDS-:

1 - CORE,CARBONATION
2 - UPV
3- REBOUND HAMMER
4- FERROSCAN



ELEVATION VIEW

ANNEXURE-II

DETAILED DRAWING

ANNEXURE-III

SITE EXECUTION METHODOLOGY

METHODOLOGY 1:

FOR WALLS MODIFICATION (AT RADIOTHERAPY DEPARTMENT)

Step 1: Surface Preparation by Chipping of Unsound Concrete - Chip-off and remove all the plaster and roughen the existing top surface of the RCC wall by hacking and remove any loose concrete if any.

Step 2: Supplementary Reinforcement - Additional reinforcement steel as per the structural drawings would be supplemented at required spacing and alignment. This supplementary reinforcement (main reinforcement/ ties/ shear connectors) shall be inserted/ anchored into the existing structural member using appropriate Rebarring & anchorage chemical as per drawings. Rebarring shall be done for designated dia. at designed embedment length as mentioned in drawing as per structural requirement by drilling the holes using power drilling machine & cleaning of holes using blow pump, wire brush etc. Then rebars should be inserted in holes that should be filled with Rebarring / anchorage chemical as drawing.

Stage 3: Concrete pouring – The concrete of (M-25 GRADE) of 2.35 gm/cc with slump more than 140mm thickness shown in the drawing shall be poured after application of bond coat (Nito bond or equivalent bond coat over the old concrete surface to provide strong adhesion of parent concrete with applied repair concrete) as guided by the site In- charge. The concrete shall be poured immediately after the application of bonding coat when the coat is tacky.

Stage 4: Finishing of surface: After de-shuttering, wet curing shall be done for 7days.

25/3/15

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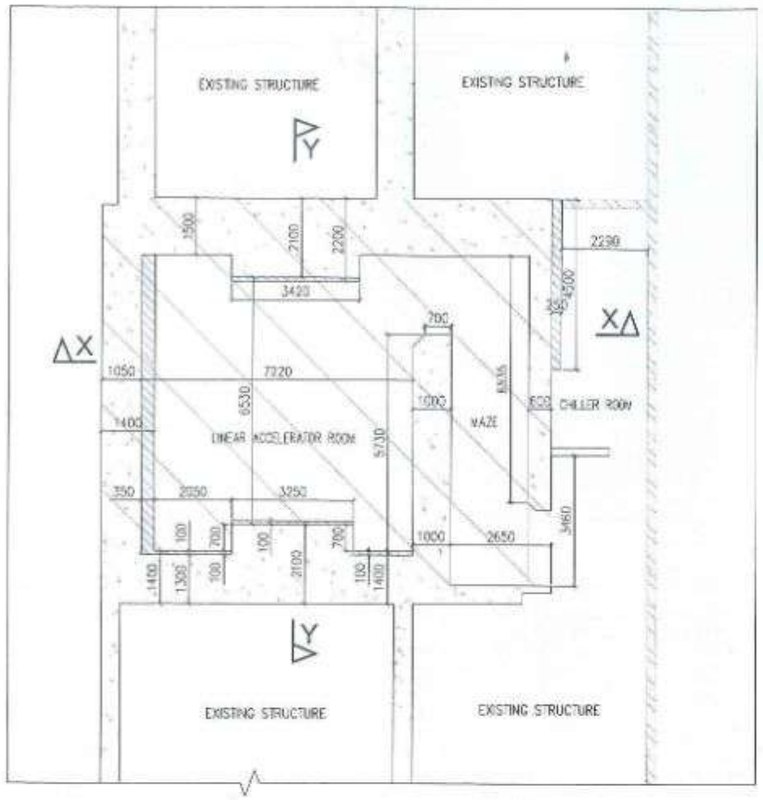
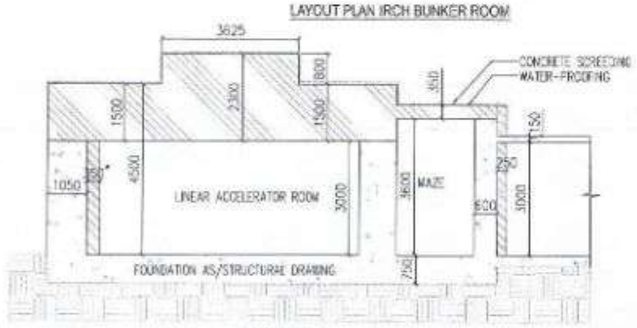


LAYOUT PLAN IRCH BUNKER ROOM



SECTION X-X
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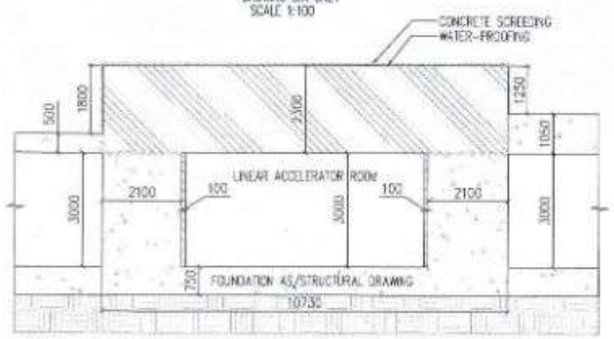
SCALE 1:100



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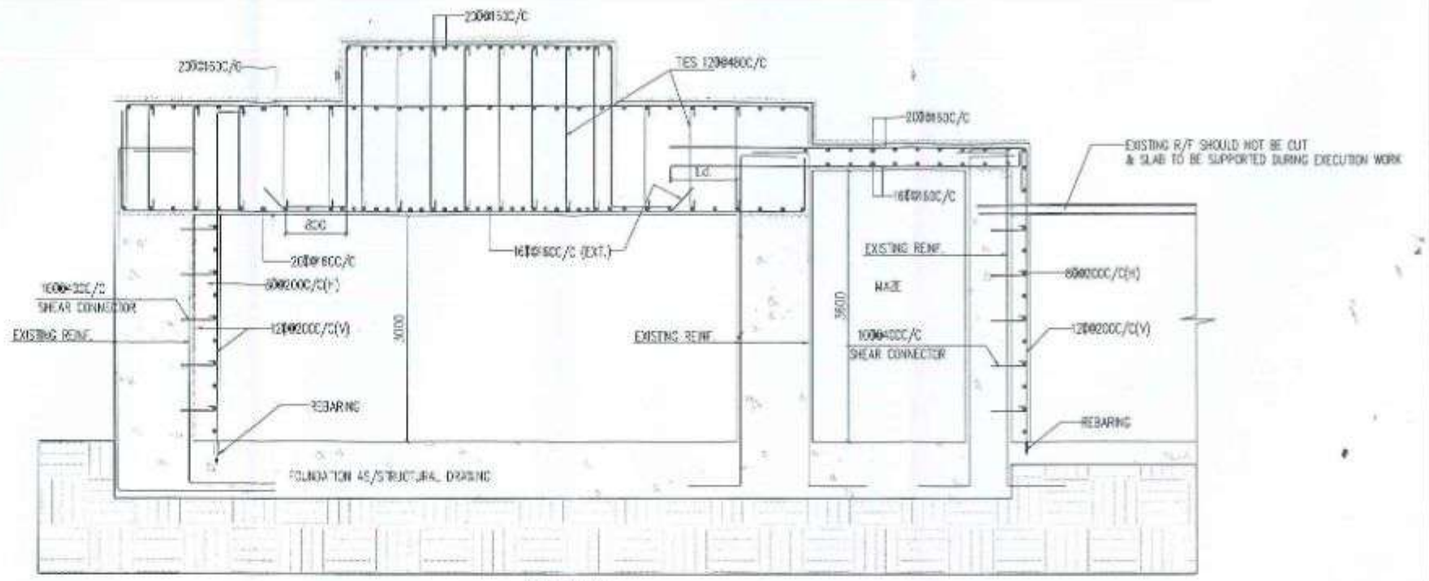
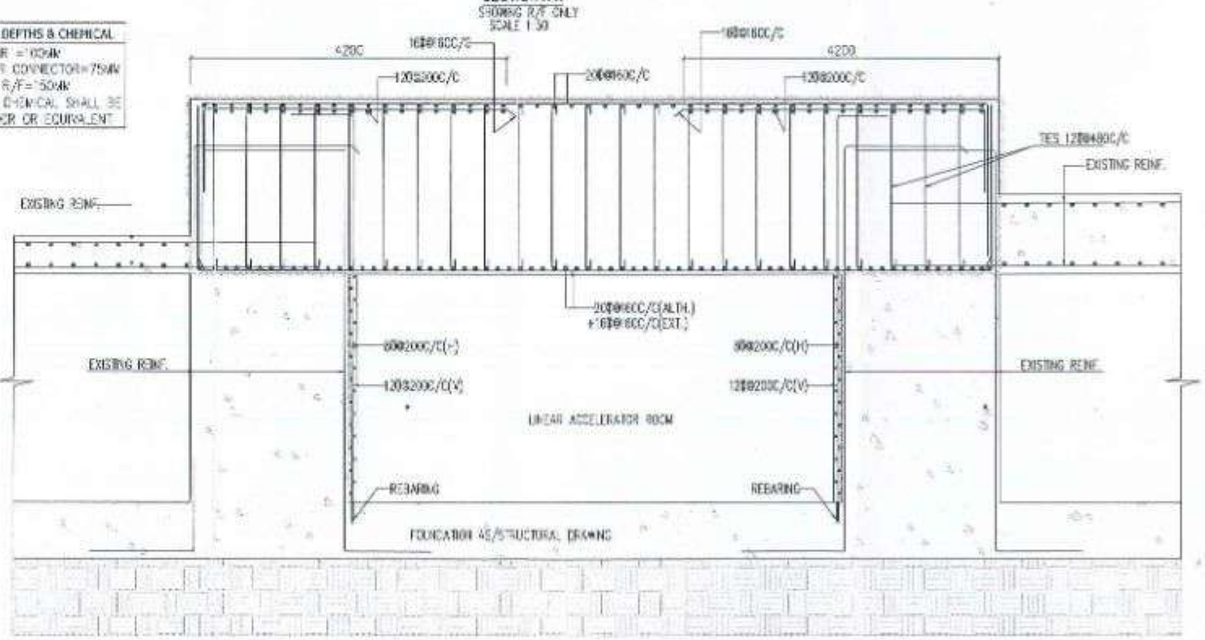


REBARING DEPTHS & CHEMICAL
8# BINDER = 100MM
10# SHEAR CONNECTOR= 75MM
12# MAIN R/F = 50MM
REBARS CHEMICAL SHALL BE HILTY 250R OR EQUIVALENT

SECTION X-X
SHOWING R/F ONLY
SCALE 1:50



SECTION Y-Y
SHOWING R/F ONLY
SCALE 1:50

LEGEND	
	PROPOSED CONCRETE IN WALLS (M-25 GRADE) OF 2.35 gm/cc (MIN.) WITH SLUMP MORE THAN 140MM.
	PROPOSED CONCRETE (M-25 GRADE) OF 2.35 gm/cc WITH SLUMP MORE THAN 100MM.
	EXISTING CONCRETE

NOTE:-
REFER METHODOLOGY DOCUMENT FOR EXECUTION OF WORKS

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS IN METERS.
2. FOLLOW WRITTEN DIMENSION ONLY & DO NOT SCALE.
3. REINFORCEMENT SHALL BE Fe-500 (TMT).
4. COVER TO R/F SHALL BE 40MM.
5. Waterproofing as per specifications.

PROJECT
Proposed Submission Drawing of 6MV & 15MV Linear Accelerator Room at I. R. C. H., A. I. I. M. S., New Delhi.

SHEET TITLE
STRUCTURAL DETAILS FOR MODIFICATION

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SCALE	DATE	DRAWN BY	CHK'D BY	REV'SD	DWG NO.
NTS	31-03-2025	A.S.	S.S.	00	

Creative Design Consultants & Engineers Pvt. Ltd.
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Vasundhara, Ghaziabad-201012
Delhi NCR (U.P.) India

STRUCTURAL ASSESMENT REPORT

For

BUNKER ROOM

(In IRCH Department)

at

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

Ansari Nagar, East, New Delhi - 110029

Submitted By:

CREATIVE DESIGN CONSULTANTS & ENGINEERS PVT. LTD.
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25/12/24
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EXECUTIVE SUMMARY

The existing bunker room in the IRCH Department required structural modifications as per the drawings and specifications available with the IRCH AIIMS. These modifications involved adding structural elements, such as slabs and walls, to accommodate the installation of new updated Linear Accelerator machines in the existing bunker room. To assess the feasibility of these structural modifications in the existing bunker rooms, Institute Rotary Cancer Hospital (IRCH) AIIMS, Ansari Nagar, East, New Delhi (110029) has engaged M/s CCEPL to undertake detailed structural assessment of these existing bunkers.

In line with the desired scope of the work, CCEPL team has carried out a critical visual inspection along with some confirmatory testing of the existing bunker structures at the site to evaluate their current condition.

During the visual inspection, a level difference of approximately 0.6m in the height of the slab in the maze area was observed in the IRCH bunker as compared to its height specified in the as-built drawings provided by client. The roof top of this bunker is also covered with a brick bat Coba layer, probably for waterproofing.

The inspection revealed the presence of dampness at multiple locations is in the ceiling of slab and the walls, mainly in the IRCH bunker. The Rebound Hammer, Ultrasonic Pulse Velocity, Carbonation and core compressive strength results indicate the M10 grade of concrete in the walls and slab of the IRCH bunker room. The current report provides a detailed structural assessment of the bunker room in the IRCH Department, including a critical visual inspection, confirmatory testing, and structural analysis.

Based on the findings of the basic on site/lab testing and input drawings received, Finite element analysis was performed. Through analysis and design it was found that the proposed modifications for wall are viable with Cement grouting in the existing structure and addition minimum reinforcements within the addition thickness of proposed RCC layer. The existing slab system have to be replace by New concrete slab .

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1 INTRODUCTION

1.1 General

Based on the client's requirements, the upgrading of the existing bunker rooms, in the IRCH Department involves the addition of new structural elements, including walls and slab. These modifications are designed to accommodate the installation of new updated Linear Accelerator machines in the existing bunker room. A slab system has been incorporated into the roof of the IRCH bunker, and additional walls have been added as per the drawing specifications provided by the client IRCH AIIMS, Ansari Nagar, East, New Delhi (110029), the client engaged M/s CCEPL for a structural assessment to evaluate the feasibility of these modifications and to recommend suitable remedial measures where necessary.

The CCEPL team visited the site to perform the critical visual inspection and the testing for structural assessment. During the site inspection, the bunker room in the IRCH department was found to be non-operational. Structural assessment testing in the IRCH department's bunker room was performed on November 28, 2024.

1.2 Scope of Work

The scope of work includes a structural assessment to check the feasibility of the modifications required in the structural elements, considering the additional loads introduced by the proposed structural modifications, as outlined in the drawings, received from the client, for the existing bunkers.

1.3 Objectives

The various objectives of the study are as follows:

a) Study of all the relevant drawings as received from the client to understand the structural system of the existing bunker building.
b) Verification of the as built structural dimensions and configuration with the available drawings.
c) Conducting critical visual inspection along with some basic on-site/Lab testing.
d) Structural Analysis for the bunker buildings.

1.4 Inputs Received from the Client

The following drawings for the IRCH department, as mentioned in Table1 below, are provided by the client for the structural assessment.

Table 1 Drawing inputs received from the client

S.N.	Name of Drawing	Drawing Type
1	IRCH Room Layout Plan Room33 along with sections	Modified Drawing
2	IRCH Room Layout	Original Construction Drawing

2 STRUCTURAL ASSESSEMNT FINDINGS

2.1 Findings from Structural Drawings

A detailed review of the structural drawings provided by the client was conducted to gain a thorough understanding of the structural system of the existing bunker building. The client proposed modifications to the structural elements, considering slab and walls in the existing bunker room at the IRCH department.

2.2 Assessment of As-Built Structural Elements

Following a review of the structural drawings provided by the client, the as-built structural dimensions and configuration of the bunker room were verified. The assessment revealed that the maze slab in the bunker room at the IRCH Department has a measured height of 3.6 m, compared to the 3 m indicated in the as-built drawings.

2.3 Findings of Critical Visual Inspection

A detailed investigation was done in bunker at the IRCH department to establish the in-site condition of the structure. The investigation included a preliminary visual survey and collection of data on the prevailing environment, its geometry, and the presence of signs/ details of distress and deterioration, if any.

i) Bunker Room at IRCH Department

The bunker room at the IRCH Department was on the ground floor of the building which has a configuration of single floor system.

Following are the findings of the critical visual Inspection:

a) Dampness in the structure was observed on the ceiling of the maze slab of the bunker room which is evident from the photographs attached below in Figure1, Figure2, Figure3, and Figure4.

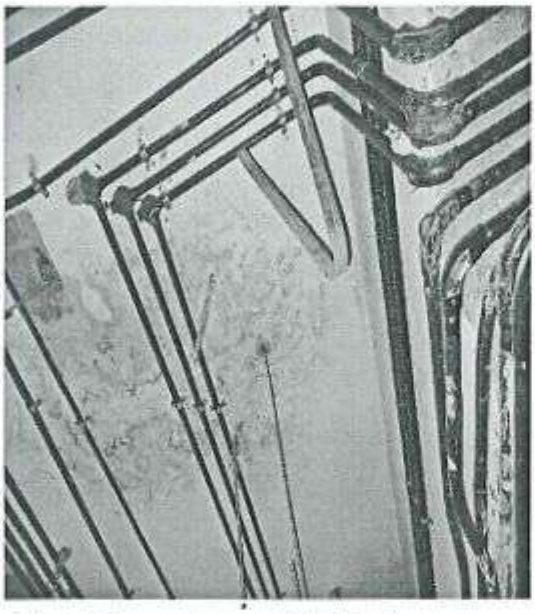

Figure 1 Dampness in maze slab of Bunker room

Figure 2 Dampness in Maze slab of Bunker room

Figure 3Dampness in Maze slab

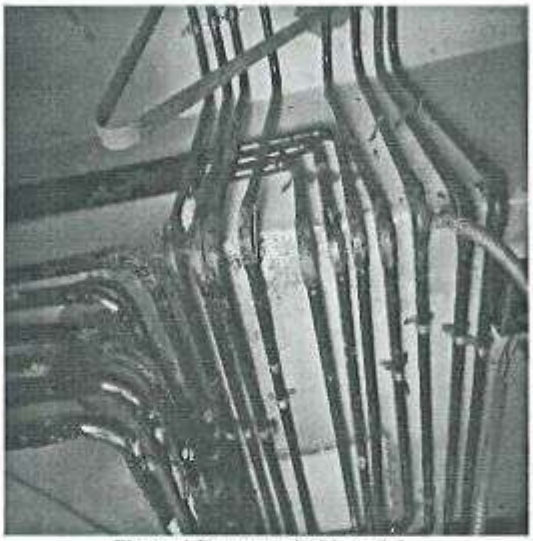

Figure 4 Dampness in Maze slab

b) The bunker room was found to have only a single floor. On the roof of the bunker room in the IRCH department, a brick bat Coba waterproofing system was observed. As depicted in Figure 5 below.

Figure 5 Brick bat Coba waterproofing over bunker roof

2.4 Findings of basic On-site/Lab Testing

On-site testing including rebound hammer test, ultrasonic pulse velocity test, ferro scanning, carbonation test and core extraction were conducted to assess the general quality of the concrete and the location of reinforcement in the walls and slabs of the bunker rooms. The extracted cores were tested in the laboratory for estimating the equivalent cube compressive strength of the concrete in the structural elements of the bunker rooms.

i) Bunker Room at IRCH Department

Testing results indicate that the concrete strength is approximately equivalent to an M10 grade. High rebound numbers indicate increased surface hardness, which might be because of carbonation. The absence of color change in the carbonation test results indicates that carbonation has penetrated beyond the concrete cover, revealing moisture ingress into the cement matrix, likely due to the presence of voids. This observation is further verified by Ultrasonic Pulse Velocity (UPV) test results, which reveal the presence of voids and a honeycombed structure within the concrete matrix. Additionally, ferro-scanning results confirm the presence of reinforcement bars in the walls of the bunker room. A detailed report for the basic on site/lab testing attached in Annexure-I of this report.

2.5 Findings of Structural Evaluation

2.5.1 Structural analysis Methodology

Based on the finding of the On-site/Lab Testing, Finite element model of the bunker room was developed in ETABS to check the stresses in the bunker room walls and slabs. A detailed design parameter and findings are given below:

The bunker room at the IRCH Department was modeled in ETABS, as shown in Figure 6, and the following load and strength parameters were considered:

- Self-Weight of RCC Elements
- Floor Finish = 4 KN/sqm (considering brick Coba)
- Imposed load as per IS875 part 2 requirements
  Roof Accessible = 1.5 KN/sqm

- As per IS 456 load combination considered for the analysis purpose is 1.5(D. L+L.L) where D.L = Dead Load, L.L = Live Load
- Core Tests indicate the probable strength of column concrete to be 10 N/mm^2. Core Strength correlation with the existing concrete gives us equivalent M10 grade concrete for walls.
- The building was constructed approximately 40 years ago. Considering the age of the structure, the age degradation factor of 0.7 was applied to the reinforcement grade Fe250. Accordingly, a yield strength of 175 N/mm^2 was adopted for walls.
- For slab system Grade of M25, and Fe500 considered.

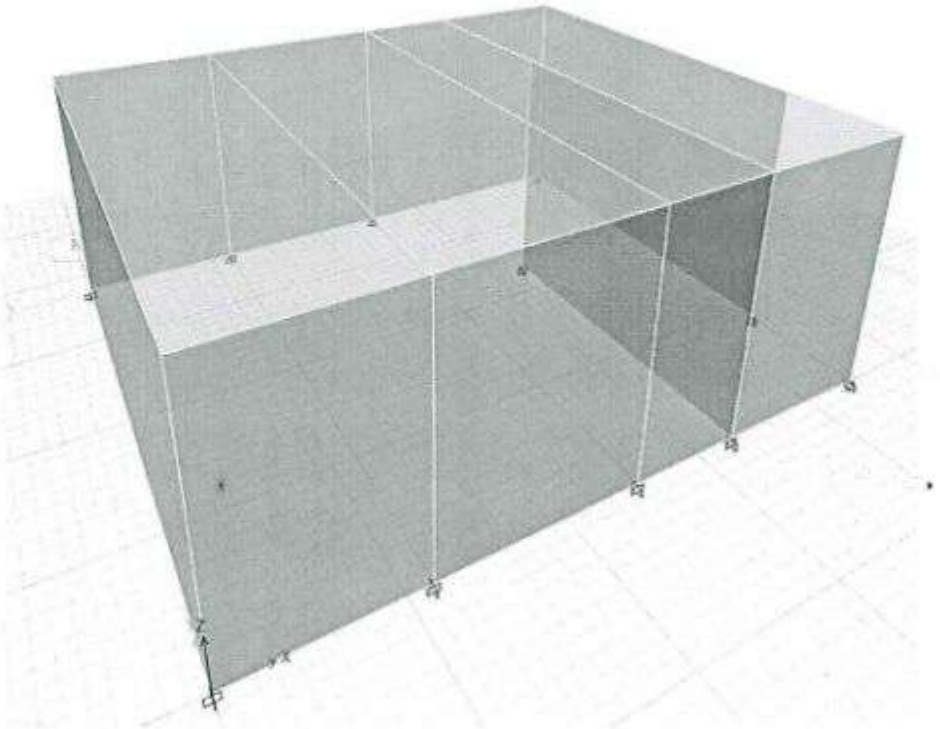

Figure 6 3D Model of Bunker at IRCH Department

After applying the loads, a finite element analysis was performed, as shown in Figure 7, and the moment values for the slab and wall were captured from the ETAB model. Based on these

moments, the minimum required reinforcement was calculated shown in Figure 10 for Slab and for walls shown on Figure 12.

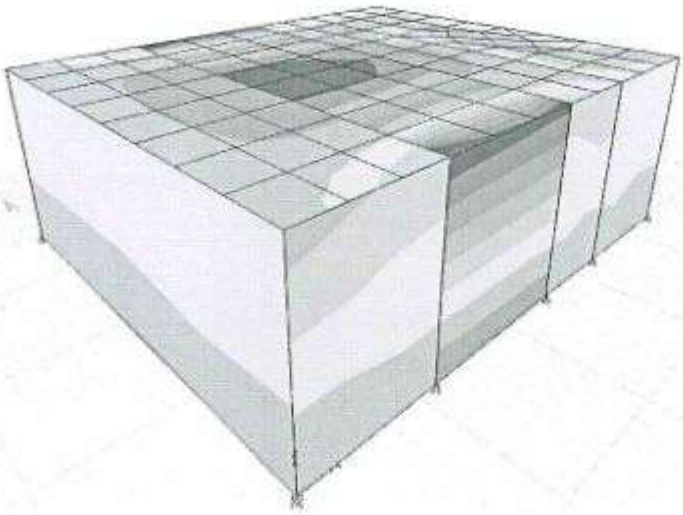

Figure 7 Finite Element analysis model

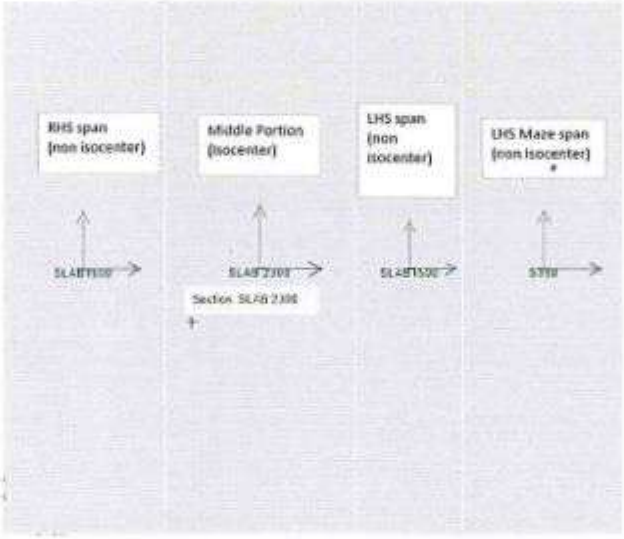

Figure 8 Slab Location

a) Design calculation check for Slab

Design Calculation Check for RCC Slab			
SNO	Design Parameters:		
1	Self weight of Flat Slab	Modelled As/actual in ETABS	
2	Floor Finish Load	4	KN/m2
5	Total Dead Load	4	KN/m2
6	Imposed Load for Office Building as per IS 875 (Part2)	1.5	KN/m2
7	Concrete strength considered in the design (fck)	25	N/mm2
8	fy	500	N/mm2
9	Thickness of slab at middle portion (Isocenter span) (D) with addition of 550 mm thk slab	2300	mm
10	Thickness of slab at (RHS-LHS) side portion (Non-Isocenter span) (D) with addition of 550 mm thk slab	1500	mm
11	Thickness of slab at maze portion (Non-Isocenter span) (D)	350	mm

SNO	Location	Bending moment as per ETAB Analysis(T-m)	Depth(D) of slab	Ast required (mm^2)	Minimum steel provided (0.12%) at bottom face for sagging moment	CHECK
1	At Middle Portion of slab in X direction(Isocenter span) .For Sagging moment	17	2300	170.2520501	2760	safe
3	At RHS Span of Slab (Non-Isocenter span) in X direction. For Sagging moment	6	1500	92.11313105	1800	safe
4	At RHS Span of Slab (Non-Isocenter span) in X direction. For Hogging moment	14	1500	215.284633	provide minimum face rf.	
5	At LHS Span of Slab (Non-Isocenter span) in X direction. For Sagging moment	15	1500	230.7096928	1800	safe
6	At LHS Span of Slab (Non-Isocenter span) in X direction. For Hogging moment	7	1500	107.4873805	provide minimum face rf.	
7	At LHS Maze are Span of Slab (Non- Isocenter span) in X direction. For Sagging moment	0.8	350	52.73031348	420	safe
8	At LHS Maze are Span of Slab (Non- Isocenter span) in X direction. For Hogging moment	1	350	65.96292039	420	safe

9	At Middle Portion of slab in Y direction(Isocenter span) .For Sagging moment	42	2300	421.5452206	2760	safe
10	At Middle Portion of slab in Y direction(Isocenter span) .For Hogging moment	51	2300	512.282025	2760	safe
11	At RHS Span of Slab (Non-Isocenter span) in Y direction. For Sagging moment	13	1500	199.865952	1800	safe
12	At RHS Span of Slab (Non-Isocenter span) inY direction. For Hogging moment	14	1500	215.284633	1800	safe
13	At LHS Span of Slab (Non-Isocenter span) inY direction. For Sagging moment	13	1500	199.865952	1800	safe
14	At LHS Span of Slab (Non-Isocenter span) in Y direction. For Hogging moment	21	1500	323.394453	1800	safe
15	At LHS Maze are Span of Slab (Non- Isocenter span) in Ydirection. For Sagging moment	0.7	350	46.12155416	420	safe
16	At LHS Maze are Span of Slab (Non- Isocenter span) in Y direction. For Hogging moment	1	350	65.96292039	420	safe

Figure 9 Slab calculations

a) Design calculation check for Walls

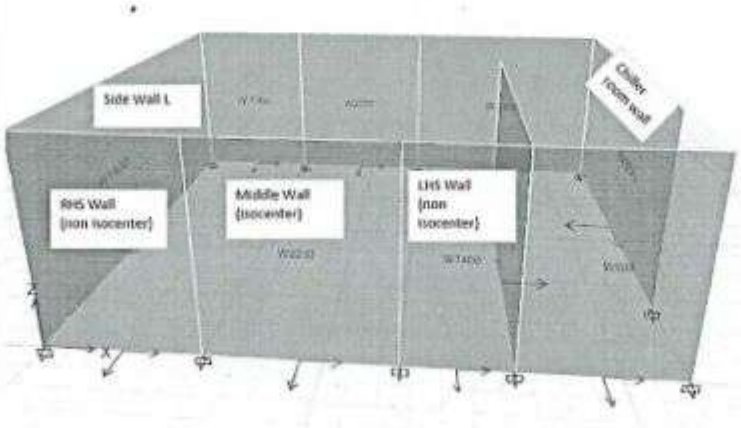

Figure 10 Wall Locations

SNO	Location	Bending moment as per ETAB Analysis(T-m)	Existing Width of Wall	Width of wall with addition of new concrete	Ast required (mm^2)	Assuming Minimum steel provided (0.15%) at	Strengthening requirement
1	Middle wall at (Isocenter area) in X direction.For Sagging moment	2.8	2100	2200	83.6920802	3150	Safe
2	Middle wall at (Isocenter area) in X direction.For Hogging moment	7	2100	2200	209.439836	3150	Safe
3	RHS walls (Non- Isocenter area) in X direction.For Sagging moment	1.2	1300	1400	36.366245	1950	Safe
4	RHSwalls (Non- Isocenter area) in X direction.For Hogging moment	2.7	1300	1400	126.936104	1950	Safe
5	LHS walls (Non- Isocenter area) in X direction.For Sagging moment	0.9	1300	1400	42.2672294	1950	Safe
6	Side LHSwalls (Non-Isocenter area) in X direction.For Hogging moment	2	1300	1400	93.9879728	1950	Safe
7	Side Wall Length =7.8 m in X direction.For Sagging moment	0.4	1050	1400	16.7799188	1575	Safe
8	Side Wall Length =7.8 m in X direction.For Hogging moment	0.9	1050	1400	42.2672294	1575	Safe
9	Chiller Room Wall l=4.5 in X direction.For Sagging moment	0.4	600	850	30.9440837	900	Safe
10	Chiller Room Wall l=4.5 in X direction.For Hogging moment	0	600	850	0	900	Safe
11	Middle wall at (Isocenter area) in Y direction.For Sagging moment	13	2100	2200	389.51859	3150	Safe
12	Middle wall at (Isocenter area) in Y direction.For Hogging moment	35	2100	2200	1054.29635	3150	Safe
13	RHS walls (Non- Isocenter area) in Y direction.For Sagging moment	6	1300	1400	282.631158	1950	Safe
14	RHSwalls (Non- Isocenter area) in X direction.For Hogging moment	16	1300	1400	758.206369	1950	Safe
15	Side LHS walls (Non-Isocenter area) in Y direction.For Sagging	5	1300	1400	235.386462	1950	Safe
16	LHSwalls (Non- Isocenter area) in X direction.For Hogging moment	11	1300	1400	519.702666	1950	Safe
17	Side Wall Length =7.8 m in Y direction.For Sagging moment	2	1050	1400	93.9879728	1575	Safe
18	Side Wall Length =7.8 m in Y direction.For Hogging moment	4	1050	1400	188.197832	1575	Safe
19	Chiller Room Wall l=4.5 in Y direction.For Sagging moment	1	600	850	77.4343731	900	Safe
20	Chiller Room Wall l=4.5 in Y direction.For Hogging moment	0.4	600	850	30.9440837	900	Safe

Figure 11 Walls Calculations

The minimum reinforcement details for the walls and slab have been detailed in the drawings given in Annexure-II of this report.

3 CONCLUSION AND RECCOMENDATION

Based on the structural assessment conducted, the following conclusions can be drawn:

1) The review of the structural drawings revealed proposed modifications to the bunker room, including the addition of a RCC slab and walls in the existing bunker room
2) The assessment of the as-built structural dimensions revealed that the height of the maze slab in the IRCH department bunker room is approximately 0.6m less than that given in the as built drawings.
3) The IRCH bunker room is a single-story structure with a Brick Bat Coba waterproofing system. The visual inspection of the bunker room revealed dampness in the slab of the maze area in the IRCH department bunker room.
4) The onsite and lab test results revealed that the RCC walls and slab of IRCH bunker room has an equivalent cube compressive strength of approximately 10 MPa. This low strength is further supported by poor pulse velocities and high carbonation depths. Ferro scan tests confirmed the presence of reinforcement bars in the walls of existing bunker room
5) The structural analysis revealed that the walls of the IRCH department are safe for additional concreting. Cement grouting in the existing walls is recommended. Additional reinforcement shall be provided in the proposed additional concrete layers for the modification of the bunker room given in Annexure-II of this report. The detailed methodology for the execution works is given in Annexure-III of this report.
6) The existing slab needs to be replaced with new concrete of grade M25, with required reinforcement as detailed in Annexure-II of this report. And the detailed execution methodology is provided in Annexure-III of this report.

25/3/25

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ANNEXURE-I

(SITE TESTING DETAIL AND LOCATIONS)

(Non-Destructive Test Results)

A. REBOUND HAMMER TEST:

A Schmidt hammer, also known as a Swiss hammer a rebound hammer or concrete hammer test, is a device to measure the elastic properties or strength of concrete or rock, mainly surface hardness and penetration resistance.

1. **Objective:** The rebound hammer method could be used for:
   a. Assessing the likely compressive strength of concrete with the help of suitable correlations between rebound index and compressive strength,
   b. Assessing the uniformity of concrete
   c. Assessing the quality of the concrete in relation to standard requirements
   d. Assessing the quality of one element of concrete in relation to another.

2. **Principle:** When the plunger of the rebound hammer is pressed against the surface of the concrete, the spring-controlled mass rebounds and the extent of such rebound depends upon the surface hardness of concrete. The surface hardness and therefore the rebound are taken to be related to the compressive strength of the concrete. The rebound is read off along a graduated scale and is designated as the rebound number or rebound index.

Figure I (a) Rebound Hammer Test Equipment

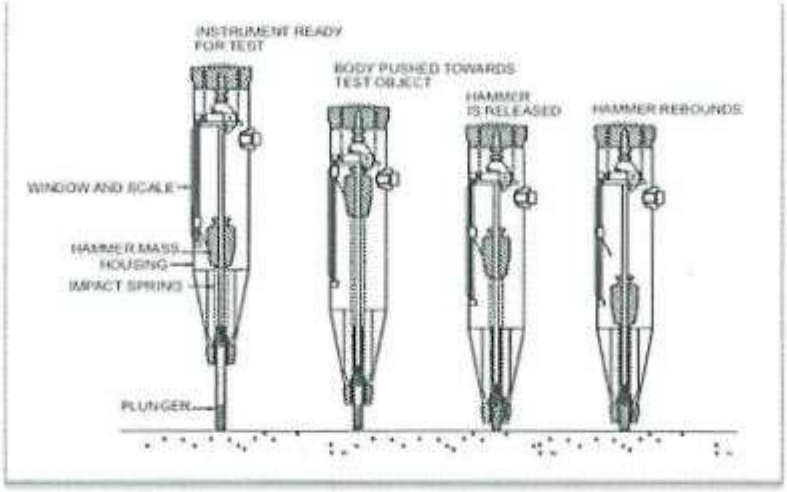


Figure I (b) the procedure of Rebound Hammer Test

The rebound Hammer test measures the surface hardness of concrete with approximate correlations to estimate the compressive strength of the structure. **A total No. of 8 tests** has been conducted in accordance with **IS 516 (Part 5/Sec 4):2020**.

REBOUND HAMMER TEST											
SI NO.	Location	Structural element	Rebound values								
			1	2	3	4	5	6	Direction	Average value	Corrected value
1	BUNKER ROOM IR-1	WALL	26	27	26	28	24	25	→	26	26
2	BUNKER ROOM IR-2	WALL	32	31	37	35	30	35	→	33	33
3	BUNKER ROOM IR-3	WALL	31	29	28	28	30	30	→	29	29
4	BUNKER ROOM IR-4	WALL	28	28	23	29	24	28	→	27	27
5	BUNKER ROOM IR-5	WALL	28	26	27	29	30	27	→	28	28
6	BUNKER ROOM IS-1	SLAB	34	34	37	32	33	30	→	33	33

7	BUNKER ROOM IS-2	SLAB	27	26	28	23	27	25	→	26	26
8	BUNKER ROOM IS-3	SLAB	32	34	34	30	34	31	→	33	33

❖ **Snapshots of Rebound Hammer Test:**

Figure 1.1 Rebound Hammer Test

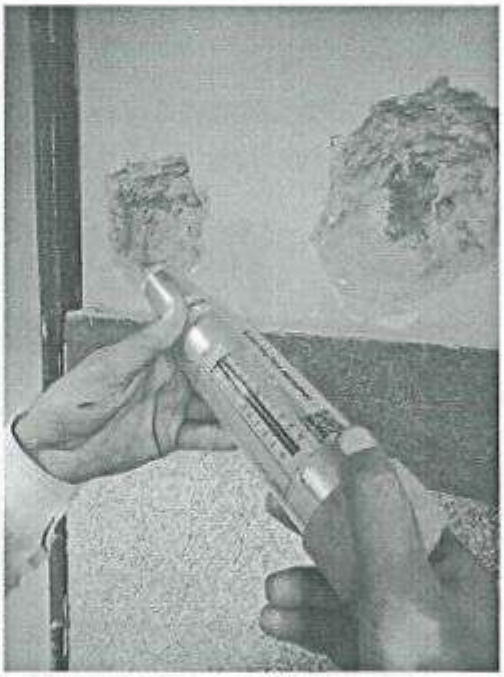


Figure 1.2 Rebound Hammer Test

Figure 1.1 Rebound Hammer Test

Figure 1.2 Rebound Hammer Test

B. ULTRASONIC PULSE VELOCITY TEST:

Ultrasonic Pulse Velocity (UPV) testing is used to determine the integrity and quality of structural concrete or stone (up to 6 feet thick) by measuring the speed and attenuation of an ultrasonic wave passing through the element being tested.

1. **Objective:** The ultrasonic- pulse velocity test method could be used for:
   - **a.** The homogeneity of a material
   - **b.** The presence of voids, cracks, or other internal imperfections or defects
   - **c.** Changes in the concrete may occur with time (i.e., due to cement hydration) or damage from fire, frost, or chemical attack.
   - **d.** The strength or modulus of a material
   - **e.** The quality of the concrete in relation to specified standard requirement.

2. **Principle:** The ultrasonic pulse is generated by an electro acoustical transducer. When the pulse is induced into the concrete from a transducer, it undergoes multiple reflections at the boundaries of the different material phases within the concrete. A complex system of stress waves is developed which includes longitudinal (compressional), shear (transverse), and

surface (Raleigh) waves. The receiving transducer detects the onset of the longitudinal waves, which is the fastest. Because the velocity of the pulses is almost independent of the geometry of the material through which they pass and depends only on its elastic properties, the pulse velocity method is a convenient technique for investigating in-situ concrete. The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity, and uniformity is good. In case of poorer quality, lower velocities are obtained. If there is a crack, void or flaw inside the concrete that comes in the way of transmission of the pulses, the pulse strength is attenuated and it passes around the discontinuity, thereby making the path length longer. Consequently, lower velocities are obtained. The actual pulse velocity obtained depends primarily upon the materials and mix proportions of concrete. Density and modulus of elasticity of aggregate also significantly affect the pulse velocity.

The pulse velocity is determined by the equation:

Pulse Velocity = Path Length / Transit Time

Figure II UPV Test Equipment

Ultrasonic Pulse Velocity (UPV) Test involves the transmission of ultrasonic pulses through the structural member and computing the wave velocity in it. Thus, computed velocity is indicative of the quality of concrete and if the member is suffering from any structural flaw like honeycombing, voids etc. **Total 8 No. of UPV tests** have been conducted according to **IS 516 (Part 5/Sec 1):2018.**

Table: Velocity Criterion for Concrete Quality Grading [Ref: IS 516 (Part 5 / Sec 1):2018 Amendment No.1- Nov 2019]		
Sl. No.	**Average Value of Pulse Velocity by Cross-Probing (Km/s)**	**Concrete Quality Grading**
i) For concrete (≤ M25):		
a)	Below 3.5	Doubtful
b)	3.5 - 4.5	Good
c)	Above 4.5	Excellent
ii) For concrete (>M25):		
a)	Below 3.75	Doubtful
b)	3.75 – 4.5	Good
c)	Above 4.5	Excellent

UPV TEST RESULTS

Date of Testing: 27-09-2024 & 28-09-2024

SI NO.	Location	Structural element	Method of Testing	Distance (mm)	Time (microseconds)	Velocity (km/s)	Final Corrected Velocity calculated (km/s)	Quality
BASEMENT								
1	IR-1	WALL	Indirect	510	284.0	1.80	1.80	Doubtful
2	IR-2	WALL	Indirect	510	268.3	1.90	1.90	Doubtful
3	IR-3	WALL	Indirect	410	344.5	1.19	1.19	Doubtful
4	IR-4	WALL	Indirect	400	181.1	2.21	2.21	Doubtful
5	IR-5	WALL	Indirect	590	341.8	1.73	1.73	Doubtful
6	IS-1	SLAB	Indirect	400	150.6	2.66	2.66	Doubtful
7	IS-2	SLAB	Indirect	740	516.0	1.43	1.43	Doubtful
8	IS-3	SLAB	Indirect	640	236.3	2.71	2.71	Doubtful

***NOTE: In surface probing (Indirect Transmission) method, the pulse velocity may be increased by 0.5 km/s, for values > 3.0 km/s.**

❖ **Snapshots of Ultra-Sonic Pulse Velocity Test:**

Figure 1.5 UPV Test

Figure 1.6 UPV Test

Figure 1.7 UPV Test

C. CONCRETE CORE TEST

Compressive Strength Test on Drilled Concrete Cores is required to determine the strength of hardened concrete in structure.

1. **Objective:** The core test method is used for:

The quality of the concrete provided to a construction (potential strength).

a. The quality of the concrete in the construction (in-situ strength), known as actual strength.
b. The ultimate capacity of the structure to carry the imposed loads; actual loads, design loads, and new additional loads.
c. The deterioration in a structure due to overloading, fatigue (bridge structures, machine base, etc.), chemical reaction (ASR or chemical spillage, etc.), fire or explosion, and weathering.

2. **Principle:** In the Concrete Core test, the sample or core is collected from the hardened concrete and extracted using the core cutter machine and then these cores are used to determine the compressive strength of the concrete. After preparing the ends, a compressive axial load will be applied to the samples at a continuous rate until failure occurs. The compressive strength will be determined by dividing the maximum load by the cross-sectional area of the sample, calculated from the mean dimensions of the section, and shall be expressed to the nearest N/mm2. The product of the correction factor for core diameter (cores having a diameter less than 100 mm) is given below, and the measured compressive strength shall be known as the corrected compressive strength:

Diameter of Core Sample	Correction Factor
75 ± 5	1.03
< 70	1.06

A correction factor according to the l/d ratio of the core specimen after capping shall be obtained from by this formula as given below:

F = 0.11N+0.78

where,

F = correction factor, and

N = length / diameter ratio.

The product of this correction factor and the measured compressive strength or the corrected compressive strength for diameter, shall be known as the corrected cylinder strength, this being the equivalent strength of a cylinder having a height/diameter ratio of two. The equivalent cube strength of the concrete shall be determined by multiplying the corrected cylinder strength by 5/4. **Total No. of 2 Core tests** have been conducted according to **IS 516(Part 4):2018**.

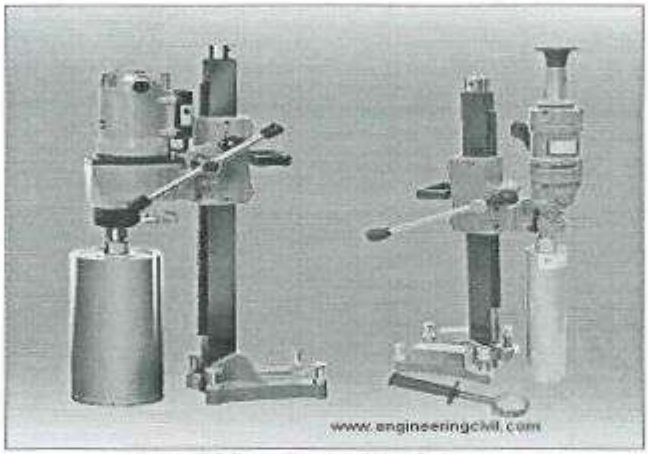


Figure IV Core Cutting Machine

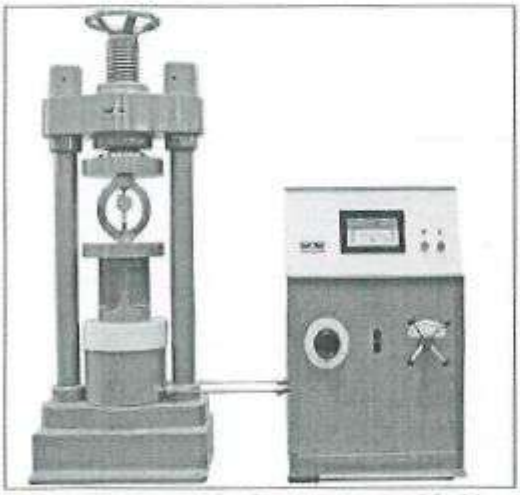


Figure V Compressive Strength Testing Machine

Figure VI Testing of Concrete Core

Concrete Core Test

SI NO.	Description/ Sample Id	Dia (mm)	Length after capping of Core (mm)	Area (mm2)	Ratio (L/D)	C.F	Load (KN)	Direct C.S. (N/mm2) (Lx1000Area)	Corrected Strength N/mm2) (Direct C.S.X1.06	Corrected Strength N/mm2) (Direct C.S. X C. F.)	Equivalent Cube Strength (N/mm2) (Corrected C. S. X 1.25)
Date of Testing 27/09/2024 & 28/09/2024											
1	IR-S1	93.15	128.22	6811	1.38	0.946	63	9.25	9.53	9.01	11.26
2	IRCH-RW-1	66.18	90.40	3438	1.37	0.944	36	10.47	11.09	10.47	13.09

NOTE RW – RCC WALL, S1- SLAB.

❖ **Snapshots of Concrete Core Test:**

Figure 1.8 Core Test

Figure 1.9 Core Test

Figure 1.10 Core Test

Figure 1.11 Core Test

E. The Carbonation Test:

Carbonation testing provides a means with which the inspector can determine the extent of carbon dioxide infiltration into the concrete. The process is like chloride ion testing where a sample is either removed, either by coring or drilling and the sample is tested by the application of a revealer.

1. **Objective:** Carbonation is a process in which carbon-di-oxide from the atmosphere diffuses through the porous cover concrete and may reduce the pH to 8 or 9, at which the passivating/oxide film is no longer stable. Carbonation process involves the following two stages: First, the atmospheric carbon dioxide (CO_2) reacts with water in the concrete pores to form carbonic acid (H_2CO_3). This is followed by reaction of the carbonic acid with calcium hydroxide [$Ca(OH)_2$] to form calcium carbonate ($CaCO_3$). This process leads to a reduction in the pH value of the pore solution from 12.5 to 13.5 to around 8 to 9, which causes de-passivation of protective layer of the reinforcement bars and initiates their corrosion.

2. **Principle**: Carbonation testing provides a means with which the inspector can determine the extent of carbon dioxide infiltration into the concrete. The process is similar to chloride ion testing where a sample is either removed, either by coring or drilling and the sample is tested by the application of a revealer. The revealer commonly used is phenolphthalein. When

phenolphthalein comes into contact with high pH (>10) concrete the solution shows as bright pink. When the solution comes into contact with low pH (<10) the solution shows no color change and the concrete can be considered carbonated.

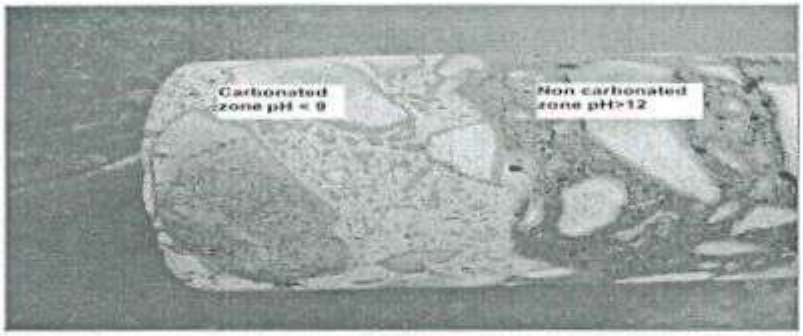


Fig. VII Carbonation of core

The carbonation test is performed by extracting the cores of in-situ concrete. The carbonation test is also performed by drilling a hole on the concrete surface to the different depth up to concrete cover. **Total No. of 2 Carbonation tests** have been conducted according to **IS 516 (Part 5/Sec 3): 2021.**

CARBONATION TEST				
Date of Testing: 27/09/2024 & 28/09/2024				
SI. NO.	**Structural Element**	**Location**	**Test Result**	**Depth of Carbonation (mm)**
1	RCC WALL	IRS1	No Colour observed	152
2	RCC WALL	IRCH-RW1	No Colour observed	104

NOTE-: RW= RCC WALL, S= SLAB

❖ **Snapshots of Carbonation Test:**

Figure 1.12 Core Test

Figure 1.13 Core Test

F. PS – 300 FERROSCAN

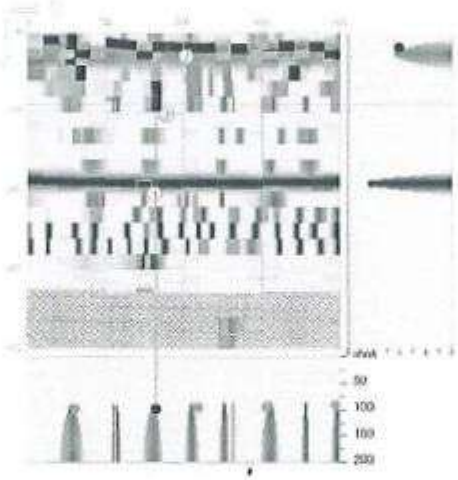
Concrete detector for rebar localization, depth measurement and size estimation in structural analysis

- Verification and analysis for 1st layer rebar
- Checking concrete cover over large areas for structural repair work.
- Building acceptance inspections and quality control
- Generation of structural assessment reports including statistics and visual presentation in 2D/3D views of areas
- Max. detection depth for object localization: 200 mm
- Localisation accuracy: 1% +/-3mm mm
- Minimum distance between two neighbouring objects: 30mm

Figure VIII PS-300 Ferro-scan

FERRO SCAN REPORT NO.1

Client:	**IRCH AIIMS, NEW DELHI**
Element location:	**Bunker Wall**
Date / Time:	2024-09-28 14:56:37
Comment:	REINFORCEMENT DETAILS: VERTICAL L BARS =1NOS OF 20 MM Dia @ 130-202 C/C HORIZONTA BARS =1NOS OF 12MM & 1 NOS OF 20MM Dia VERTICAL BARS= 1NOS OF 20 MM Dia MINIMUM COVER TO REINFORCEMENT WITH PLASTER 38-89 MM



x: 248 mm y: 135 mm z: 0 mm Thickness: 200 mm

Overlay: - mm

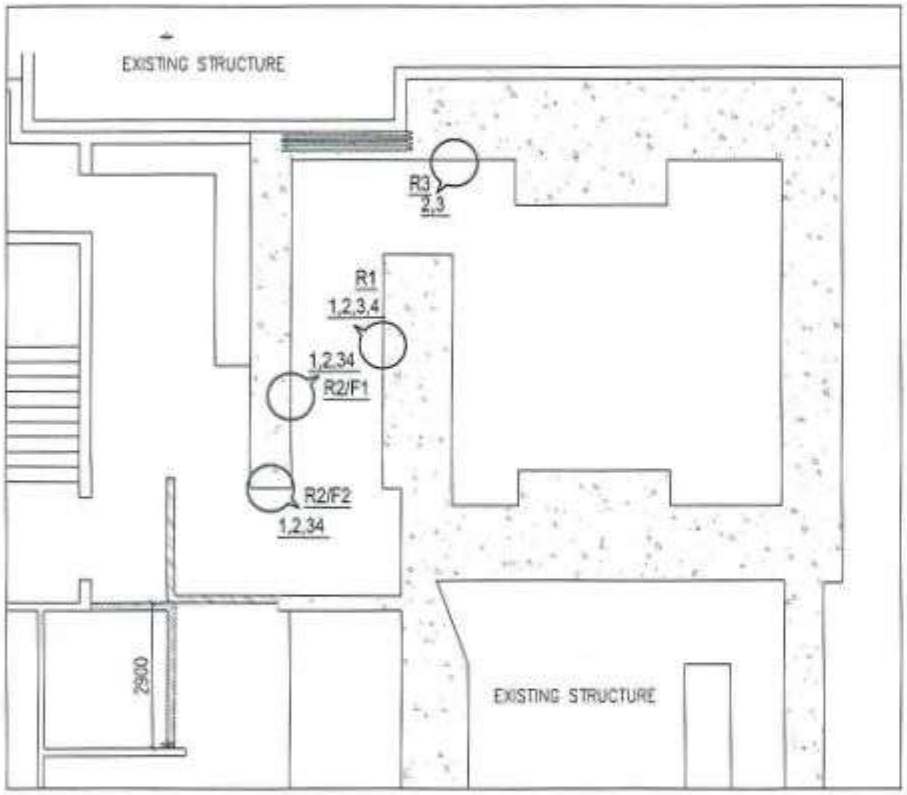
Project name:	- BUNKER ROOMS IRCH DEPARTMENT	IN Element:	: Wall
Address:	- AT ALL INDIA INSTITUTE OF MEDICAL SCIENCES, ANSARI NAGAR, EAST, NEW DELHI, 110029	Scan Area:	400x600

Ø Horizontal:	14 mm +/- 6 mm	Type:	Input
Ø Vertical:	14 mm +/- 6 mm	Type:	Input

Recorded measurements:	x:	y:	Cover:	Ø:	Orientation:	Quality:
1.	225 mm	286 mm	38 mm	12 mm	Horizontal	High
2.	285 mm	24 mm	89 mm	20 mm	Horizontal	High
3.	248 mm	135 mm	89 mm	20 mm	Vertical	High

Snapshots of Ferro scan Test:

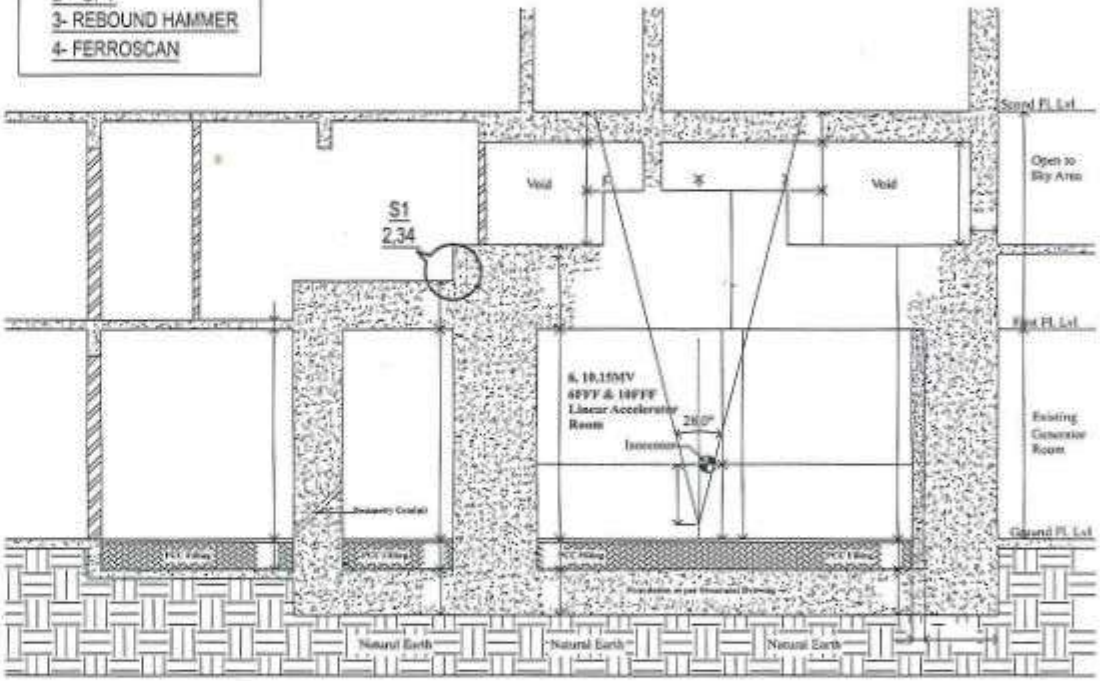
TESTING LOCATIONS



TESTING LOCATION RADIOTHERAPY DEPARTMENT BUNKER ROOM

LEGENDS:-

1 - CORE,CARBONATION
2 - UPV
3- REBOUND HAMMER
4- FERROSCAN



ELEVATION VIEW

ANNEXURE-II

DETAILED DRAWING

ANNEXURE-III

SITE EXECUTION METHODOLOGY

METHODOLOGY 1:

FOR WALLS MODIFICATION (AT RADIOTHERAPY DEPARTMENT)

Step 1: Surface Preparation by Chipping of Unsound Concrete - Chip-off and remove all the plaster and roughen the existing top surface of the RCC wall by hacking and remove any loose concrete if any.

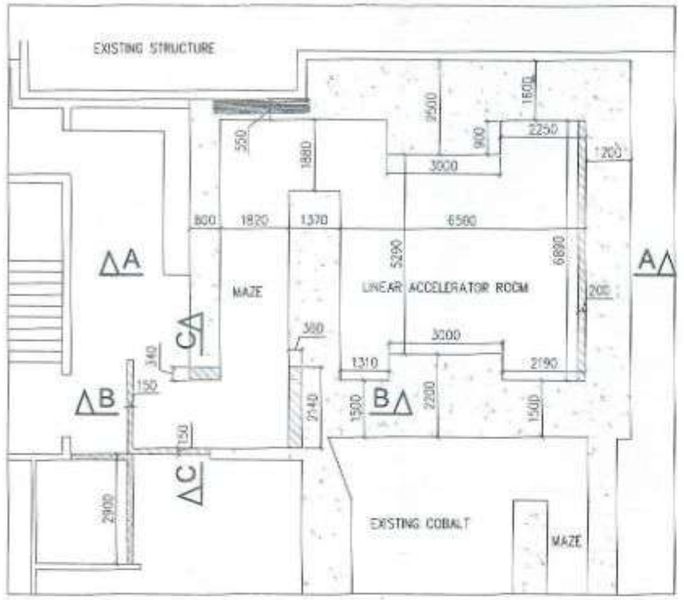
Step 2: Supplementary Reinforcement - Additional reinforcement steel as per the structural drawings would be supplemented at required spacing and alignment. This supplementary reinforcement (main reinforcement/ ties/ shear connectors) shall be inserted/ anchored into the existing structural member using appropriate Rebarring & anchorage chemical as per drawings. Rebarring shall be done for designated dia. at designed embedment length as mentioned in drawing as per structural requirement by drilling the holes using power drilling machine & cleaning of holes using blow pump, wire brush etc. Then rebars should be inserted in holes that should be filled with Rebarring / anchorage chemical as drawing.

Stage 3: Concrete pouring – The concrete of (M-25 GRADE) of 2.35 gm/cc with slump more than 140mm thickness shown in the drawing shall be poured after application of bond coat (Nito bond or equivalent bond coat over the old concrete surface to provide strong adhesion of parent concrete with applied repair concrete) as guided by the site In- charge. The concrete shall be poured immediately after the application of bonding coat when the coat is tacky.

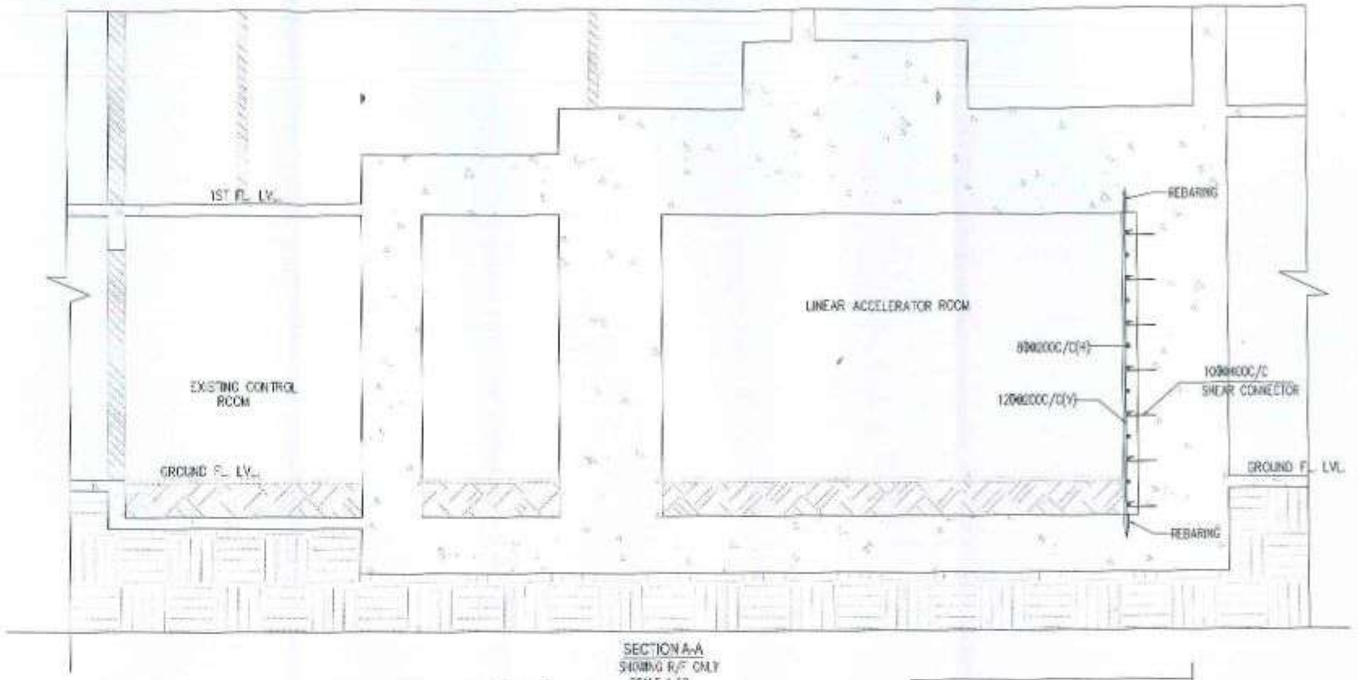
Stage 4: Finishing of surface: After de-shuttering, wet curing shall be done for 7days.

25/3/15

Prof. Sahil Bansal
Department of Civil Engineering
Indian Institute of Technology
Hauz Khas, New Delhi

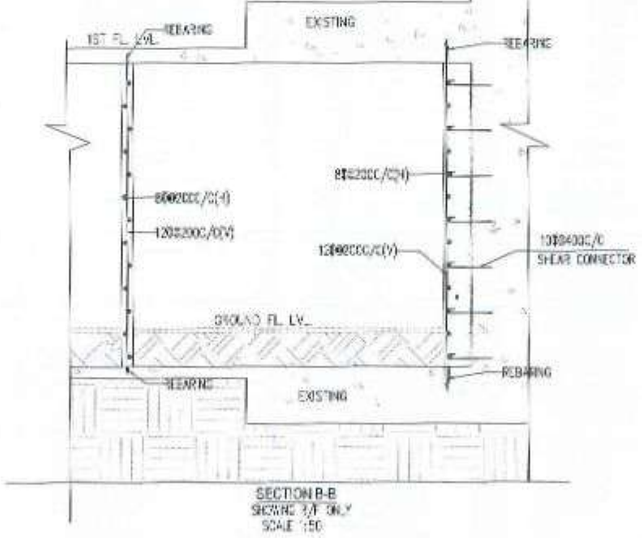


LAYOUT PLAN RADIOTHERAPY DEPARTMENT BUNKER ROOM

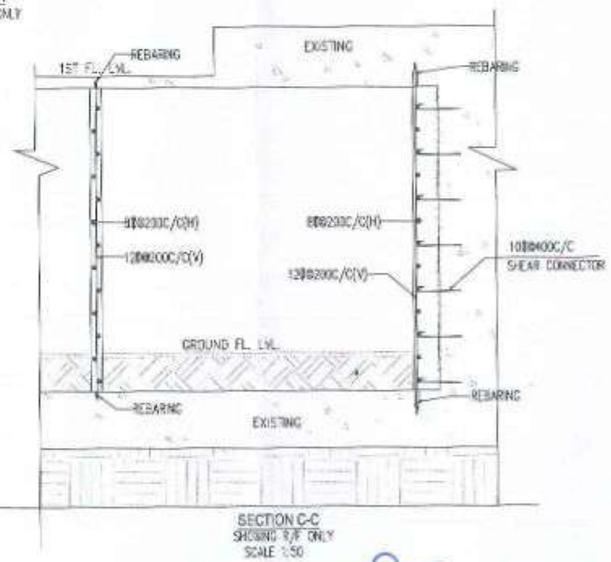


SECTION A-A
SHOWING R/F ONLY
SCALE 1:50

SECTION A-A
SHOWING G.A ONLY
SCALE 1:50

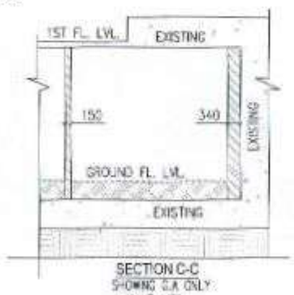


SECTION B-B
SHOWING R/F ONLY
SCALE 1:50



SECTION C-C
SHOWING R/F ONLY
SCALE 1:50

SECTION B-B
SHOWING G.A ONLY
SCALE 1:50



SECTION C-C
SHOWING G.A ONLY
SCALE 1:50

LEGEND

- PROPOSED CONCRETE IN WALLS (M-25 GRADE) OF 2.35 gm/cc (MIN.) WITH SLUMP MORE THAN 140MM.
- EXISTING CONCRETE
- WALL TO BE DEMOLISH
- BRICK WALL

NOTE-:
REFER METHODOLOGY DOCUMENT FOR EXECUTION OF WORKS

REBARING DEPTHS & CHEMICAL
8ϕ BINDER =100MM
12ϕ SHEAR CONNECTOR=75MM
12ϕ MAIN R/F=150MM
REBARING CHEMICAL SHALL BE HIT HY 220R OR EQUIVALENT

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS IN METERS.
2. FOLLOW WRITTEN DIMENSION ONLY & DO NOT SCALE.
3. REINFORCEMENT SHALL BE Fe-500 (TMT).
4. COVER TO R/F SHALL BE 40MM.

PROJECT
DEPARTMENT OF RADIOTHERAPY
ALL INDIA INSTITUTE OF MEDICAL SCIENCES, NEW DELHI

SHEET TITLE
STRUCTURAL DETAILS FOR MODIFICATION

PROOF CONSULTANT
IIT DELHI

CONSULTANT
CREATIVE DESIGN CONSULTANTS & ENGINEERS PVT. LTD.
CREATIVE HOUSE, C-1, CHI V,
GREATER NOIDA, 201310
E-mail: ccepl.design@gmail.com, website: www.ccepl.co.in

ccepl

Prof. Sahil Bansal
Department of Civil Engineering
Indian Institute of Technology
Hauz Khas, New Delhi-110016

DR. AMAN DEEP
Managing Director
Creative Design Consultants & Engineers Pvt. Ltd.
408, SG Alpha Tower, Sector-9
Vasundhara, Ghaziabad-201012
Delhi NCR (U.P.) India

Subject:- Structural Stability Assessment of Advanced High Energy Linear Accelerator Under Turnkey Work.

1. General Requirements:

(1) The unit is to be installed on full turnkey basis with Civil Works (Interior & Structural design Build), facade works, plumbing (Internal & External), and Electric works, HVAC Works, Communications, MGPS and Furniture etc. Structural works likes site modification, dismantle and removal of the existing slab system will be carried out by Consignee along with all regulatory/statutory approvals.

(2) All the site hindrances like underground & overlay HT/LT line, water supply lines or sewage lines, communication, or data lines, etc. In case any of the utility service above is encountered during working, removal/relocation will be the responsibility of the consignee.

(3) Removal of plantation/trees from the area under scope will be arranged by consignee with required NOC from MOEF.

(4) Any PCPNDT/ Statutory/Regulatory approval will be responsibility of consignee.

(5) During the executing of structural work like RCC wall ,Column, Slab, Beam & its modification & expansion which is required as per site requirement a structural engineer has been appointed by the consignee , So that they looks the work during execution as per structural drawing given by the IIT Delhi.

(6) After Completion of the structural work it should be dully vetted by IIT Delhi/Govt. Institute which is arranged by the consignee.

AE (Civil)
09.04.25

IITD

2. **Civil Works:** Turnkey will include the Civil Construction work as under mentioned and shall be as per applicable IS codes & CPWD specification:

(1) Preparation of all structural and architectural working drawing, clearing of the site excavation of foundation trenches, construction of foundation footings and superstructure brick walls. Any other regulatory guidelines and duly vetted by the Consignee.

(2) Construction should be RCC frame structure/columns/beams to facilitate modifications and expansion later. Foundations of the building should be designed for two floors for future construction. Mixing & use of plain and reinforced concrete shall be in accordance with the provisions of IS : 456:2000.

(3) Waterproofing of the roof is to be done with as per DSR 2023 code 22.6 method.

(4) Flooring in the other areas will be Italian Marble.

(5) Floor cable trenches with stainless steel & or Tile covers will be provided for the cables in the bunker room and Equipment rooms.

(6) Complete plumbing operations including laying of sanitary lines, manholes, wash basins, geysers, white vitreous EWC etc will be provided and shall be Jaquar/ Kohler/Grohe.

(7) Arrangement of water supply lines for drinking and general use will be made of with CPVC pipe of supreme/Prakash make.

(8) All water pipes shall be of high-density CPVC of Supreme/Prakash make . The bathroom fixtures shall be brass chrome plated.

(9) The washing and drainage lines should be made of chemical resistant material as per DSR 2023 code 17.35.1.2

AE (Civil)
09.04.25

(10) All LED lights and smoke detectors to be accommodated integrated in the false ceiling. All the internal wiring including that of telephone, LAN etc will be concealed.

(11) All rooms will have vitrified flooring 600X600 mm and wall tiles 600 X600 mm

(Orient/ Kajaria/ Somany) upto false ceiling, except main Bunker Room which will have

PVC conductive flooring and laminated paneling.

(12) External finish white cement based wall putty and water proof paint like Apex Ultima/equivalent

(13) Bunker Room 600x600 mm Acoustical tile Supported on Aluminum suspension and cove with light and other area should have 600x600 mm . Acoustical tile Supported on GI suspension Skylight of size 1200x1800mm should be provided in Bunker Room.

(14) Fire safety measures a fire alarm system of reputed make with smoke detector indicator panels, call boxes, electronic sirens and wiring will be installed.

(15) All the rooms in the complex will be signposted. Sun film or venation Blinds will be put-up in all windows.

(16) The entire complex will be made rodent/ Pest resistant.

(17) Color aesthetics will be kept in mind while matching the paint with the furniture.

(18) False ceiling should have 2.00 mm thick aluminium powder coated/Gypsum/perforated G.I 600X600 mm as per site requirement.

(19) All dismantling works are included before execution of work.

AE (Civil)
09.04.24

Gmail **Store Section Dr. BRAIRCH <storeirch160@gmail.com>**

Re: Submission of Revised Draft Tender Document for perusal and Approval - Reg.

1 message

Dr.Jaspreet Kaur <drjaspreet.ro@gmail.com> Fri, Apr 25, 2025 at 3:53 PM
To: "Store Section Dr. BRAIRCH" <storeirch160@gmail.com>

Approved, please go ahead
Thanks

Dr.Jaspreet Kaur MD
Professor
Department of Radiation Oncology
VMMC & Safdarjung Hospital
New Delhi 110029

On Fri, 25 Apr 2025, 11:52 am Store Section Dr. BRAIRCH, <storeirch160@gmail.com> wrote:

> Respected Members,
>
> DGHS Nominee, and External Experts,
>
> This is to inform you that, in light of the revised specifications submitted by the User Department—formulated subsequent to the representations received and the deliberations held during the pre-bid meeting concerning the floated tender—and based on the Structural Stability Report along with the recommendations of the Engineering Department, a draft of the revised Tender Evaluation Document (TED) has been prepared.
>
> The same is enclosed herewith, including the updated technical specifications and the turnkey scope of work, for your kind perusal and approval prior to proceeding with the signing process and seeking final approval from the Competent Authority.
>
> With regards,
> *On behalf of the Senior Stores Officer*
> Dr. B.R. Ambedkar Research Centre for Health (Dr. BRA RCH)
> AIIMS, New Delhi – 110029
> Tel: 011-2659 3496

Gmail **Store Section Dr. BRAIRCH <storeirch160@gmail.com>**

Re: Submission of Revised Draft Tender Document for perusal and Approval - Reg.

1 message

vikas yadav <drvikasyadav2012@gmail.com> Fri, Apr 25, 2025 at 1:30 PM
To: "Store Section Dr. BRAIRCH" <storeirch160@gmail.com>
Cc: "Dr.Jaspreet Kaur" <drjaspreet.ro@gmail.com>, "saurabhraut0099@gmail.com" <saurabhraut0099@gmail.com>, Subramani vellaiyan <manismpaiims@gmail.com>, Haresh KP <drkpharesh@gmail.com>, "RT Prof. Suman Bhaskar" <drsumanbhasker@gmail.com>, Sanjay Thulkar <sanjaythulkar@gmail.com>, Seema Mishra <seemamishra2003@gmail.com>, Sunil Kumar <dr_sunilk@hotmail.com>, Chandra Shekhara <drchandruaiims@yahoo.com>, Dr Rakesh Garg <drrgarg@hotmail.com>, "Dr. Anita Chopra" <chopraanita2005@gmail.com>, Prabhat Malik <drprabhatsm@gmail.com>, Mithlesh Singh <mithlesh@aiims.gov.in>, archnasharma@aiims.gov.in

Sir,
With ref to above email the revised specifications/Tender Evaluation Document (TED) submitted by the User Department is approved from my side.
Regards

On Fri, Apr 25, 2025 at 11:52 AM Store Section Dr. BRAIRCH <storeirch160@gmail.com> wrote:

> Respected Members,
>
> DGHS Nominee, and External Experts,
>
> This is to inform you that, in light of the revised specifications submitted by the User Department—formulated subsequent to the representations received and the deliberations held during the pre-bid meeting concerning the floated tender—and based on the Structural Stability Report along with the recommendations of the Engineering Department, a draft of the revised Tender Evaluation Document (TED) has been prepared.
>
> The same is enclosed herewith, including the updated technical specifications and the turnkey scope of work, for your kind perusal and approval prior to proceeding with the signing process and seeking final approval from the Competent Authority.
>
> With regards,
> *On behalf of the Senior Stores Officer*
> Dr. B.R. Ambedkar Research Centre for Health (Dr. BRA RCH)
> AIIMS, New Delhi – 110029
> Tel: 011-2659 3496

--
Dr Vikas Yadav MD.
Professor and Head,
Department of Radiation Oncology ,
VMMC and Safdarjung Hospital,
New Delhi 110029
Mob +919267925337

Gmail **Store Section Dr. BRAIRCH <storeirch160@gmail.com>**

Re: Submission of Revised Draft Tender Document for perusal and Approval - Reg.

1 message

Dr Saurabh Raut <saurabhraut0099@gmail.com> Fri, Apr 25, 2025 at 5:28 PM
To: "Store Section Dr. BRAIRCH" <storeirch160@gmail.com>
Cc: Subramani vellaiyan <manismpaiims@gmail.com>

Dear Store Section Team, Dr. BRAIRCH,

With reference to the above email, I have gone through and herewith approve the revised specifications/Tender Evaluation Document (TED) submitted by the User Department.

Regards.

Dr. Saurabh Raut
Medical Physicist-RSO
Deptt of Radiotherapy, Lok Nayak Hospital, Delhi-110002
(Mob no. 9873617537, Whats app no. 8826547940)

On Fri, Apr 25, 2025 at 12:55 PM Dr Saurabh Raut <saurabhraut0099@gmail.com> wrote:

> Dear Store Section Team, Dr. BRAIRCH,
>
> I herewith acknowledge the email and attached document, will go through the document before the scheduled meeting.
>
> Regards.
>
> Dr. Saurabh Raut
> Medical Physicist-RSO
> Deptt of Radiotherapy, Lok Nayak Hospital, Delhi-110002
> (Mob no. 9873617537, Whats app no. 8826547940)
>
> On Fri, Apr 25, 2025 at 11:52 AM Store Section Dr. BRAIRCH <storeirch160@gmail.com> wrote:
>
> > Respected Members,
> >
> > DGHS Nominee, and External Experts,
> >
> > This is to inform you that, in light of the revised specifications submitted by the User Department—formulated subsequent to the representations received and the deliberations held during the pre-bid meeting concerning the floated tender—and based on the Structural Stability Report along with the recommendations of the Engineering Department, a draft of the revised Tender Evaluation Document (TED) has been prepared.
> >
> > The same is enclosed herewith, including the updated technical specifications and the turnkey scope of work, for your kind perusal and approval prior to proceeding with the signing process and seeking final approval from the Competent Authority.
> >
> > With regards,
> > *On behalf of the Senior Stores Officer*
> > Dr. B.R. Ambedkar Research Centre for Health (Dr. BRA RCH)
> > AIIMS, New Delhi – 110029
> > Tel: 011-2659 3496