Date: 13.09.2024

To,
All Prospective Bidders,

CORRIGENDUM No. -I

Subject: Tender for "Construction of Government Medical College & Hospital for 100 Students Capacity & 430 Bedded Hospital at Buldhana, Maharashtra and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis".

Tender No: HSCC/DMER-MHA/BULDHANA/EPC/2024/51; dated 31.07.2024

This has reference to above tender; the following corrigendum may be noted:

1. The following additional documents are being issued & uploaded through corrigendum no.-I for the subject tender work.

(i). Design Basis Report (DBR) – Structure Works
(ii). Tender Drawings – Structure & Fire Fighting
(iii). Topographical Survey & Soil Investigation Report

The above corrigendum/ documents shall be treated as integral part of the tender document and to be submitted duly signed & stamp along with tender/bid.

All other terms & conditions remain unchanged.

Prospective bidders are advised to regularly visit through HSCC e-tender portal **https://hscc.enivida.com** & HSCC website http://www.hsccltd.co.in as corrigendum/amendments etc. if any, will be notified on this portal only and no separate advertisement will be made for this.

General Manager (Engg.)
HSCC (India) Ltd.

Design Basis Report (DBR) – Structure

CONTENTS

1.0 INTRODUCTION

This chapter provides brief design basis report related to Civil and Structural work for the "**CONSTRUCTION OF 100 ADMISSION NEW MEDICAL COLLEGE AT BULDHANA, MAHARASTRA**".

2.0 BUILDINGS PROFILE AND CONFIGURATION

All buildings profile and configuration shall be conforming to the approved architectural drawings.

3.0 BUILDING WORK

3.1 Mud mat concrete

All blinding and leveling concrete shall be of minimum 100 mm thickness of concrete mix M10 (min) over 100mm thick course sand, unless otherwise specified.

3.2 Plinth

The grade slab at ground floor of all buildings except basement area shall comprise of the following layers:

- 200mm compacted stone/ trap metal soling including filling voids with crushed sand/grit, ramming, watering etc.
- 100mm thick M-10 PCC
- 150mm thick M-25 RCC reinforced with single layer 10mm dia 200mm C/C reinforcement bars in each direction.
- Floor finish as per specifications.

3.3 Brickwork

All brickwork shall be ACC block/ Flyash brick, unless otherwise specified.

4.0 PROJECT SPECIFIC

4.1 Geographic / topographic parameters:

Sr. No.	Description	Parameters
1	Location of site	Buldhana, Maharashtra
2	Seismic zone	III
3	Wind Speed	39 m/s
4	Environmental Exposure Condition as per Table 3 of IS 456:2000	Structure upto Plinth Level – Severe Structure above Plinth Level –Moderate
5	Water Table	As per geotechnical report
6	NGL/FGL/FRL	As per architectural drawings and master plan

4.2 Structural System:

Structural system of the buildings shall be combinations of RCC Shear walls and/or Columns with conventional Beam Slab System. Appropriate foundation system will be considered based on soil investigation report and its recommendation.

The sizes of the RCC structural elements shall be considered as per the design requirements subjected to the minimum thickness as follows:

- Column – 300mm
- Roof slabs, Floor slabs, Walkways, Balconies, Canopies, Waste slab etc. – 150mm
- Retaining wall – 200mm
- Precast roof slab, walls of cable/pipe trenches, Sun shade etc. – 100mm
- Footing – 350 mm
- Precast trench covers – 75mm

5.0 DESIGN PHILOSOPHY

5.1 All RCC structures shall be designed according to IS: 456-2000 and other relevant BIS codes using STAAD, ETAB, SAFE etc. as appropriately.

5.2 Serviceability limits considered are as follows:

Crack width 0.3 mm for beams and slabs

0.2 mm for Footing, Retaining wall and water tanks

0.1 mm for STP structures

Drift Ratio: 0.004 (displacement / height)

5.3 The Vertical deflection under imposed load should be limited as follow:

- L/250 considering all imposed loading including temperature and creep/shrinkage
- L/350 considering all imposed loading including temperature and creep/shrinkage after construction of the finishes of 20mm whichever is less.

5.4 Steel structure shall be designed as per IS: 800-2007 or latest.

5.5 Fire resistance rating for structural and non-structural elements shall be considered as Type 2 constructions as per Table 1 of NBC 2016 Vol. – 1.

6.0 LOADING ON STRUCTURE:

6.1 Dead Loads:

The self-weight of the various elements is computed based on the unit weight of materials as given below as per IS: 875 (part 1):

Materials	Unit Weight (KN/m^3)
Reinforced Cement Concrete	25.00
Plain Cement Concrete	24.00
Steel	78.50
Soil	As per the soil report (Min. 18.00)
Water	9.81
Cement Plaster	20.40

This load case comprises of self-weight of all the frames and shell elements modeled into the Structure

6.1.1 Dead Imposed Loads:

Items	UDL (KN/m^2)
Floor finishes Approx. 50 mm	1.20
Sunken portion	Depends upon the depth of filling (with lightweight density of 10 KN/m3)
Screed for water proofing in Terrace	Actual

6.1.2 Wall Loads:

It comprises of load from walls (including partitions in floors). Loads are calculated and applied at appropriate locations uniformly distributed load.

6.2 Live Loads

The live loads assessed based on the occupancy classification as per IS: 875(Part-2).

Type of Structure	Occupancy classification	UDL (KN/m^2)
Institutional, Educational	Bed rooms, wards, dressing rooms, dormitories and lounges	2.00
	Kitchens, laundries and laboratories	3.00
	Dining rooms, cafeterias and restaurants	3.00
	Toilets and bathrooms	2.00
	X-ray rooms, operating rooms, general storage areas -to be calculated but not less than	3.00
	Office rooms and OPD rooms	2.50
	Corridors, passages, lobbies and staircases including fire escapes – as per the floor serviced but not less than	4.00
	Boiler rooms and plant rooms – to be calculated but not less than	3.00

	Balconies	Same as the rooms to which they give access but with a minimum of 4.0
	Library (without separate storage)	4.00
	Library (with separate storage)	3.00
	Library (Stack Area)	6.0 KN/m2 for a minimum height of 2.2 m + 2.0 KN/ m2 per meter height beyond 2.2 m
	Assembly areas with fixed seats, Lecture Halls	4.00
	Multipurpose Hall (with fixed seats)	4.00
	Multipurpose Hall (without fixed seats)	5.00
	Live load on accessible terrace	1.50
	Live load on inaccessible terrace	0.75
	Service areas, Heavy Medical Equipment's / Machines	Actual

6.3 Wind Loads

The wind pressure shall be calculated based on the data furnished below and other provision laid in IS: 875 (Part 3).

Description	Parameter
Wind Parameters	Buldhana, Maharashtra
Basic wind speed	39 m/s
Risk coefficient	As per table -1 of IS:875 (Part 3)
Terrain category	2
Topography factor	1

Return period of 100 years for Hospital and other important buildings and 50 years for General buildings to be considered to estimate the risk coefficient. However, this requirement is not

applicable to replaceable materials.

6.4 Earthquake Load

The loading due to earthquake is assessed based on the provision of IS: 1893, Dynamic analysis for earthquake force in all three directions is to be carried out by response spectrum method.

Description	Parameter
Seismic Parameters	Buldhana, Maharashtra
Seismic zone	III
Zone factor	0.16
Soil type	As per geotechnical report
Lateral Load resisting System	SMRF
Response reduction Factor (R)	5
Importance Factor	As per IS 1893

*Fundamental time period

$Ta=0.075h^{0.75}$ (for RC MRF Buildings without Masonry infills)

Ta = 0.09h / sqrt(d) (for all other buildings)

Where h = height of building, d= base dimension of the building at plinth level along the considered direction of the earthquake shaking.

Importance factor – **1.5 for Hospital, Service block, Substation
1.2 for Residential/Commercial Building for occupancy more than 200 persons

6.5 Temperature Load

Temperature load due to diurnal variation for summer and winter shall be considered for designing the structures as per relevant code of practice.

6.6 Special Loads

Imposed load of 10 KN/Sqm is considered in LMR base slab or as per manufacture, whichever is more.

6.7 Load Combinations

The various loads shall be combined accordance with the stipulations in IS: 456- 2000. Whichever combination produces the most unfavorable effect in the building, foundation or structural member concerned shall be adopted.

Load Combinations	Limit State of Collapse			Limit State of Serviceability		
	DL	LL	WL/EL	DL	LL	WL/EL
DL+LL	1.5	1.5	--	1.0	1.0	--
DL +/- WL	1.5 or 0.9$	--	1.5	1.0	--	1.0
DL + LL +/- WL	1.2	1.2	1.2	1.0	0.8	0.8
DL +/- EL	1.5 or 0.9$	--	1.5	1.0	--	1.0
DL + LL +/- EL	1.2	1.2	1.2	1.0	0.8	0.8

$ This value is to be considered when stability against overturning or stress reversal is critical.
Note: DL-Dead load; LL- Live load; WL- wind load; EL- Earthquake load.

The above load combinations will be considered and effect of worst combinations will be taken for design for various elements. Live load reduction factors as per IS: 1893 and IS: 875 part-2 will be considered.

7.0 DESIGN CONDITIONS FOR UNDERGROUND OR PARTLY UNDERGROUND LIQUID RETAILING STRUCTURES

All underground or partly underground liquid containing structures shall be designed as per IS: 3370 for the following conditions:

i) For Water tanks and Underground sumps, crack width shall be limited to 0.2mm and for STP it shall be limited to 0.1mm as per Clause 35.3.2 of IS 456:2000.

ii) liquid depth up to full height of wall : no relief due to soil pressure from outside to be considered;

iii) structure empty (i.e. empty of liquid, any material, etc.) : full earth pressure and surcharge pressure wherever applicable, to be considered;

iv) partition wall between dry sump and wet sump: to be designed for full liquid depth up to full height of wall;

v) partition wall between two compartments: to be designed as one compartment empty and other full;

vi) structures shall be designed for uplift in empty conditions with the water table as indicated in geo technical report/ defined to be taken for design purpose whichever is higher;

vii) walls shall be designed under operating conditions to resist earthquake forces from earth pressure mobilization and dynamic

viii) underground or partially underground structures shall also be checked against stresses developed due to any combination of full and empty compartments with appropriate ground/uplift pressures from below to base slab. The design shall be such that the minimum gravity weight exceeds the uplift pressure at least by 20%

8.0 REINFORCEMENT CEMENT CONCRETE (RCC)

8.1 Concrete

Grade of Reinforced Concrete - M30 (Min)

Grade of Reinforced Concrete for WTP, STP, UGT, OHT - M40 (Min)

Note:

- Normal weight aggregates are considered for all concrete works.
- Minimum Cement content and maximum water cement ratio is considered as per IS: 456 – 2000 Table-5.

8.2 Reinforcement

Steel reinforcement shall be Grade Fe 500D confirming to IS: 1786-2008.

Structural steel of grade E250/E350 and other requirements confirming to IS 800: 2007 shall be used.

9.0 NOMINAL COVER TO REINFORCEMENT

For the durability requirement, environmental exposure condition shall be considered as per Sr. No. 5.1 above and two (2) hrs. fire resistance whichever is more as per relevant clause of IS : 456 and National Building Code (NBC).

10.0 ROAD WORK, SURFACE PARKING, PLINTH PROTECTION

10.1 Road Work

10.1.1 Cement Concrete Road

The cement concrete road shall be designed as per relevant IRC and/or BIS code subjected to the minimum thickness as follows:

- Surface preparation and compaction
- Granular Sub-base course (GSB) – 250mm
- Dry Lean Concrete (DLC) – 100mm
- Cement Concrete (M30 grade Min.) – 150mm
- Dowel bar, Tie bar, Groove & Bituminous Joint

10.1.2 Bituminous Road

The Bituminous road shall be designed as per relevant IRC and/or BIS code subjected to the minimum thickness as follows:

- Surface preparation and compaction
- Granular Sub-base course (GSB) – 250mm
- Wet Mix Macadam (WMM) – 200mm
- Dense Bituminous Macadam (DBM) – 75mm
- Bituminous Concrete (BC) – 40mm
- Prime coat, Tack Coad and Seal coat

10.2 Surface parking

The Surface parking shall be designed as per relevant IRC and/or BIS code subjected to the minimum thickness as follows:

- Surface preparation and compaction
- Dry Lean Concrete (DLC) – 75mm
- Cement Concrete (M30 grade Min.) – 150mm
- Dowel bar, Tie bar, Groove & Bituminous Joint

10.3 Plinth Protection

The Plinth protection shall be designed as per relevant code subjected to the minimum thickness as follows:

- Surface preparation and compaction
- Dry Lean Concrete (DLC) – 75mm
- Cement Concrete (M25 grade Min.) – 125mm
- Groove and Bituminous Joint

11.0 MINIMUM THICKNESS FOR ALUMINIUM SECTION

The thickness of Aluminium sections use for building works shall be as per design subjected to the minimum thickness as follow:

- Door section – 2.0mm
- Door frame – 2.5mm
- Partition section – 2.0mm
- Casement window – 1.5mm
- Sliding window – 1.0 mm

The min. weight of aluminium windows shall not be less than 7.0 kg per sqm subjected to considering above thickness.

12.0 DESIGN CODE & STANDARDS

Materials and workmanship shall comply with the current relevant Indian Standards (with amendments) on the date of submission of the tender,

Where the relevant standard provides for the furnishing of a certificate to the Employer's Representative, at his request, stating that the materials supplied comply in all respects with the standard, the Contractor shall obtain the certificates and forward it to the Employer's Representative.

The specifications relevant latest edition of codes & the latest edition of references mentioned below are considered to be part of this Bid specification. All standards, specifications, codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions.

In case of discrepancy between the Bid Specification and the latest edition of code, the latest edition of code shall govern. Some of Indian Standard Codes, as given below for the reference:

Sr. No.	Code	Description
1.	IS:875 (Part 1)	Code of Practice for design loads (other than earthquake) for buildings and structures- Unit weights of buildings materials and stored material.
2.	IS:875 (Part 2)	Code of Practice for Design loads (other than earthquake) for buildings and structures- Imposed
3.	IS:875 (Part 3)	Code of Practice for Design loads (other than earthquake) for buildings and structures- Wind loads

4.	IS:875 (Part 5)	Code of Practice for Design loads (other than earthquake) for buildings and structures- special loads and load combinations.
5.	IS:456	Code of Practice for Plain and Reinforced Concrete.
6.	IS:800	Code of Practice for General Construction in steel.
7.	IS:1893	Criteria for Earthquake resistant design of structures.
8.	IS:13920	Ductile detailing of reinforced concrete structures subjected to seismic forces- Code of practice
9.	IS:1786	Specification for High Strength Deformed Steel Bars and Wires for
10.	IS:6313 (Part 2)	Code of Practice for Anti-Termite Treatment measures in buildings-
11.	IS:2911	Code of practice for design and construction of pile foundations
12.	IS: 4326	Code of Practice for Earthquake Resistant Design and Construction of Buildings

- *Any other relevant codes shall be followed as per requirements from Indian, British & Euro standards.*