Indian Institute of Science (IISc)
Bangalore - 560012

Supercomputer Education and Research Centre (SERC)
IISc

Notice Inviting Tender (NIT) under
Single-Cover Bid System

for

Strengthening of Ground Floor Slab for Withstanding Supercomputer Rack Load in Data Centre in SERC
[Local Tender]

Enquiry or Tender No:
IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1
Date: September 1, 2025

Chair
Supercomputer Education and Research Centre (SERC)
Indian Institute of Science (IISc)
Bangalore – 560012, India
Email: tender.serc@iisc.ac.in

Contents

1. Preamble

The Supercomputer Education and Research Centre (SERC) in Indian Institute of Science (IISc) invites bids for strengthening data center being constructed in the ground floor to accommodate the heavy-load supercomputer racks to be placed in the data center. The strengthening has to be done using supporting columns and beams at the basement level, as per the guidelines in a report prepared by a structural consultant.

2. Technical Details

The work involves structural strengthening of the existing deficiency in RC beams in the data center and roof slab by re-in forcing the identified beams in the basement floor of SERC, as per a report of a structural consultant (**Annexure H**). Annexure H.C gives the data centre layout diagram and the recommended strengthening measures.

Following are the specific details of the workflow to be carried out.

1. Clearing the place by making ground for five (5) steel columns by doing earthwork excavation to the required depth, de-watering if required.

2. Providing PCC 1:4:8, bar bending as per design for footing pedestals, placing 20mm footing bolts as specified and pouring M30 grade concrete.
3. Re-filling of the soil around the pedestal if required and transporting the excess soil as instruction received.
4. Erecting the steel columns as per design with base and top plates and bolts at the bottom and top, grip expansion bolts and nuts and sealing the gaps with Conbextra GP2 and low viscous grout as per specifications.
5. Fixing four (4) horizontal steel beams for supporting the roof slabs at identified and designed as per drawing.
6. Painting the steel columns with Asian Paints primer one coat and two coats of enamel paints.

Note: The bidder must carry out a site visit before submitting the bid. It is the sole responsibility of the bidder to visit and examine the site of works and its surroundings, and to gather all necessary information for the preparation of the tender and subsequent execution of the contract. Bids will not be accepted from the bidders who have not carried out the site visit.

Following is the detailed schedule of items to be incorporated.

Table 1

Sl No	Description	Unit	Quantity
1	**Chipping of Existing flooring concrete** Removal of existing concrete and cutting of reinforcement in RC grade slab by gentle process (without disturbing the rest area) at region where the footing excavation needs to be done. Shifting of debris outside the campus. COST inclusive of all materials, consumables, scaffolding, labours, equipment hire charges, tools and tackles etc., complete.	Cum	10
2	**Earth work in Excavation** Earth work in excavation by manual/mechanical means in foundation including dressing of sides and ramming of bottoms, for the following lifts, including stacking the excavated soil anywhere within site area as directed. Rate shall be inclusive of shoring, strutting, removal of slurry, dewatering, all other incidental charges etc., Work shall be carried out as per the instructions of Engineer-in-charge.	Cum	55
3	**Dewatering foundation**		
a	Dewatering foundation/excavated floor area etc., using pumps from the excavated areas flooded due to cloudburst/excess rainfall/ground water table. This item shall be executed only after getting prior approval from IISc.	Day	6
b	Extra over rate of 20% is payable for dewatering and removal of the slush from the excavated foundation/excavated floor area etc. flooded due to cloudburst/excess rainfall for all above excavation items. This item shall be executed only after getting prior approval from IISc.	Cum	12
4	**Boulders/jelly and Sand filling along with consolidation in layer** Filling of Boulders & Sand below foundation and consolidating in layer, compaction etc., COST inclusive of all materials, consumables, scaffolding, labours, equipment hire charges, shifting the debris, tools and tackles etc., complete. (Based on site conditions)	Cum	24

5	**Plain cement concrete** Providing and laying in position volumetric plain cement concrete (1:4:8) for footings and grade slab etc., of specified ratio including the centring and shuttering with proper compaction, finishing, roughening to surfaces wherever required, curing etc. The rate shall include for providing recesses, preparation of ground surface for laying concrete, top surface of the concrete to be finished smooth wherever required, providing gradients, trimming, ramming, removal of slurry, cost of materials, labour, loading and unloading, transportation, scaffolding and all other incidental charges etc., with all leads and lifts, complete and as directed by the Engineer-in-charge at all levels.	Cum	6
6	**Steel fabrication (HYSD STEEL Fe-500)** Providing &Fabricating HYSD STEEL Fe-500 TMT reinforcement for RCC work including straightening, cutting, bending, hooking, placing in position lapping or welding wherever required tying with binding wire and anchoring to the adjoining members wherever necessary complete as per design (chairs and wastage shall not be measured and paid) and directions of the Engineer-in-charge. (This includes footing, pedestal and grade slab reinforcement) COST inclusive of all materials, consumables, shuttering, labours, equipment, scaffolding/staging, hire charges, tools and tackles etc., complete.	MT	1.5
7	**Foundation bolts** Providing and fixing in position of the foundation bolts of embedded length 600mm as per the drawings and technical specifications provided. COST inclusive of all materials, fabricating, threading, consumables, labours, equipment hire charges, tools and tackles etc., complete		
a	**20mm dia bolts of EN 8.8 grade**	No's	40
8	**Reinforced cement concrete - (M30 grade)** Providing and laying in position design mix concrete manufactured as per mix design of specified grade (Design mix to be approved by the Consultant) for reinforced cement concrete work including pumping to area of laying, cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, shuttering, improve workability without impairing strength and durability with proper compaction, curing, vibrating, consolidating, finishing, providing recesses, necessary grooves, chamfers, rounding of corners either structural or functional shall be left in concrete as required in detailed drawings.	Cum	24
9	**Earth Re-filling** Filling with good earth available at site premises (excluding rock) such as moorum or any other type of earth as approved by IISc for the areas of the foundation trenches, sides of foundations, excavated floor area etc. in layers not exceeding 200 mm in depth; including watering to have the optimum moisture content sufficient for the compaction and consolidating each deposited layer to achieve a proctor density of 95% complete as per the specifications, lead anywhere within site premises at all levels. Work shall be carried out as per the instructions of Engineer-in-charge.	Cum	17

10	**Structural steel quantity for Supporting existing floor beam** Strengthening of existing floor beam by providing intermidiate support using Structural steel member below the existing beams and anchoring them into the existing floor beam, along with welding them with fillet weld as per sketch and directions of engineer in-charge. This includes applying a coat of zinc-chromate primer, 2 coats of enamel paint, procuring, materials, cutting, welding, placing in position. COST inclusive of all materials, fabricating, fixing in position, scaffolding, transport, consumables, labours, equipment hire charges, tools and tackles etc., complete.		
a	**SHS 200X200X8 - Grade Fe-355**	MT	1.8
b	**RHS 82X145X4.8 - Grade Fe-355**	MT	0.15
c	**MS Plate (20mm Thick) for foundation - Grade Fe-250**	MT	0.2
d	**MS Plate (16mm Thick) - Grade Fe-250**	MT	0.3
e	**MS Plate (10mm Thick) - Grade Fe-250**	MT	0.15
f	**MS Stiffener Plate (8mm Thick) - Grade Fe-250**	MT	0.4
11	**Conbextra GP2 grouting below steel column baseplate** Grouting the gap between steel plates and RC pedestal with conbextra GP2. (Total quantity may vary depending upon the site conditions) COST inclusive of all materials, consumables, labours, equipment hire charges, tools and tackles etc., removing all unnecessary waste material below baseplate before grouting, complete	No's	5
12	**Surface Preparation (Chipping of Existing Plaster and Shifting of the same)** Removal of existing plaster in RC beams by gentle chipping until the hard concrete is exposed (without disturbing the original concrete) at region where steel members/plates to be fixed. COST inclusive of all materials, consumables, scaffolding, labours, equipment hire charges, tools and tackles etc., complete.	Sq.m	3
13	**Grip Expansion Bolts** Providing and fixing the Grip expansion bolts of embedded length around 75mm-150mm as per the drawings and technical specifications provided. COST inclusive of all materials, fabricating, consumables, labours, equipment hire charges, tools and tackles etc., complete		
a	**12mm dia bolts from Hilti or Equivalent**	No's	20
b	**20mm dia bolts from Hilti or Equivalent**	No's	36
14	**Low Viscocity Epoxy grouting** Grouting the gap between steel beam/plates and RC beam/slab with low viscosity epoxy. (Total quantity may vary depending upon the site conditions) COST inclusive of all materials, consumables, labours, equipment hire charges, tools and tackles etc., removing all unnecessary waste material from site before grouting, complete	Kg	5

15	**Painting :** All steel surfaces with one coat of chromeoxide primer and two coats of enamel of the desired shade of Asian Paints make after cleaning the surfaces throughly COST inclusive of all materials, consumables, labours, equipment hire charges, tools and tackles etc.,	Sq.m	40

LIST OF APRPOVED MAKES FOR CIVIL WORKS:
Steel : TATA/SAIL/JSW
Cement :Ultratech/ACC
Enamel Paint : Apcolite rust shield pu

The Contractor shall submit the Test Certificates of Steel, Foundation Bolts, Grip Expansion Bolts, and the Grade of Concrete used.

Important Notes

1. **Ref Dwg No : ECPL-D/IISC/ST-01, 04, 05 & 06 in Annexure H.C**
2. The quantities mentioned is only tentative, it may vary by 10 to 15%. However, the actual quantity will be known only after the execution of work.
3. Payment will be made for actual quantities and items that are utilized only.
4. Rates should be based on SR rates and prevailing market rates.
5. Rerouting of electrical cables, plumbing line, sanitary lines etc., shall be made to facilitate restoration works.
6. Electrical power supply and water will be provided at the workplace.
7. Work should be carried out as per the specifications in the report submitted.
8. Protection of the electrical panels near the site of works and other such sensitive equipment in the vicinity with adequate covering materials during the construction works will be in the scope of the bidder.
9. The work should be completed in 6 weeks.

3. Bidder's Eligibility Criteria

The bidder should have carried out similar works at minimum half the price quoted in this bid in at least two other sites in India during July 1, 2023 - June 30, 2025. Bidders should include necessary document for establishing this experience with necessary proof in terms POs and customer contact details

4. Acceptance Criteria

1. The bidder should complete all the items specified in the tender to the satisfaction of the customer.
2. Any delay in commissioning or conformance to the acceptance beyond the stipulated time will result in extending the warranty: Each day of delay would result in 3 additional days of warranty.
3. This penalty clause is only applicable for solutions which are considered as technically meeting the requirements, as evaluated by the technical committee. The clause cannot therefore be used as an argument to qualify any solution, which the technical committee considers as not meeting the requirements.

5. Safety Regulations

The contractor shall at his own expense, arrange for the safety provisions as per the codes of Indian Standard Institution, Indian Electricity Act / Rule and such other Rules, Regulations and Laws as may be applicable in respect of all labour, directly or indirectly employed in the work for performance of the Contractor's part of this agreement. While the Indian Electricity Rules 1956, as amended up to date, are to be followed in entirety, any installation or portion of the installation that does not comply with these Rules, should be rectified immediately.

The contractor shall be responsible for and indemnify the buyer against all injury to persons – both his own workmen and others and for all damage to structural and / or decorative part of the buyer's property during erection and commissioning of the equipment. The contractor shall repair / reinstate all such damage at his own cost.

No inflammable materials shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of the Indian Explosives Act. If such storage is unavoidable, it should be allowed only for short period and in addition, special precautions such as cutting off supply such places at normal times, storing materials away from wiring and switch boards, giving electric supply for a temporary period with due permission of engineer- in charge shall be taken.

Protective and safety equipment such as rubber gloves, earthing rods, line men's belt, portable respiration apparatus, necessary number of caution boards such as " Man on Line", "Don't switch on" etc. should be provided in easily identifiable locations. Where electric welding or such other nature of work is undertaken, goggles shall be provided.

Rubber or insulating mats should be available in front of the main switchboards or any other control equipment of medium voltage or above.

Standard first Aid boxes containing materials as prescribed by Indian red cross should be provided in easily identifiable locations and should be easily available.

Periodical examination of the first aid facilities and protective and safety equipment provided should be undertaken and proper records shall be maintained for their adequacy and effectiveness.

Charts (one in English and one in regional language) displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently displayed at appropriate places.

A chart containing the names, addresses and telephone numbers of nearest authorized medical practitioners, hospitals, fire brigade and also officers in charge shall be displayed prominently along with the first Aid box.

Steps to train supervisory staff and authorized persons of the engineering staff in the first Aid practices, including various methods of artificial respiration with the help of local authorities such as fire brigade, St. John's Ambulance Brigade, Indian Red Cross or other recognized institutions equipped to impart such training shall be taken, as prompt rendering of artificial respiration can save life at the time of electric shock.

Electrical wiring and control switches should be periodically inspected and any defective wiring switches which will expose live parts should be replaced immediately to make installation safe.

While carrying out work in Vessels / AC ducts or any other confined place, hand lamps with metallic guard suitable for 24 Volts AC supply shall be used All non-current carrying metallic parts of electrical system and equipment shall be earthed with two separate earthing wires of adequate capacity.

a. GENERAL RESPONSIBILITY

The contractor shall obtain a “Work Permit” from the Site Engineer / Client before starting any work at site. The work permits are issued to prevent any one working in unauthorized areas and they are valid for specific period.

The contractor shall produce test certificates from Government approved certifying authorities for all the lifting gear & hoists (slings, chains, hooks, chain pulley blocks, winches, cranes etc.) before starting the work. The contractor’s supervisor for subsequent spot checks shall retain the certificates.

The contractor is to remove all waste materials from and around the work site and leave the work spot spick and span.

Works like Gas cutting, welding etc.

Before carrying out any work like gas cutting, welding etc. the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

The contractor shall produce certificates for his welding sets checked by the site in charge before starting the work. The certificates shall have to be renewed every two months. A copy of the current certificate shall be displayed on the welding sets.

Only cables in good condition and insulated holders are to be used. The length of the supply cable shall not exceed 25 feet and the welding set body shall be properly earthed. Under no circumstance building structure pipeline should be used as a return path of the current.

A charged fire extinguisher of CO2 type is to be carried with each welding set.

The welder is to wear good quality insulated welding gloves, shoes & goggles while at work.

Tarpaulins are not be used in the vicinity of welding / gas cutting jobs.

b. EXCAVATION

In the event of an excavation being made, it is the responsibility of the contractor to see that any opening, sump or pit caused by them is securely fenced as required by the Factory Act.

c. WORKING AT HEIGHT

For carrying out work at heights exceeding 6 feet or over and near the opening in floors, roofs, etc the following precaution to be taken.

The written permission of the Departmental Manager is to be taken before carrying out any work. Adequate safety precautions like use of safety belts, crawling ladders etc are to be taken.

All personnel engaged on overhead work shall be men experienced in such work.

Whenever possible timber staging or platform shall be erected with planks of minimum thickness 2 inches and minimum width 12 inches when the nature of work demands staging of a greater width than plank provided then additional planks shall be added and lashed securely.

Staging shall be provided with simple safety rails or ropes throughout its length, at waist height and on each open side.

Staging supports shall be of standard steel scaffolding safely secured and supported on firm level footings or slung from overhead beams. The supports shall be situated at a maximum distance of 8 feet apart and staging shall be secured to each support.

In case the site or nature of work is unsuitable for erection of proper staging all workers shall wear safety belts around their waists and secure their lifelines to strong scaffolding or structural members.

Wherever it is not possible to put up staging and / or use safety belts, safety nets or sheets shall be slung beneath the place of work.

When working in open process vessels or tanks, safety belts or safety nets shall always be used whether or not staging and scaffolding is provided.

Safe access to all points of work should be provided in the form of suitable ladders, stairways etc.

Contractor's employee of at least status of a foreman shall examine all arrangements before starting such work is commenced and shall satisfy himself that all reasonable safety precautions have been taken.

d. FIRE INSTRUCTIONS

Before carrying out any gas cutting, welding etc, the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

Smoking is strictly prohibited in premises. Severe action will be taken if any of the contractor's workmen is found smoking at the work site area.

In case fire is discovered, dispatch additional force & site Engineer. Wherever possible switch off any electrical and gas apparatus near the fire.

Check the nature of fire, pick up appropriate fire extinguisher and try to put out fire. For Electrical fire use carbon dioxide fire extinguisher.

e. PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment should be worn wherever necessary.

f. REVIEW MEETINGS

Periodic safety review meeting shall be conducted to review safety and for better coordination with other agencies.

Periodically safety review will be held with Site Engineer and issues will be discussed and action points shall be monitored and recorded in a separate safety Register / File.

g. WORK AFTER NORMAL WORKING HOURS

Extra care need to be taken for jobs being carried out after normal working hours with due revalidated work permit.

h. ACCIDENTS

In case of injury or serious illness, the department should be informed immediately. All injuries are to be reported by filling in the "injury report" form, which will be available with the respective department / site engineer.

These safety conditions should not be regarded as exhaustive. These have been issued for the guidance of the contractor and will not in any way absolve the contractor from any obligations or liabilities that might incur or transfer such obligations on liabilities to the company.

6. BoQ Sheet

The BoQ sheet and the costs should be as per Table I in Section 2, with separate base prices per quantity, base prices for the total quantity, GST prices, total prices and the grand total price.

7. Organization of the Technical Bid

The bid should strictly be organized in the following sequence only.
Note: IISc reserves the right to disqualify any bid that does not provide all the required data and not following the organization given below.

1. **Annexures A-F** of this tender.
2. Proofs for bidder's eligibility criteria as given in Section 3.
3. Technical details of the offered solution aligning with the requirements given in Section 2 of this tender.
4. Commercial quote for the items mentioned in Table I of Section 2, base price per unit, base price for total quantity, total price for each item, GST price and grand total including GST for all items.
5. Terms and conditions of the offer.

8. General Terms and Conditions

1. Local tender purchase preference.
    a. The Bidder should belong to either Class-1 or Class-2 suppliers distinguished by their "local content" as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter. a) Class-1 supplier: Goods and services should have local content of equal to or more than 50%. b) Class-2 supplier: Goods and services should have local content of equal to or more than 20 % and less than 50%.
    b. Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
    c. The quotations should be on FOR-IISc Bangalore basis in INR only.
    d. Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as Class-1 local suppliers/Class-2 local suppliers by claiming the services such as transportation, insurance, installation, commissioning, training, and other sales service support like AMC/CMC, etc., as local value addition.
    e. Purchase preference as defined by the recent edits to GFR (within the "margin of purchase preference") will be given to the Class-1 supplier.
    f. MSMEs can seek an exemption to some qualification criteria. IISc follows GFR2017 for such details.
2. Offer must be submitted under ONE-BID system consisting of both Technical and Price (Financial) bids as hard copies in a single sealed envelope superscribed as "Bid Submission for Strengthening of Ground Floor Slab in Data Centre in SERC" within the stipulated period to the indicated mailing address. In addition, soft copy of the bid must be sent by email to tender.serc@iisc.ac.in within the stipulated time.
3. The vendors may communicate to the committee through the email ID provided in the first page, which will be the official email for the purpose of this tender.
4. Delayed and/or incomplete tenders are liable to be rejected.

5. The Bid should be duly signed by the authorized representative of the bidder.
6. The bidders are requested to go through the Terms and Conditions detailed in this document, before filling out the tender. Agreeing to the terms and conditions of the tender document (by signing all pages of the copy of a tender document) is a mandatory requirement.
7. A tender, not complying with any of the above conditions is liable to be rejected.
8. **Cancellation of Tender:** Notwithstanding anything specified in this tender document, the purchase committee, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the rights
    a. to accept OR reject any tender.
    b. to accept any tender in full or in part.
    c. to reject the tender, offer not confirming to the tender terms.
    d. to cancel the tender at any time without assigning any reason whatsoever.
9. **Delivery, Installation and Training:** The bidder shall provide the lead time to delivery of materials, and subsequent works at IISc, Bangalore from the date of receipt of purchase order. The materials should be delivered, and works should be carried out within 6 weeks from the date of receipt of purchase order.
10. **Disputes and Jurisdiction:** Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Bangalore, India.

9. Bid – Terms and Conditions

1. The technical bid should contain all the information and should have the organization as given in Section 7. Bids without the specific information and organization as in Section 7 will be automatically disqualified.
2. The technical evaluations will be made only based on the technical bids and the shortfall responses submitted by the bidder.
3. Price bids of only technically qualified vendors will be considered.
4. The commercial bid should contain among other things, unit prices for each of the items mentioned in Table I in Section 2 along with applicable GSTs, payment terms, etc. as per requirements of IISc mentioned in the tender document. All such conditions must be in line with the tender. In case of any deviation or conditional offer, the bid may be treated as non-responsive and not be considered for evaluation. The Commercial bid should contain details of the prices for each one of the subsystems of the total offer clearly giving the rate and the quantity. Bundling of the prices is not acceptable.
5. This is a local tender. Quote should come only from Indian organization. Prices should be quoted only in INR (Indian Rupees) and will be with GST only.
6. The component of tax, and any other statutory levies should be shown separately and not included in the total amount, to enable IISc to avail any exemption.
7. Proposals should contain the name and contact details, viz., phone, fax, and email of the designated person to whom all future communication will be addressed. The contact details should also be mentioned on the overall envelope.
8. Bid and price validity should be for six months from the date of opening of the technical bids.
9. IISc will place the purchase order only on the successful bidder, the L1 bidder with the least cost bid, as per the decision of IISc. In this regard, decision of IISc will be final and binding.

10. Payment Terms

1. 50% payment shall be released by IISc against delivery of the materials, 25% after erection of ISMBs and the remaining 25% after completion of the works and acceptance at IISc Bengaluru in good and functional condition and to the entire satisfaction of the Purchaser (IISc).
2. Payment will be subject to deduction of TDS as per rules / laws and any other deduction as per PO terms.
3. The entire work including supply and installation should be completed within six weeks after receiving a firm PO from IISc.
4. Liquidated Damage: As time is the essence for this procurement, hence the ordered materials are required to be delivered and installed in all respects within the stipulated period in the purchase order failing which penalty for late delivery and installation will be imposed at the rate 1% of the total order value per week or part thereof for the delayed period subject to maximum of 10% of the total order value and this liquidated damage will be deducted during the payment of the invoice / bill of the supplier. Earliest / expected delivery period should be clearly indicated in the technical bid.

11. Important Dates

1. Release of tender: September 1, 2025.
2. Site visit period: September 2 – September 10, 2025. Bidders can coordinate their site visits by emailing tender.serc@iisc.ac.in.
3. Last date for sending queries: September 11, 2025, 5 PM IST. Queries may be sent to tender.serc@iisc.ac.in.
4. Release of corrigendum to the tender based on the queries, if necessary: September 13, 2025, 5 PM IST.
5. Start date for submission of the bid: September 14, 2025, 10 AM IST.
6. Last date for submission of the bid: September 23, 2025, 5 PM IST.
    a. Hard copy submission: The bid in the form of an envelope containing the hard copies of both the technical and commercial bids, in two sealed envelopes, should be submitted and reach the below-mentioned mailing address by the same date, 6 PM IST. Note that the hard copy of the technical bid should exactly match with the soft copy submitted.
    b. Soft copy submission: **Soft copy of only the technical bid** must be sent by email to tender.serc@iisc.ac.in by the above-mentioned time. **No soft copy of commercial bid should be submitted**. Soft copy submission of commercial bid at any stage before the opening of the hard copy commercial bid will lead to disqualification of the bid.

Mailing address:

Chair
Supercomputer Education and Research Centre (SERC)
Indian Institute of Science (IISc)
Bangalore – 560012
India

12. Annexures

12.1 Annexure A – Covering Letter

Date:

To:
The Chair
Supercomputer Education and Research Centre
Indian Institute of Science
Bangalore – 560012, India

Subject: Undertaking as per GFR – 2017, Rule 170(iii)

Dear Sir,

We, the undersigned, offer to carry out the project including Products/items, components etc. as per tender at IISc, Bangalore, in response to your Tender No **IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1**. We are hereby submitting our proposal for the same, which includes Technical bid and the Financial Bid.

1. We hereby declare that all the information and statements made in this Technical bid are true and we accept that any misinterpretation contained in it, may lead to our disqualification.
2. We agree to abide by all the terms and conditions of the RFP document, including corrigenda. We would hold the terms of our bid valid for 180 days as stipulated in the RFP document.
3. We confirm that the deliveries, installation will be done within 6 weeks from the issue of the PO, if the order is placed.
4. We undertake, if our proposal is accepted, to initiate the Implementation activities towards supply of material and services, as stipulated in the referred RFP.
5. The undersigned is authorized to sign this undertaking.

Yours sincerely,

Authorized Signatory:

Name and Title of Signatory:
e-mail:
Mobile No:

12.2 Annexure B - Undertaking

Date:

To:
The Chairperson
Supercomputer Education and Research Centre
Indian Institute of Science
Bangalore – 560012, India

Subject: Undertaking as per GFR – 2017, Rule 170(iii)

Dear Sir,

As a part of the eligibility requirement stipulated in the said tender document, we hereby submit a declaration as given below for your Tender No **IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1.**

1. We will not withdraw or amend or modify or impair or derogate the our bid partly or fully or any condition of it after tender opening, during the period of tender validity (six months from the date of opening of the technical bid),
2. In case, we are declared as successful bidder and an order is placed on us, we will submit the acceptance in writing within 7 days of placement of order on us.
3. In case of failure on our part to deliver/provide the item/installation/service as per the order's terms and conditions within the stipulated period, we are aware that we shall be declared as ineligible for the said tender and /or debarred from any future bidding process of IISc or any Government entity for a period of minimum one year.

Yours sincerely,

Authorized Signatory:

Name and Title of Signatory:
e-mail:
Mobile No:

12.3 Annexures C – Details of the Bidder

The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Details of the Bidder

Sl. No	Items	Details
1.	Name of the Bidder	
2.	Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership Deed)	
3.	Registration No/ Trade License, (attach attested copy)	
4.	Registered Office Address	
5.	Address for communication	
6.	Contact person- Name and Designation	
7.	Telephone No	
8.	Email ID	
9.	Website	
10.	PAN No. (attach copy)	
11.	GST No. (attach copy)	

Signature of the Bidder

Name

Designation, Seal Date:

12.4 Annexure D – Declaration regarding Experience

To,
The Chairperson,
Attn: Prof. Sathish Vadhiyar
Supercomputer Education and Research Centre
Indian Institute of Science
Bangalore – 560012, India

Ref: **IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1**
Dated: September 1, 2025

Strengthening of Ground Floor Slab for Withstanding Supercomputer Rack Load in Data Centre in SERC

Sir,

I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company / firm has ------ years of experience in supplying and installing the items mentioned in the tender.

(Signature of the Bidder)
Printed Name
Designation, Seal Date:

12.5 Annexure E – Declaration Regarding Track Record

To,
The Chairperson,
Attn: Prof. Sathish Vadhiyar
Supercomputer Education and Research Centre
Indian Institute of Science
Bangalore – 560012, India

Ref: Tender No: **IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1**
Dated: September 1, 2025

Strengthening of Ground Floor Slab for Withstanding Supercomputer Rack Load in Data Centre in SERC

Sir,

I've carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company/ firm is not currently debarred / blacklisted by any Government / Semi Government organizations / institutions in India or abroad. I further certify that I'm competent officer in my company / firm to make this declaration.

Or

I declare the following

Sl.No	Country in which the company is Debarred /blacklisted / case is Pending	Blacklisted / debarred by Government / Semi Government/Organizations /Institutions	Reason	Since when and for how long

(NOTE: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

Yours faithfully
(Signature of the Bidder)

Name
Designation, Seal
Date:

12.6 Annexure F - Declaration for acceptance of terms and conditions

To,
The Chairperson,
Attn: Prof. Sathish Vadhiyar
Supercomputer Education and Research Centre
Indian Institute of Science
Bangalore – 560012, India

Ref: Tender No: **IISc/Purchase/SERC/2025/Strengthening_SupercomputerRackLoad/1**
Dated: September 1, 2025

Strengthening of Ground Floor Slab for Withstanding Supercomputer Rack Load in Data Centre in SERC

Sir,

I've carefully gone through the Terms & Conditions as mentioned in the above referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I'm an authorized signatory of my company and am, therefore, competent to make this declaration.

Yours faithfully,

(Signature of the Bidder)
Name
Designation, Seal Date:

12.7 Annexure G -Details of items quoted:

a. Company Name
b. Product Name
c. Part / Catalogue number
d. Product description / main features
e. Detailed technical specifications
f. Remarks

Instructions to bidders:

1. Bidder should provide technical specifications of the quoted product/s in detail.
2. Bidder should attach product brochures along with technical bid.
3. Bidders should clearly indicate compliance or non-compliance of the technical specifications provided in the tender document.

12.8 Annexure H – Report by Structural Consultant and the Associated Drawings

Refer following pages.

Report No: ECPL-D/02-2025/033

Report on

VERIFICATION OF STRUCTURAL ADEQUACY OF THE EXSITING IDENTIFIED RC MEMBERS AT REQUIRED LOCATIONS FOR SERC DEPARTMENT BUILDING AT INDIAN INSTITUTE OF SCIENCE CAMPUS, MALLESHWARAM, BENGALURU

FEBRUARY 2025

Report for

Prof. Sathish Vadhiyar
Chairman, SERC Department
Indian Institute of Science
CV Raman Road, Banglore-560 012

Report By:

ENSTRUCTURA CONSULTANTS (PVT) LTD.
2054, 2nd Main, BCCHS Layout,
Raghuvanahalli, off. Kanakapura Road,
Bengaluru - 560 062
Ph. No:- +91 9663329229
E-mail:- design@enstructura.com

Report on	**:**	Verification of structural adequacy of the exsiting identified RC members at required locations for SERC department building at Indian Institute of Science Campus, Malleshwaram, Bengaluru
Report for	**:**	**Prof. Sathish Vadhiyar** Chairman, SERC Department Indian Institute of Science CV Raman Road, Banglore-560 012
Email reference	**:**	Oral reference from Prof. Sathish vadeyar and subsequent E-mails.
ECPL Job No.	**:**	ECPL-D/02-2025/033
Date of Assessment study	**:**	18th February 2025
Assessment study carried out under the guidance of	**:**	Sri. S. Ravi Technical Director **ENSTRUCTURA CONSULTANTS (PVT) LTD.,** Bengaluru
Assessment study carried out by	**:**	Sri. Deepak Gowda Senior Design Engineer Sri. Chandrakanth NDT Engineer Sri. Raghava K NDT Engineer Sri. Mahesh Patil Technical Assistant Sri. Siddaraju Testing Assistant **ENSTRUCTURA CONSULTANTS (PVT) LTD.,** Bengaluru
Assessment carried out in the presence of	**:**	Mr. Akhil Engineer-SERC Department
Date of submission of report	**:**	06/03/2025
Date of submission of revised report	**:**	01/08/2025

A. INTRODUCTION

The existing **"Supercomputer Education and Research Centre"** (SERC) Block located at Indian Institute of Science campus, Malleshwaram, Bengaluru is a conventional RC framed structure comprising of Basement, Ground plus four upper floors only. It is planned to install a data-centre racks of 2.2 T/sq.m weight on existing ground floor slab. It is reported that the building was constructed in the year 1993 and since then it is in service.

Of late, concerned authorities wanted to conduct structural adequacy of existing RC members at ground floor to carry proposed loads.

Hence, a reference was made to **ENSTRUCTURA CONSULTANTS (PVT) LTD.,** Bengaluru, by the concern authorities to carry out structural verification study for the same and to provide suitable strengthening measures, if required.

In response to this, detailed structural verification study was carried out by us on 18th of February 2025. This report, in brief, depicts the outcome of the tests and design checks carried out.

B. METHODOLOGY ADOPTED

The structural system at ground floor consists of conventional beams and slabs supported on RC columns. The main beams are spanning for 13.2m c/c and the same beams are split into two spans by providing intermediate columns at ground floor level. It is proposed to place data-centre racks on existing false flooring resting on the existing slab and beams which will be in-turn supported using steel columns in basement floor.

The proposed structural steel beams and columns are designed for the proposed design loads using structural analysis software E-Tabs. The reactions are applied on the 3 dimensional model of the existing structure was generated using structural analysis software E-Tabs which includes all the loads due to proposed data-centre racks. Based on the outcome of theoretical analysis and design check, appropriate strengthening measures are recommended.

C. PHYSICAL OBSERVATIONS

Following are the observations made consequent to detailed inspection of the existing building: (Physical observation photographs are attached in **Annexure H.A).**

1. The building is a typical RCC framed structure consisting of basement, ground and 4 upper floors (6 structural slabs).

2. The ground floor where it is proposed to install data-centre racks consists of RC Slabs & beams supported on RC columns.
3. No structural distress features are observed in any of the structural members where modifications are proposed.
4. De-bonding of plaster were observed on RC columns at a few locations, especially at the fourth floor level.
5. Cracks on masonry wall was observed at a few locations, mainly near column-wall junctions.

D. EVALUATION TESTS

A few non-destructive tests were carried out on basement where modifications are proposed, to assess quality/strength of in-situ concrete.

1. Rebound Hammer test to assess the surface hardness/ strength of in-situ concrete in RC slab.
2. Ultrasonic Pulse Velocity Test to assess the quality of concrete in RC columns and beams.
3. Cover meter studies to assess the thickness of cover concrete provided to the rebar and location of peripheral rebar's in RC members.

1. Non-Destructive tests to assess the quality/strength of in-situ concrete in RC slabs.

1. Rebound Hammer Test on RC Ceiling slab:

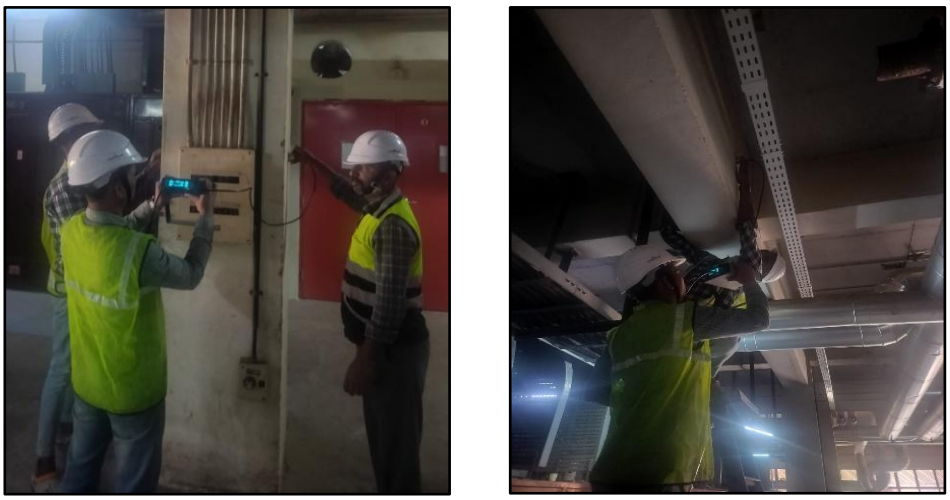
Rebound Hammer test was carried out on RC slabs at identified locations in order to assess the surface hardness / estimated strength of in-situ concrete. The test was conducted using **Schmidt Rebound Hammer** from **M/s. Proceq, Switzerland** as per the guidelines in Indian Standard IS: 516-(Part-5/Section 4)-2020. Position of hammer during testing was vertically upwards. The results of the test are tabulated in ***Table-1*** and corresponding estimated strength chart is appended in ***Table-1*** *in* **Annexure H.B.**

Rebound Hammer test on RC ceiling slab in progress

From the test results it is found that the compressive strength of ins-situ concrete in ground RC slabs is in the range **19.0 to 21.0 N/sq.mm.**

2. Ultrasonic Pulse Velocity Test on RC Columns and beams:

Ultrasonic Pulse Velocity Test was conducted on identified RC Columns & beams to assess the quality of in-situ concrete using **"PUNDIT LAB"** (Portable Ultrasonic Non-destructive Digital Indicating Tester) equipment manufactured by **M/s. Proceq, Switzerland** as per the guidelines in Indian Standards IS: 516-(Part-5/Section 1)-2018. Direct method of testing was adopted at site. The results are tabulated in ***Table-2*** and corresponding quality grading chart is appended in ***Table-2A*** *in* **Annexure H.B.**



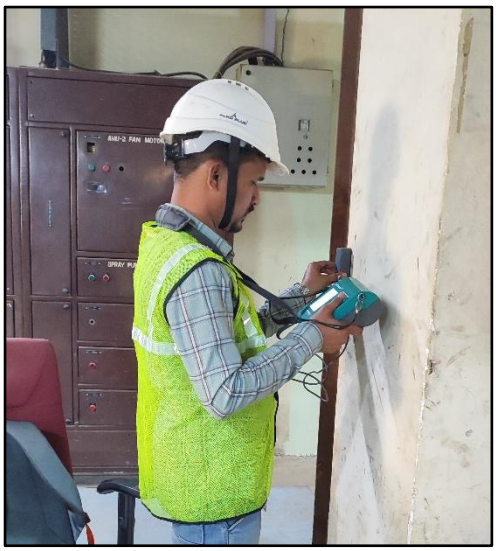
Ultrasonic Pulse Velocity test on RC column and beam in progress

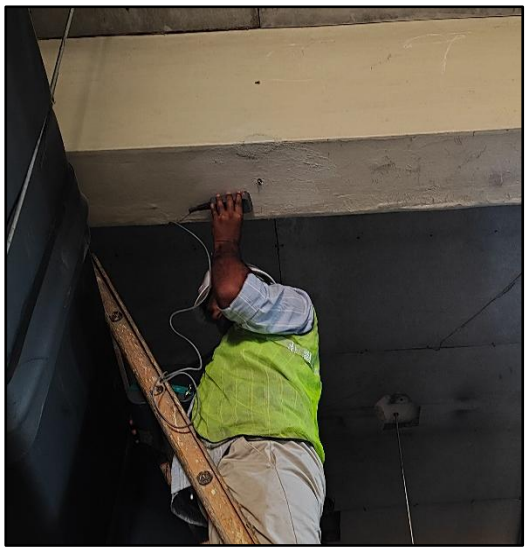
From the test results, it is inferred that the quality of concrete in the tested RC columns and beams falls under the category of **"Doubtful and Good concrete"** as per the Table-

1 of IS: 516-(Part-5/section 1)-2018 (Amendment No.1, Nov-2019) considering concrete grade ≤ M25 at unaffected regions. However, as per earlier code IS: 13311-(Part-1):1992-(RA-2013) the quality of concrete falls under the category of **"Medium to Good concrete".**

3. **Cover meter studies to assess the thickness of cover concrete to the reinforcement in RC columns and beams.**

Cover meter test was carried out on identified RC columns and beams at random in order to assess the thickness of cover concrete and to locate peripheral rebar's. The test was conducted using **Profometer-5**$^{+}$ from **M/s. Proceq, Switzerland.** The results of the test are tabulated in ***Table-2*** Refer **Annexure H.B.**





Cover meter studies on RC columns in progress

From the results of Cover meter test, it is found that the cover concrete provided to the rebar in tested RC columns and beams is in order.

E. THEORETICAL ANALYSIS AND DESIGN VERIFICATION

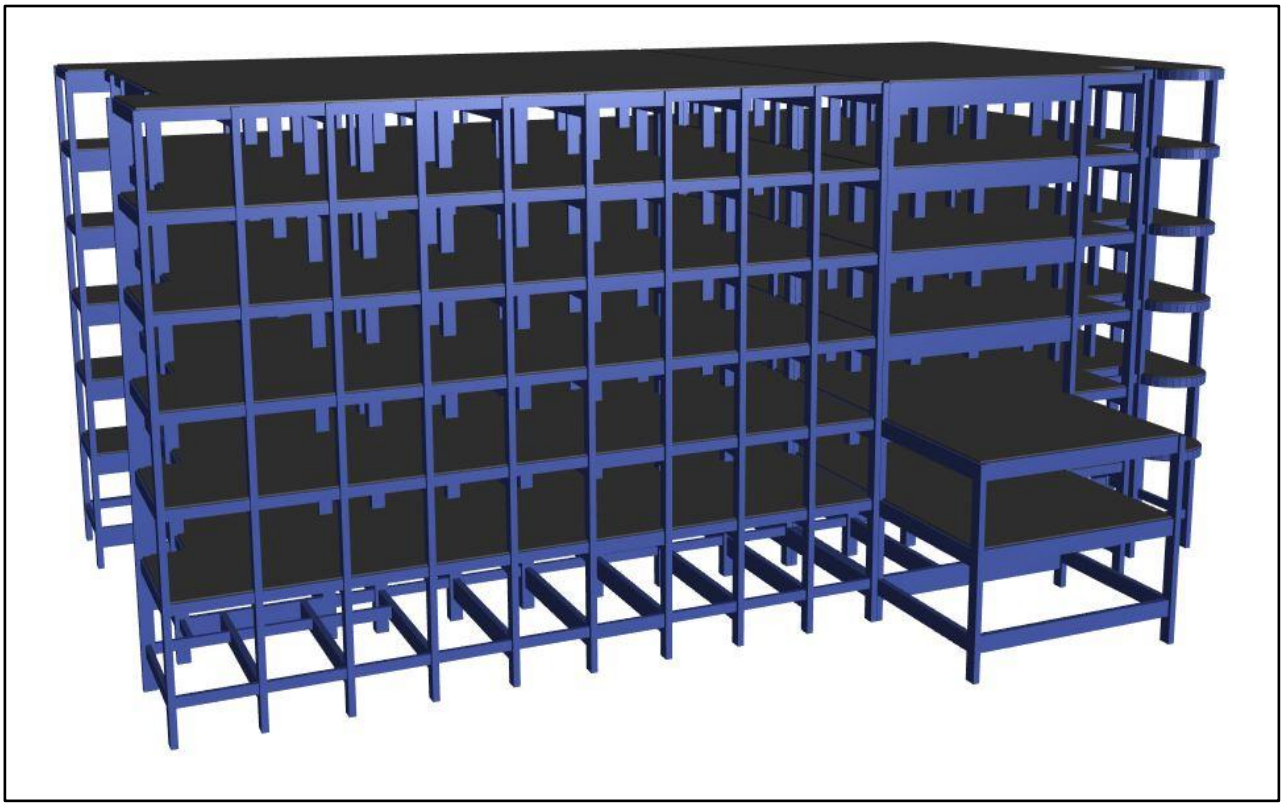
1. Structural system of the building

The Existing building comprises of Basement, Ground plus four upper floors. Staircase head room, lift machine room, DG platforms, overhead water tank etc., are provided above terrace floor level. Theoretical analysis and design check of the existing building (Along with Computer labs) is carried out considering the following design parameters.

The Grade of concrete and steel considered for analysis:

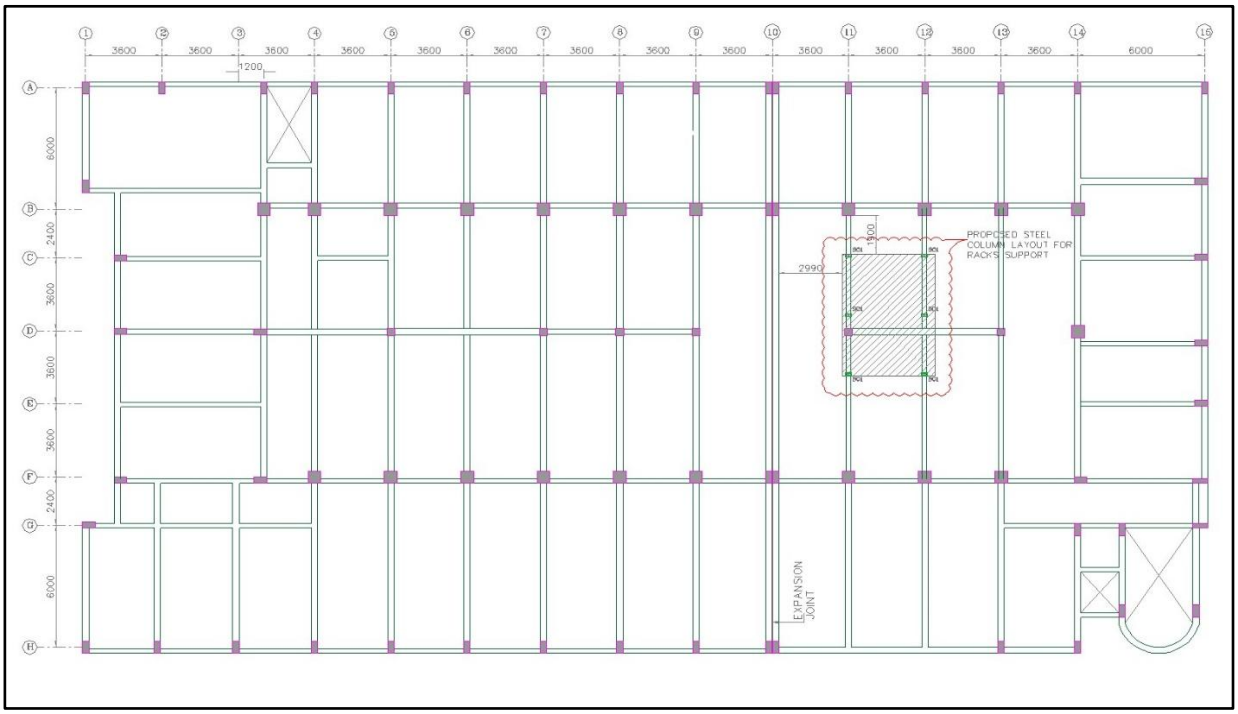
The grade of concrete considered is M20 for Columns, floor beams and slabs as per existing drawings available with client and results of Non-destructive test reports. The grade of reinforcing steel considered is Fe 415 for all RC members.

Note: The dimensions and reinforcement details of RC members are considered with reference to the furnished structural drawings. The same is generally verified at site by physical observations, on site measurements and conducting Non-destructive tests on the RC members where racks are to be installed. The position and loading details of the proposed racks are considered as per the details furnished by the user department. Sketch showing position of racks are enclosed in Annexure.



3-D view of the analytical model of the building generated using ETABS software.

Plan of the analytical model of the building generated using ETABS software. Beam and Column layout at Ground floor level



Plan of the structural members at Ground floor level showing proposed locations of Data center racks

2. DESIGN STANDARDS FOR THE THEORETICAL VERIFICATION

Design check was carried out for all the design loads based on the following **"**Indian Standard specifications or codes of practice.

IS 875 – 1987- Code of practice for design loads	Part 1 – Unit weight of Building Materials Part 2 – Live loads
IS: 456 – 2000 – Code of Practice for Plain and reinforced concrete.	
IS: 800 – 2007 – Code of Practice for General construction in steel	
SP 16 – 1980 –Design aid for Reinforced concrete to IS : 456-1978	

3. LOADS

The design loads are considered for institutional building purpose as per present occupancy. The loads and load combinations are mentioned below.

a) Dead load

1. Self-weight of existing RC members as per existing drawings and on site measurements.

Self-weight of the slab (150mm thick) 0.15 x 25	:	3.75 kN/m^2

b) Super Imposed dead loads

Floor Finishes	:	2.00 kN/m^2

c) Wall loads

For Floor Height 3.75m		
230mm thick brick wall		
Considering 450mm depth beam = [0.23*(3.70 - 0.45) * 22]	:	16.40 kN/m
115mm thick brick wall	:	
Considering 450mm depth beam = [0.115*(3.70 - 0.45) * 22]	:	8.20 kN/m

d) Live load

1. By considering the building for institutional occupancy;

Stair case and corridors	:	4.0 kN/m^2
Office cabins	:	3.0 kN/m^2
Data-Centre floor area	:	3.0 kN/m^2
For Racks (As per clients requirements)	:	2.2 Ton per Sq.m

4. LOAD COMBINATIONS

The critical load combinations considered for the design check of the Structural Members,

1. DL+LL
2. 1.5(DL+LL)

Where:

DL= Dead load & Super imposed dead load

LL = Live loads

5. RESULTS OF THE THEORETICAL ANALYSIS AND DESIGN CHECK

Analysis and design check of the existing building is carried out considering all the design loads, with factor of safety of 1.5 for gravity loads only. The outcome of theoretical verification is outlined below:

Case-1: Verification of adequacy of Existing RC members at Ground floor level for Proposed Data-centre racks.

RC Beams

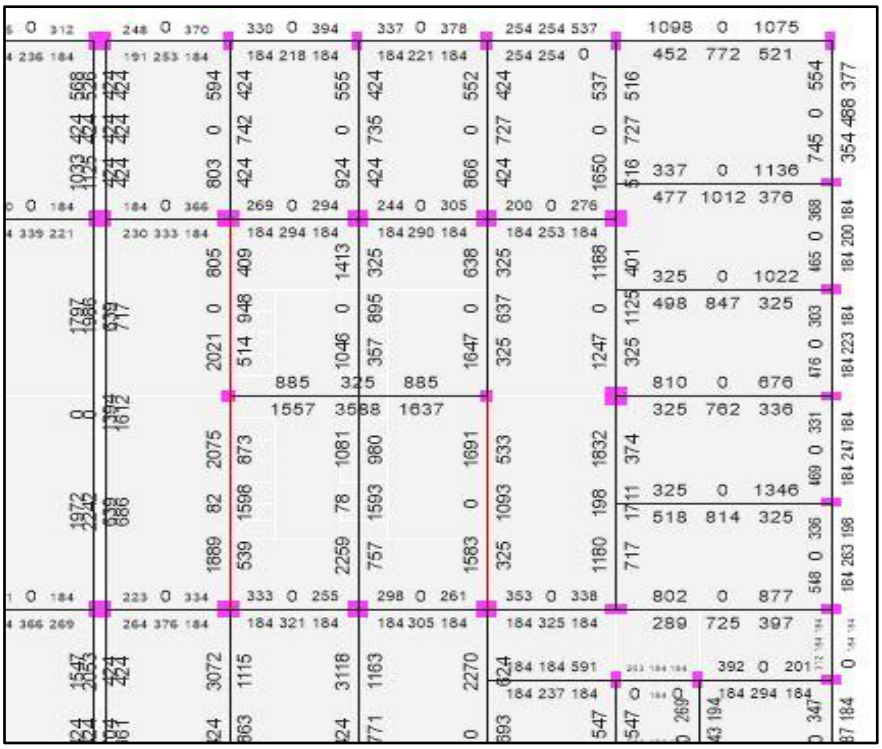
The size and reinforcement provided for ground floor beams supporting proposed rack loads are inadequate to carry proposed rack loads.

RC Slabs

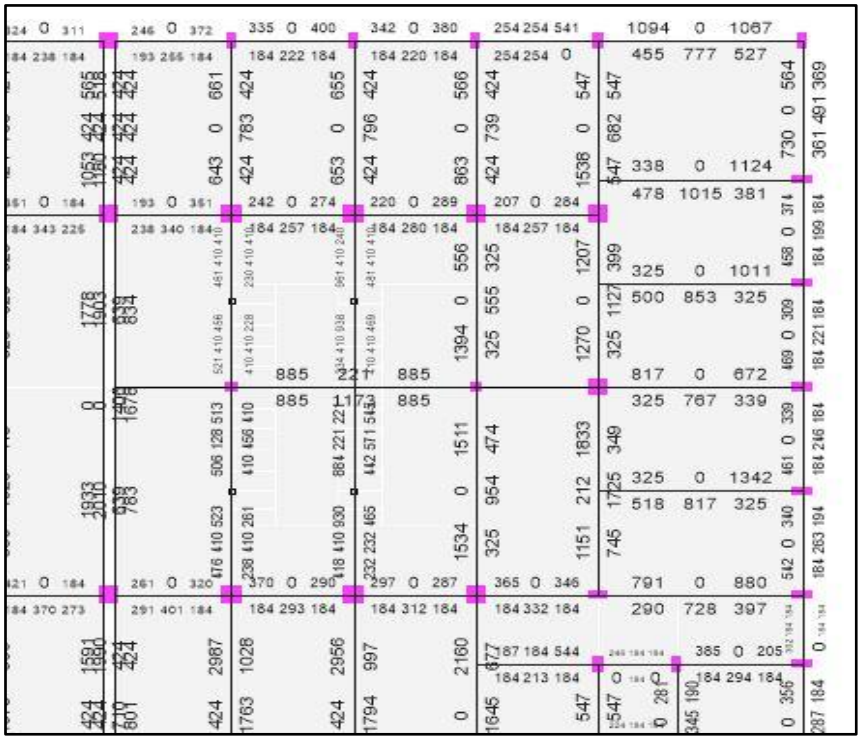
The reinforcement provided in slabs is found to be structurally inadequate for the areas where Racks are proposed.

Case-2: Verification of Existing RC members at Ground floor level for Proposed Data-centre racks by introducing additional supports to the existing RC members

After providing adequate supports and transferring the loads directly to the ground from the existing false flooring supports to ground floor slab and beams, the size and reinforcement provided for ground floor beams and columns supporting proposed rack loads are found to be adequate to carry the proposed rack loads. In case of floor slab, the punching shear at each point of load transferring area is found to be within permissible limits.



Required Beam reinforcement for the proposed data center loadings at ground floor level



Required Beam reinforcement for the proposed data center loadings after strengthening at ground floor level

F. INFERENCES

1) From the results of Rebound Hammer test, it is inferred that the estimated strength of in-situ concrete in the tested first floor slabs is in the range of **19.0 to 21.0 N/sq.mm.**
2) From the Ultrasonic Pulse Velocity test results, it is inferred that, the quality of concrete in the tested RC Columns and beams falls under the category of **"Doubtful and Good concrete"** as per the Table-1 of IS: 516-(Part-5/section 1)-2018 considering concrete grade ≤ M25. However, as per earlier code IS: 13311-(Part-1):1992-(RA-2013) the quality of concrete falls under the category of **"Medium to Good concrete"** at unaffected regions.
3) From the results of Cover meter test, it is inferred that the cover concrete provided to the identified RC members is in order.
4) The observed cracks in in-filled masonry walls below terrace floor are mainly due to temperature effect or due to shrinkage and these cracks are non-structural in nature.
5) From the detailed theoretical analysis and design check, it is inferred that the size and reinforcement provided for beams & columns is found to be inadequate for the additional loads due to the proposed data-centre racks. In case of slabs, the punching shear at each point of load transferring area (load transferred at false flooring supports) is found to be within permissible limits. However, in order to place the proposed racks, it is essential to carryout appropriate strengthening measures for the existing ground floor beams & columns, where racks are to be installed. (Details for the same is attached)
6) Based on the results of theoretical verifications carried out on the existing structure considering the proposed additional structural members, it is inferred that the existing slab, beams & columns will be structurally safe to carry the proposed additional loads.

G. STRENGTHENING MEASURES

Based on the inferences drawn, the following remedial measures are recommended for the deficient RC columns and beams:

1. Strengthening for placing data-centre racks over Ground floor beams level.

a. Existing RC members where it is proposed to install Data-centre Racks, shall be strengthened by supporting the existing floor beams by providing intermediate steel columns from the basement level.

b. The proposed steel columns shall be supported over RC pedestals and which will be in-turn supported on isolated and combined footings resting on the specified level below the basement floor level as per the structural drawings furnished.

H. CONCLUDING REMARKS

The existing "Supercomputer Education and Research Centre" (SERC) Block located at Indian Institute of Science campus, Malleshwaram, Bengaluru is a conventional RC framed structure comprising of Basement, Ground plus four upper floors only. It is planned to install a data-centre racks of 2.2 T/sq.m weight on existing ground floor slab. It is reported that the building was constructed in the year 1993 and since then it is in service.

Of late, the concerned authorities wanted to conduct structural adequacy of existing RC members at ground floor level to carry the proposed loads.

From the detailed theoretical analysis and design check, it is concluded that the size and reinforcement provided for ground floor beams & columns is found to be inadequate for the additional loads due to the proposed data-centre racks.

Hence in order to place the proposed racks, existing ground floor RC members where it is proposed to install Data-centre Racks, needs to be strengthened by providing intermediate steel columns to support floor beams. The proposed steel columns shall be supported over the pedestals and which will be in-turn supported on the isolated and combined footings resting at the specified depth/hard strata below the basement floor level.

On carrying out the proposed strengthening measures by an experienced restoration agency under the critical supervision of restoration consultants, the existing beams and columns will be rendered safe to carry the proposed additional loads.

for **ENSTRUCTURA CONSULTANTS**

S Ravi
Technical Director

****

ANNEXURE – H.A

Details of Physical Observations (Photographs)

General view of the Building

Basement floor

General view of Basement floor

ANNEXURE -H.B

Evaluation Test results

TABLE - 1

RESULTS OF REBOUND HAMMER TEST

Project	:	Indian Institute of Science at CV Raman Rd, Malleshwarram, Bengaluru- 560012
Members tested	:	RC ceiling slab (Basement ceiling slab)
Date of test	:	18th February, 2025
Grade of concrete	:	Not furnished *
Age of concrete	:	More than 28 days*
Test instrument	:	Schmidt Hammer
Make	:	M/s. Proceq, Switzerland
Position of hammer	:	Vertically upwards.
Technical reference	:	1. IS: 516 : (Part 5 : Sec 4) : 2020 2. Instrument manual furnished by M/s. Proceq, Switzerland

Sl. No.	Member Identification**	Grid Identification**	Avg. rebound number +	Remarks
BASEMENT				**Refer Table – 1A for estimated strength range of in-situ concrete**
1.	**RC Ceiling Slabs**	D-E/11-12	33	
2.		E-F/11-12	31	

* As furnished by the customer.

** Refer sketch **ECPL-D/IISc/ST-01** for Floor / Member / Grid Identification.

\+ After applying correction factor for position of hammer.

Note: 1. The results relate only to the members tested.

2. Report shall not be reproduced except in full, without the written approval of the lab.

3. Any corrections invalidate this report.

****

TABLE - 1A

REFERENCE STRENGTH CHART FOR

REBOUND HAMMER TEST

Equipment	**:**	Schmidt Hammer
Make	**:**	M/s. Proceq, Switzerland
Type	**:**	N-34
Technical reference	**:**	IS: 516-(Part5/Sec 4)-2020

REBOUND NUMBER	ESTIMATED STRENGTH RANGE (N/Sq.mm)
22 to 26	10 to 14
26 to 30	14 to 18
30 to 34	18 to 22
34 to 38	22 to 26
38 to 42	26 to 30
42 to 46	30 to 34

Note: Estimated strength is worked out based on the Calibration Chart developed for the above test instrument.

****

TABLE - 2

RESULTS OF ULTRASONIC PULSE VELOCITY TEST

Project	:	Indian Institute of Science at CV Raman Rd, Malleshwarram, Bengaluru- 560012
Members tested	:	RC Columns &Beams (Basement)
Date of test	:	18th February, 2025
Grade of concrete	:	Not furnished *
Age of concrete	:	More than 28 days*
Test instrument	:	PUNDIT Lab (Portable Ultrasonic Non-destructive Digital Indicating Tester)
Make	:	M/s. Proceq, Switzerland
Test method	:	Direct and semi-direct method.
Technical reference	:	1. Indian Standard IS: 516-(Part5/Sec 1)-2018 Amendment -1, Nov-2019 Non-Destructive Testing of Concrete, Methods of Tests, Ultrasonic Pulse velocity 2. Instrument manual furnished by M/s. Proceq, Switzerland

Sl. No.	Member Identification**	Grid Identification**	Average Pulse velocity (km/sec)	Remarks
1	2	3	4	5
BASEMENT				
1.	**RC Columns**	B/11	3.9	**Refer Table – 2A for quality grading of in-situ concrete**
2.		B/12	4.1	
3.		D/10	3.8	
4		D/13	4.0	
5		D/14	3.8	
6		F/14	3.8	
7		F/11	3.8	
8		F/6	4.0	
9		F/7	3.7	
10		F/9	3.7	
11	**RC Beams**	D/11-12	3.7	
12		C-E/11	3.6	

13		C-E/13	3.8	

* As furnished by the customer.
** Refer sketch **ECPL-D/IISc/ST-01** for Floor / Member / Grid Identification.

Note: 1. The results relate only to the members tested.
2. Report shall not be reproduced except in full, without the written approval of the lab.
3. Any corrections invalidate this report.

****

TABLE – 2A (As per IS: 516-(Part 5/Sec 1): 2018)
REFERENCE QUALITY GRADING CHART FOR
ULTRASONIC PULSE VELOCITY TEST

Instrument	**:**	PUNDIT Lab [Portable Ultrasonic Non-Destructive Digital Indicating Tester]
Make	**:**	M/s. Proceq, Switzerland

Pulse Velocity (Km/sec)	**Concrete Quality Grading**
For Concrete (≤ M25)	
Below 3.5	Doubtful
3.5 to 4.5	Good
Above 4.5	Excellent
For Concrete (> M25)	
Below 3.75	Doubtful
3.75 – 4.50	Good
Above 4.50	Excellent

Note: Concrete quality grading for different velocity criterion as reproduced From Table-1 of IS: 516-(Part 5/Sec 1): 2018.

TABLE – 2A (As per IS: 13311-(Part-1):1992-(Reaffirmed 2013))

Pulse Velocity (Km/sec)	**Concrete Quality Grading**
Below 3.0	Doubtful
3.1 to 3.5	Medium
3.6 to 4.5	Good
Above 4.5	Excellent

Note: Concrete quality grading for different velocity criterion as reproduced From Table-2 of IS: 13311-(Part I)-1992-(Reaffirmed 2013)

TABLE – 3

RESULTS OF COVERMETER TEST

Project : Indian Institute of Science at CV Raman Rd, Malleshwarram, Bengaluru- 560012
Members tested : RC Columns and Beams (Basement)
Date of test : 18th February, 2025
Test instrument : Profometer 5^{+}
Make : M/s. Proceq, Switzerland
Technical references : BS: 1881-(Part 204)-1988 & Test Instrument Manual "Metal & Reinforcement Detector" from M/s. Proceq, Switzerland.

Sl. No.	Floor / Member Identification*	Grid Identification*	Range of cover concrete** (mm)
1	2	3	4
BASEMENT			
1	**RC Columns**	B/12	40-45
2		D/10	38-42
3		F/14	40-45
4		F/11	46-49
5		F/6	42-46
6		F/7	45-50
7		F/9	44-49
8	**RC Beams**	D/11-12	29-35
9		C-E/11	30-35

* Refer drawing **ECPL-D/IISc/ST-01** for Floor / Member / Grid Identification.
**Inclusive of plaster

Note:

1. The results relate only to the members tested.
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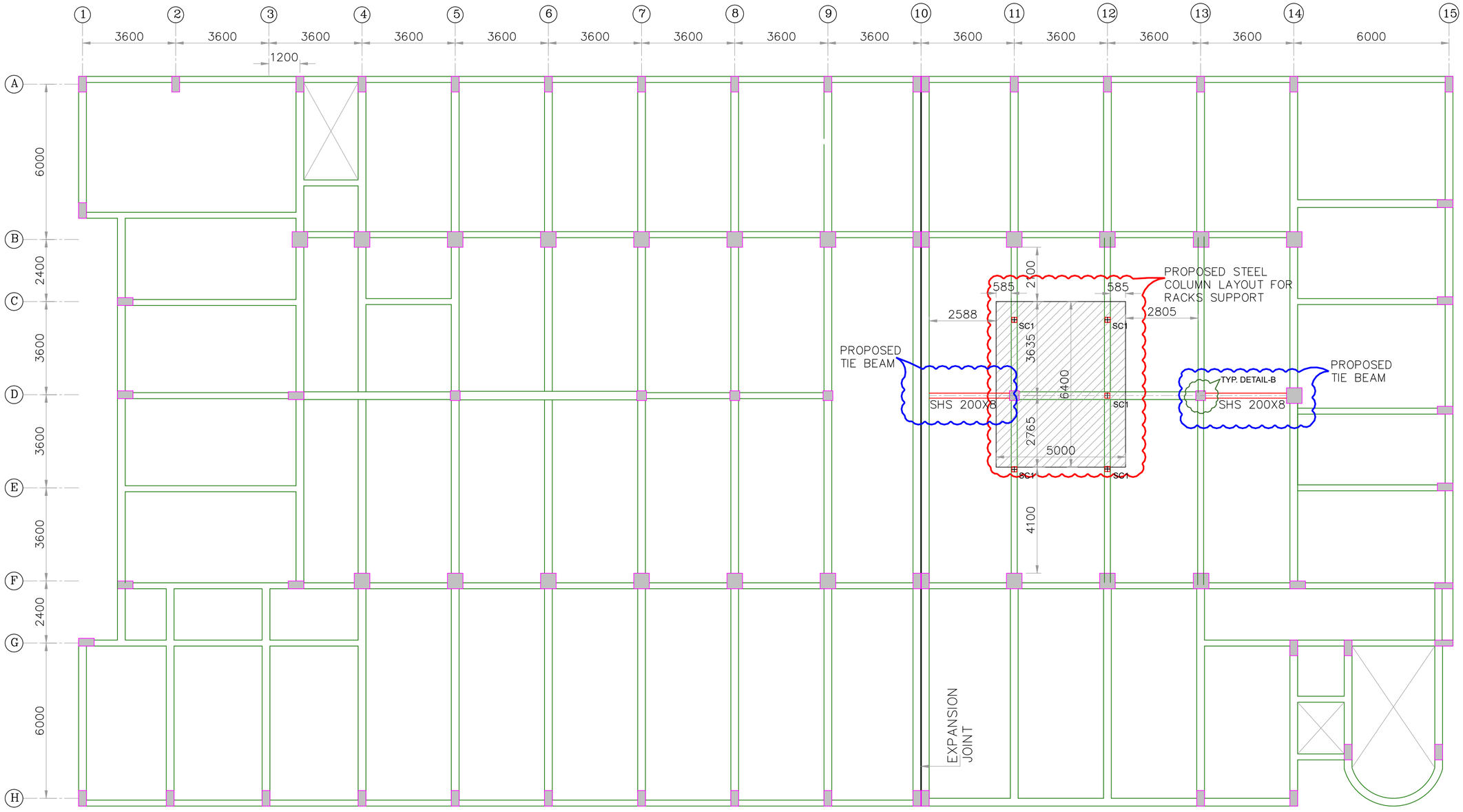
ANNEXURE – H.C

Drawings



EXISTING GROUND FLOOR COLUMN AND BEAM LAYOUT WITH PROPOSED LOCATION OF DATA-CENTRE RACKS

TITLE

EXISTING GROUND FLOOR
COLUMN AND BEAM LAYOUT ALONG WITH
PROPOSED LOCATION OF DATA CENTRE RACKS

CLIENT

INDIAN INSTITUTE OF
SCIENCE AT
MALLESHWARAM BENGALURU

PROJECT

PROPOSED MODIFICATION AT
GROUND & TERRACE FLOOR
LEVEL OF SERC BUILDING IN IISC
CAMPUS AT MALLESHWARAM

STRUCTURAL CONSULTANTS

ENSTRUCTURA CONSULTANTS (PVT) LTD.,
#2054, 2nd Main, SMLV PLAZA,
BCCHS LAYOUT, RAGHUVANAHALLI,
OFF KANAKAPURA MAIN ROAD,
BENGALURU 560 062
Ph.No: 09663329229
E-mail : design@enstructura.com

SCALE NTS	DRAWN	GT	APPD.	S.RAVI
	DESIGNED	DG	SHEET NO.	01 OF 01
DATE 01.04.25	CHECKED	DG	REV. NO.	R0

STATUS

☐ PERUSAL ☐ PRELIMINARY
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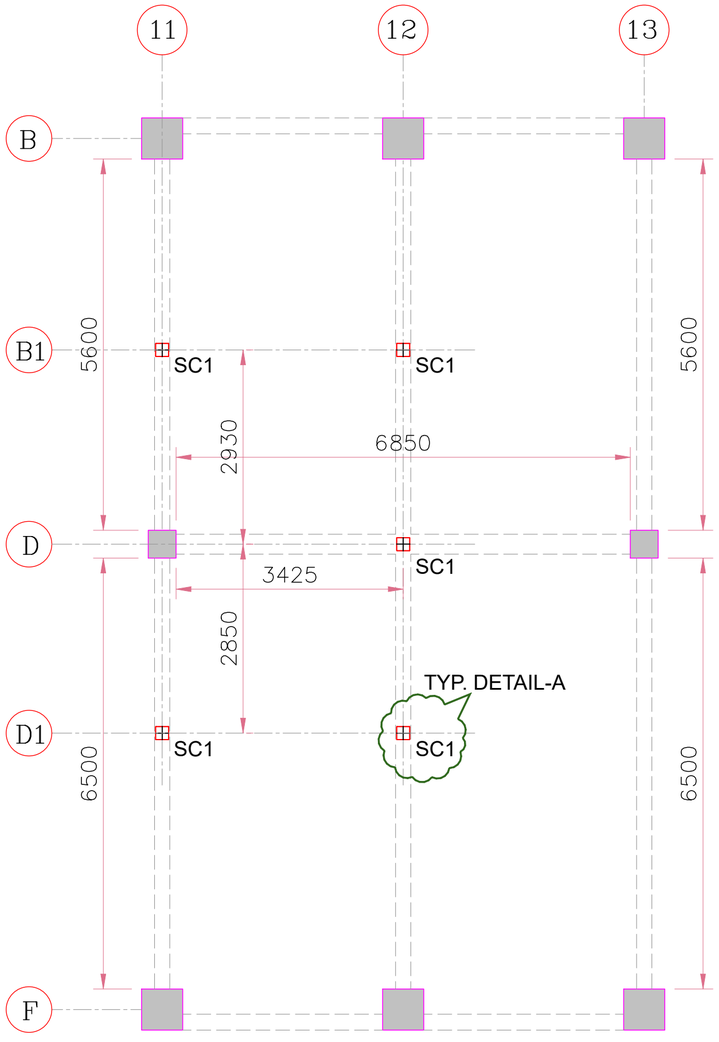
■ FOR EXECUTION

JOB NO. ECPL-D/02-2025/033

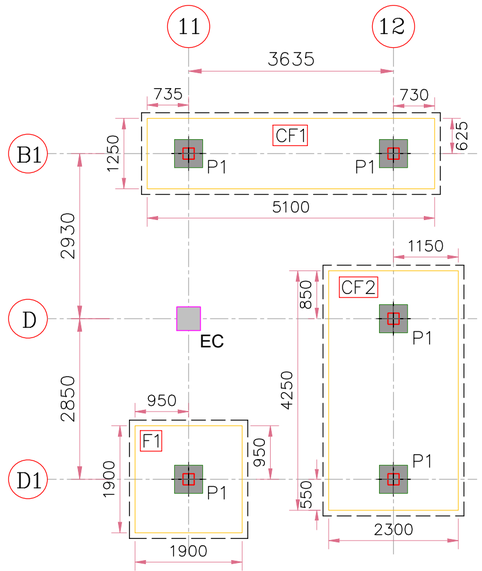
DRAWING No. ECPL-D/IISC/ST-01

NOTE:

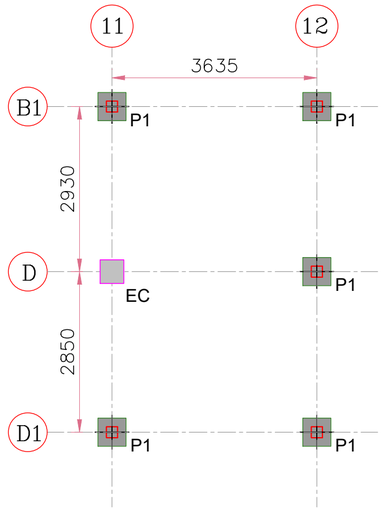
1.ALL DIMENSIONS ARE IN MM
2.FOLLOW FIGURED DIMENSIONS ONLY
3.ANY DISCREPANCY IN DRAWING SHALL BE BROUGHT TO THE NOTICE OF STRUCTURAL CONSULTANTS BEFORE PROCEEDING WITH WORK.



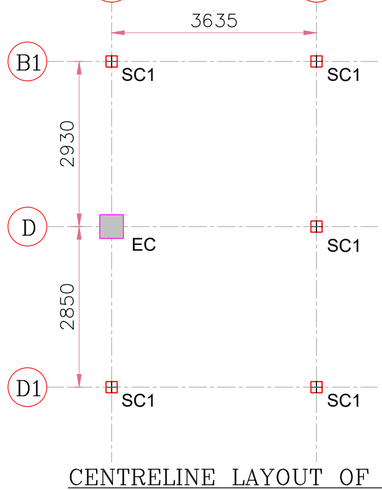
PLAN: PROPOSED STRUCTURAL STEEL COLUMN LAYOUT BELOW GROUND FLOOR BEAMS FOR PROPOSED DATA-CENTRE RACKS



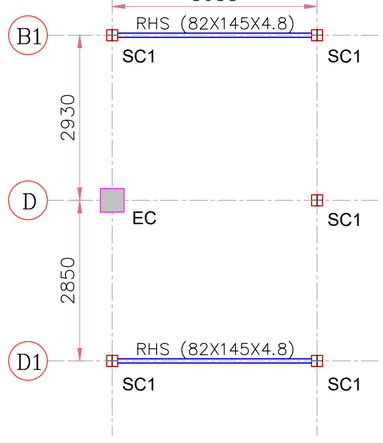
FOOTING LAYOUT FOR PROPOSED STRUCTURAL STEEL COLUMNS



PEDESTAL LAYOUT FOR PROPOSED STRUCTURAL STEEL COLUMNS
EC-EXISTING COLUMN



CENTRELINE LAYOUT OF PR
STRUCTURAL STEEL COLU
SC1=SHS(200X200X8`



PROPOSED TIE BEAM CONNECTION AT BASEMENT ROOF LEVEL

REV.	DESCRIPTION	DATE
R2	GRADE SLAB DETAILS	01-08-25
R1	STRUCTURAL SYSTEM REVISED AS PER CLIENTS REQUIREMENTS AND SITE CONDITIONS	17-04-25

TITLE
PROPOSED CENTERLINE LAYOUT OF COLUMNS, FOOTING, PEDESTALS AND STEEL COLUMNS

CLIENT
INDIAN INSTITUTE OF SCIENCE AT MALLESHWARAM BENGALURU

PROJECT
PROPOSED MODIFICATION AT GROUND & TERRACE FLOOR LEVEL OF SERC BUILDING IN IISC CAMPUS AT MALLESHWARAM

STRUCTURAL CONSULTANTS
ENSTRUCTURA CONSULTANTS (PVT) LTD.,
#2054, 2nd Main, SMLV PLAZA,
BCCHS LAYOUT, RAGHUVANAHALLI,
OFF KANAKAPURA MAIN ROAD,
BENGALURU 560 062
Ph.No: 09663329229
E-mail : design@enstructura.com

SCALE NTS	DRAWN	DG	APPD.	S.RAVI	
DATE 01.04.25	DESIGNED	DG	SHEET NO.	01 OF 01	
	CHECKED	DG	REV. NO.	R0	

STATUS
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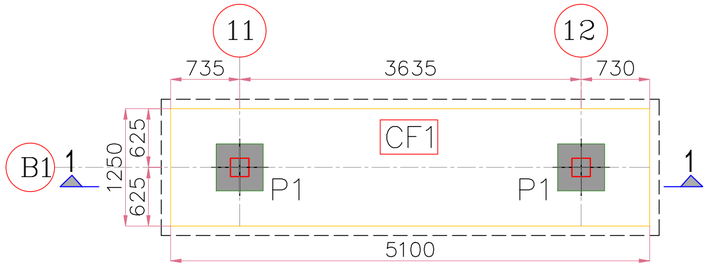
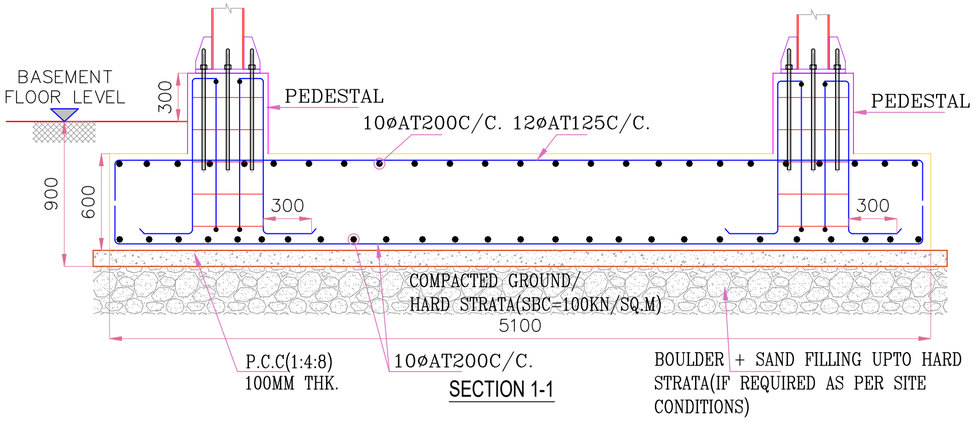
JOB NO. ECPL-D/02-2025/033
DRAWING No. ECPL-D/IISC/ST-04

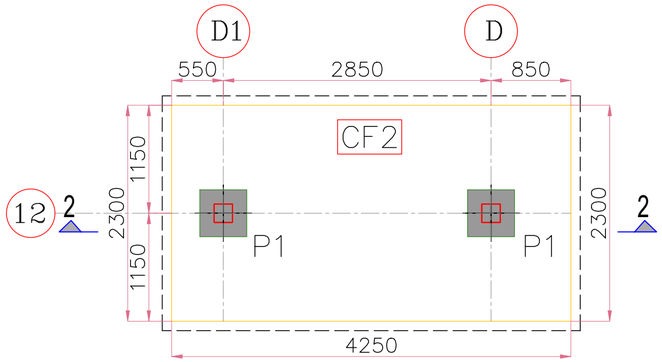
NOTE:
1.ALL DIMENSIONS ARE IN MM
2.FOLLOW FIGURED DIMENSIONS ONLY
3.GRADE OF CONCRETE: M30
4. GRADE OF REINFORCED STEEL - Fe-500
5. GRADE OF STRUCTURAL STEEL - Fe-355
6.COVER FOR MAIN R/F: PEDESTAL-40MM,FOOTING-50MM
7. ANY DISCREPANCY IN DRAWING SHALL BE BROUGHT TO THE NOTICE OF STRUCTURAL CONSULTANTS BEFORE PROCEEDING WITH WORK.



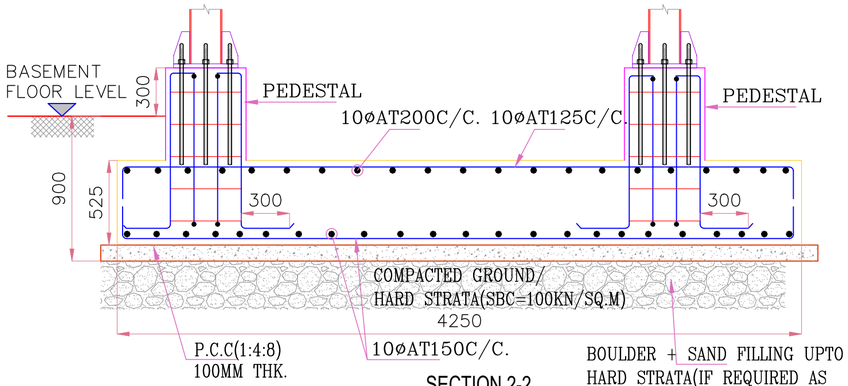
PLAN:COMBINED FOOTING CF1
D=600



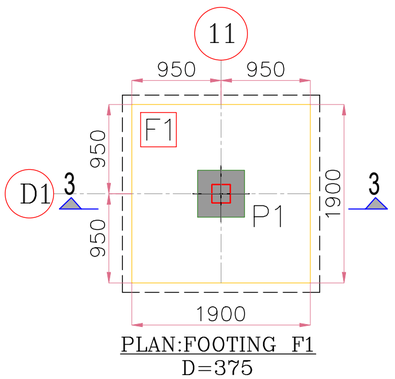
SECTION 1-1



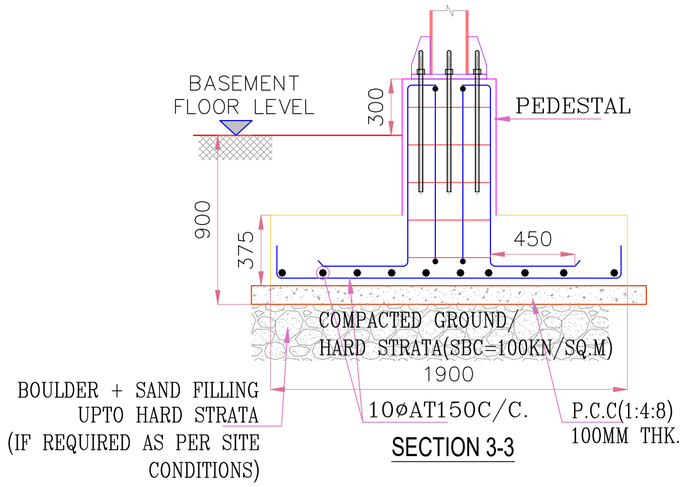
PLAN:COMBINED FOOTING CF2
D=525



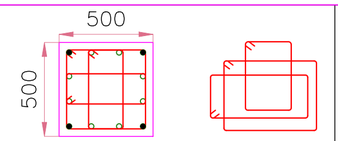
SECTION 2-2



PLAN:FOOTING F1
D=375



SECTION 3-3

SCHEDULE OF PEDESTAL		
PEDESTAL	PEDESTAL REINFORCEMENT DETAILS	
P1 500X500		● 4nos.–16ø ○ 8nos.–12ø TIES:8ø AT200C/C

REV.	DESCRIPTION	DATE
R2	GRADE SLAB DETAILS	01–08–25
R1	STRUCTURAL SYSTEM REVISED AS PER CLIENTS REQUIREMENTS AND SITE CONDITIONS	17–04–25

TITLE

PROPOSED FOOTING AND COLUMN REINFORCEMENT DETAILS

CLIENT

INDIAN INSTITUTE OF SCIENCE AT MALLESHWARAM BENGALURU

PROJECT

PROPOSED MODIFICATION AT GROUND & TERRACE FLOOR LEVEL OF SERC BUILDING IN IISC CAMPUS AT MALLESHWARAM

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BENGALURU 560 062
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SCALE NTS	DRAWN	GP	APPD.	S.RAVI
DATE 01.04.25	DESIGNED	DG	SHEET NO.	01 OF 01
	CHECKED	DG	REV. NO.	R0

STATUS

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JOB NO. ECPL–D/02–2025/033

DRAWING No. ECPL–D/IISC/ST–05

NOTE:

1.ALL DIMENSIONS ARE IN MM
2.FOLLOW FIGURED DIMENSIONS ONLY
3.GRADE OF CONCRETE: M30
4. GRADE OF REINFORCED STEEL - Fe-500
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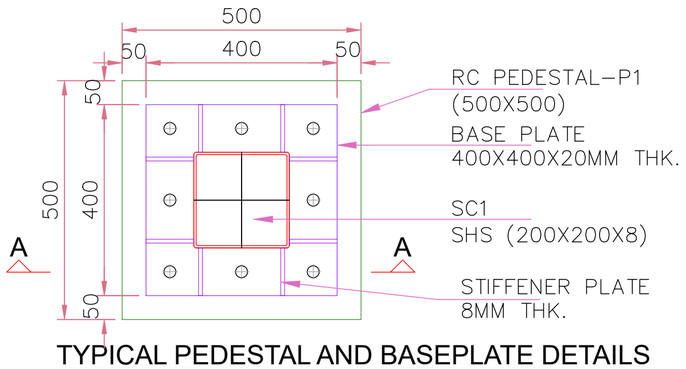
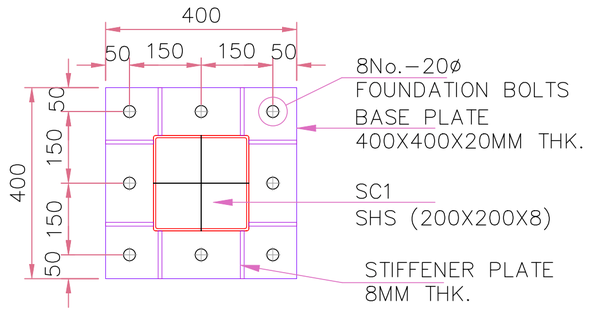
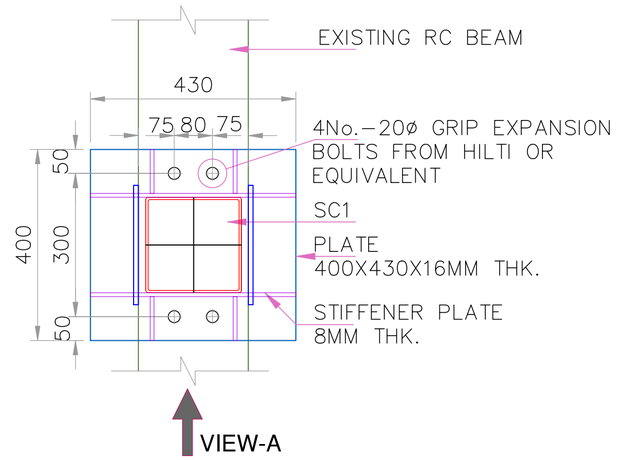


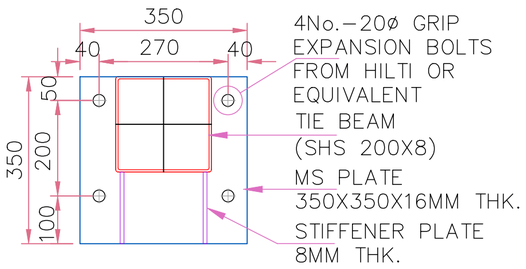
TYPICAL PEDESTAL AND BASEPLATE DETAILS

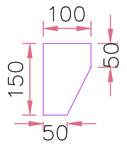


TYPICAL BASEPLATE DETAILS

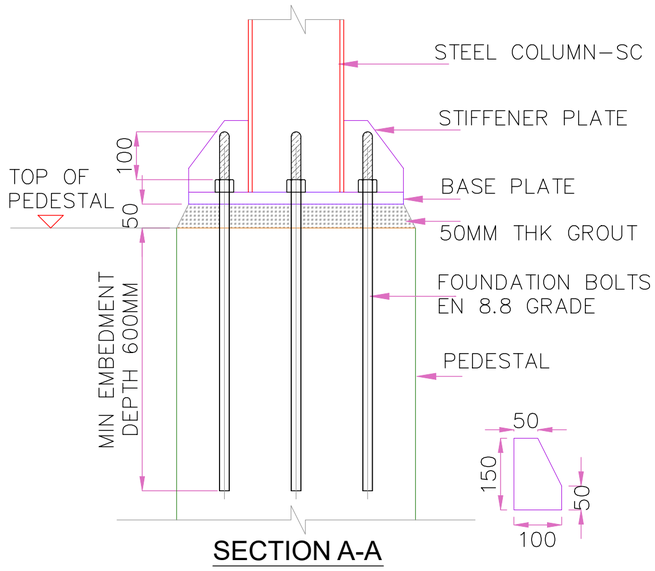


TYP. DETAILS - A
PROPOSED STEEL COLUMN AND EXISTING RC BEAM CONNECTION DETAILS

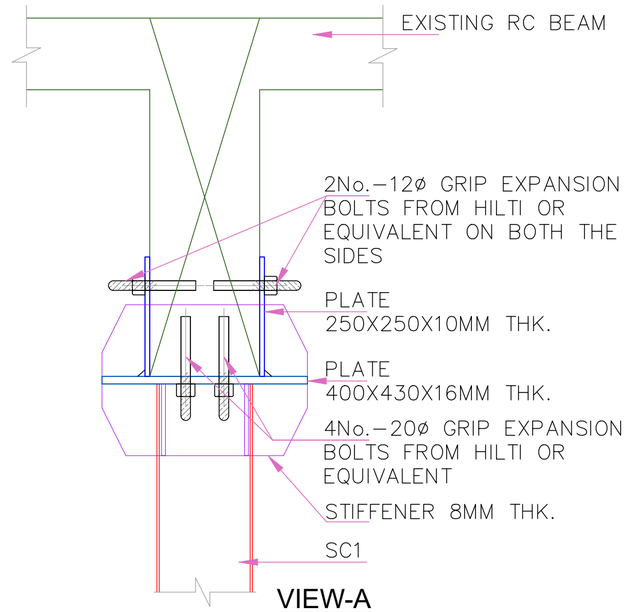




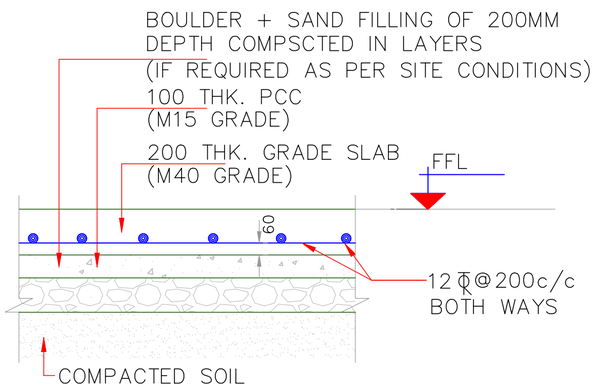
TYP. DETAILS - B
PROPOSED STEEL TIE BEAM (SHS 200X8) AND EXISTING RC BEAM/COLUMN CONNECTION DETAILS



SECTION A-A



VIEW-A



TYPICAL GRADE SLAB DETAILS AT BASEMENT FLOOR LVL

NOTE:

1. FOR REDOING OF EXISTING GRADE SLAB AT BASEMENT FLOOR LEVEL, DETAILS SHALL BE FOLLOWED SAME AS THE EXISTING, THAT IS PROVIDED AT SITE.
2. IF THERE IS ABSENCE OF REINFORCEMENT AT SITE, TYPICAL GRADE SLAB DETAILS SHALL BE FOLLOWED FOR THE SAME.

REV.	DESCRIPTION	DATE
R2	GRADE SLAB DETAILS	01–08–25
R1	STRUCTURAL SYSTEM REVISED AS PER CLIENTS REQUIREMENTS AND SITE CONDITIONS	17–04–25

TITLE

TYPICAL GRADE SLAB & CONNECTION DETAILS

CLIENT

INDIAN INSTITUTE OF SCIENCE AT MALLESHWARAM BENGALURU

PROJECT

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NOTE:

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