

**TURNKEY TENDER DOCUMENT FOR CHEMBUR 2ND FEED
PROPOSED TOWER (LATTICE/ MONOPOLE) PORTION**

CIVIL WORK

ANNEXURE-17



Prepared By	Reviewed By	Approved By	Rev	Date
			RO	30.04.2019
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SCOPE OF WORK:-

The following scope of civil work is envisaged for construction of proposed tower (Lattice/ Monopole) under Chembur 2nd feed project.

1. Detailed plot survey including marking of existing structures, roads, drains, trees etc. shall be carried out for spotting of exact tower location.
2. Soil Investigation shall be carried out at 2 locations to know the actual soil strata for design of foundation. (First location shall be at actual tower location or in case of obstructions very near to proposed location and second location anywhere inside the plot)
3. Design of proposed tower (Lattice/ Monopole).
4. Design of foundation for proposed tower (Lattice/ Monopole) based on soil report.
5. Construction of foundation for proposed tower (Lattice/ Monopole).
6. Erection of chain link fencing around the proposed tower (Lattice/ Monopole).
7. Provision of PCC/Paver Blocks within the fenced area as per the instruction of Engineer-in-charge.

SPECIFICATIONS:-

The following civil specifications shall be adopted for carrying out required civil work for construction of proposed tower (Lattice/ Monopole).

CODES & STANDARDS:-

The following codes and standards are made a part of the Specification. All standards, codes of practice referred to herein shall be the latest edition including all applicable official amendments and revisions. Superstructure and Substructure of the proposed tower (Lattice/ Monopole) shall be engineered in conformity to applicable Indian Standards for Dead Loads, Operating Live Loads, Wind Loads and Seismic Loads. RCC Design / Detailing shall be in Conformity to applicable Indian Standards for Ductile Design Requirements

In case of discrepancy between this specification and those referred to herein, this specification shall prevail.

Sr. No.	Code No.	Code for	Year
1.	IS 383	Specification for coarse and fine aggregates from natural sources for concrete	1970
2.	IS 456	Plain and Reinforced Concrete - Code of Practice	2000
3.	IS 3764	Code of Safety for Excavation	2000
4.	SP 34	Hand Book for Reinforcement & detailing	1987
5.	IS 1542	Specification for Sand for plaster	1992
6.	IS 1786	High Strength Deformed Steel Bars and Wires for Concrete Reinforcement - Specification	2008
7.	IS 2212	Code of practice for brickwork	1991
8.	IS 1200 (Part 1 to 28)	Methods of measurement of building and civil engineering works	2007
9.	IS 6461 (Part V)	Glossary of terms relating to cement concrete: Part V Formwork for concrete	1972
10.	IS 800	General Construction in Steel - Code of Practice	2007
11.	IS 1661	Code of practice for application of cement and cement-lime plaster finishes	1972
12.	IS 2395 (Part 2)	Code of practice for painting concrete, masonry and plaster surfaces: Part 2 Schedule	1994
13.	IS 2502	Code of Practice for Bending and Fixing of Bars for Concrete Reinforcement	1963
14.	IS 2720	Methods of Test for Soils	1975
15.	IS 3495(PART-1 to	Part 1 to 4 : 1992 Methods of Tests of	1992

	4)	Burnt Clay Building Bricks - Part 1 : Determination of Compressive Strength - Part 2 : Determination of Water Absorption - Part 3 : Determination of Efflorescence - Part 4 : Determination of Warpage	
16.	IS 1893 (PART-1)	Criteria for Earthquake Resistant Design of Structures - Part 1 : General Provisions and Buildings	2002
17.	IS 13920	Ductile detailing of reinforced concrete structures subjected to seismic forces	1993
18.	IS 6313 (Part 2)	Code of Practice for Anti-Termite Measures in Buildings - Part 2 : Pre-constructional Chemical Treatment Measaures	2001
19.	IS-2911-Part-1-Section-2	Code of Practice for design and construction of Pile Foundations (Concrete Piles-Bored Cast In Situ Piles)	1979 Re-Affirmed 2002
20.	IS-14893	Non Destructive Integrity Testing of Piles (NDT)-Guidelines	2001 Re-Affirmed 2006
21.	IS 802(Part1/Sec1):2 015	Use of Structural steel in Overhead Transmission line Towers-Code of Practice (Part1: Materials, Loads and Design strengths, Section1:- Materials & Loads	2015
22.	IS 802(Part1/Sec2):2 016	Use of Structural steel in Overhead Transmission line Towers-Code of Practice (Part1: Materials, Loads and Design strengths, Section2:- Design Strengths	2016
23.	IS 875 : Part 3: 2003	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Part 3 : Wind Loads	2003
24.	IS 5613 : Part 2 : Sec 1 : 2007	Code of practice for design, installation and maintenance of overhead power lines: Part 2 Lines above 11 kV and up to and including 220 kV, Section 1 Design	2007

1.1.1 EXCAVATION:-

- a. Excavation to required side slopes below ground level in all kinds of ordinary and hard soils such as Clay, sand, sandy clay, gravel, soft murrum, hard murrum etc. for foundations, pits, trenches etc. including de-watering, leveling, dressing, protection of side slopes by proper shoring, strutting as necessary and transporting excess excavated soil to stack or fill and unloading, stacking, filling, leveling and dressing to required levels and grades etc. complete as per specifications and as directed by Engineer-in-charge.

- b. In case, if there will be any statutory Royalty charges same shall be paid by contractor to the concerned Government authorities before commencement of excavation. Contractor should submit the copy of same to concerned engineer before start of works. Contractor shall be solely liable for legal and financial issues in this regard.
- c. The stacking of excavation material should be at least 50 mtr away from excavated trench.
- d. Excavation shall be done to the dimensions as required for safety and working facility. Working space provided shall not be less than as provided in IS: 1200 (Part-1). Excavation shall be carried out in slopes of 1:4 (1 horizontal : 4 vertical) or alternatively the excavation profiles shall be widened by allowing steps of 500 mm on either side after every 2 meters from the bottom
- e. The sides of the excavated portion shall be vertical and in straight line ready for termite treatment.
- f. The contractor at his own expenses shall water very well, ram and thoroughly consolidate the bottom of all excavations and ground surfaces before the construction of foundation/footing/plinth beam, filling in basement floor or other work is commenced. The excavation shall include shoring on both the sides or trenches with approved timber/steel accessories wherever necessary to prevent the sides from falling including bailing or pumping out of water if found necessary. If there are any shrubs, bushes, trees etc., are to be removed, roots of the trees should be removed for minimum depth 5'0". All these materials should be neatly stacked at site and to be disposed appropriately.
- g. During excavation, all safety norms should be followed as per statutory requirements where by labours compulsorily make use of quality safety shoes, helmets, gloves verified and approved by AEML safety officer. AEML-T being a IMS certified company insist on strictly adhering to Quality, Environment, Health & safety (QEHS) norms. Strict action will be taken against the contractor & action will be decided by AEML-T safety officer in case of violation of QEHS norms

1.1.2 BARRICADING:-

- a. "Enhancing safety/security by providing barricading on either side of excavated trench as per standard norms.
- b.

1.1.3 RUBBLE SOLING:-

- a. Dry rubble packing of 230mm thick laid in two layers of 115mm each with bottom layer consisting of hard broken stone of required size and top layer consisting of stone aggregate of size 90 to 40mm blinded with sand / gravel and well compacted to 85% of original volume complete as per technical specifications and as directed by AEML Engineer.

1.1.4 REINFORCED CONCRETE WORKS:-

- a. Providing & laying PCC of M-15 below, trenches, plinth etc. including all labour, material handling, transporting, batching, mixing, placing, leveling, compacting, curing, etc. complete in all respects as per the drawing, specification & direction of the engineer as per the relevant IS specifications complete in all respect.
- b. PCC(M15) as per IS456 (up to plinth) Providing, mixing, placing curing as per relevant IS specification, reinforced controlled cement concrete with coarse sand and graded stones aggregate of 20mm nominal size and including any admixture like plasticizer cum water proofing cement it use as required in all kinds of work and of grades as specified below including all labour, material, handling, transporting, batching, compacting with mechanical vibrator and as per drawings and specification.
- c. RCC(M30) as per IS456 (up to plinth) Providing, mixing, placing curing as per relevant IS specification, reinforced controlled cement concrete with coarse sand and graded stones aggregate of 20mm nominal size and including any admixture like plasticizer cum water proofing cement it use as required in all kinds of work and of grades as specified below including all labour, material, handling, transporting, batching, compacting with mechanical vibrator and as per drawings and specification.

1.1.5 REINFORCEMENT:-

- a. Providing and fixing reinforcement for RCC work with high yield strength ribbed cold twisted tar steel of various diameters of grade Fe 500 conforming to BIS specification including cutting, bending, fabricating and placing in position according to drawings and binding the reinforcement with 16 gauge galvanized annealed binding wire of double fold or 18 gauge GI wires and providing precast cement cover blocks for main reinforcements to ensure specified cover according to relevant IS code.
- b. Bidder shall prepare and furnish to the EIC, bar bending schedules for all RCC works for his review and approval. No work shall commence without the approval of bar bending schedule by EIC.
- c. Only TMT bars of TISCO, SAIL, RINL or equivalent shall be used.

1.1.6 FORMWORK:-

- a. Providing and fixing Plywood with film face formwork (for substructure) of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section for any depth below Finished Ground Level, including labour, materials, equipment, waste for forms, shoring, strutting, scaffolding, staging, tying, nailing, caulking, bolting, testing, etc. including removal of formwork and staging etc. all complete as per specifications, drawings and instructions of the Engineer. The contractor shall supply, fabricate, erect and dismantle (after use) all staging that is required for all activities covered under 'Form Work'. If it is so desired by the Engineer-in-Charge, the Contractor shall prepare before commencement of the actual work, the scheme and submit along with the supporting design calculations and drawings for formwork and staging and get them approved by the Engineer-in-Charge. Bidder shall prepare and furnish to the EIC, bar bending schedules for all RCC works for his review and approval. No work shall commence without the approval of bar bending schedule by EIC.

1.1.7 STRUCTURAL STEEL:

- a. Providing, fabricating and fixing in position GI flats, angles, channels, beams, Box section/tubular section, plates, Grating etc. of TISCON, RINL or equivalent subject to approval by EIC confirming to IS : 2062, including welding, drilling holes, Nuts, Bolts and washer, Hilti anchor bolt all complete as per drawing.
- b. The minimum thickness by hot dip galvanising shall be 90 microns and material shall be offered for inspection at galvanising works before final dispatch to site.
- c. All site Welding shall be suitably treated with cold galvanising paint. For galvanising works, factory approval shall be taken from R-infra EIC.
- d. After approval of final drawings work can be initiated at site. Providing, fabricating and placing steel embedded parts, angles, channels, I-beams, inserts in concrete (including trenches etc.) including labour, material, scaffolding, handling, welding, bolting, drilling, providing lugs, etc. complete.

1.1.8 SOLID BLOCK MASONRY WORKS:-

- a. Providing and constructing solid concrete block masonry in superstructure with approved quality site made/factory made blocks having minimum crushing strength 50 Kg/Sq. cm and maximum water absorption 10%, in pre polymerized wet mix jointing adhesive (Build Fast plus), doing masonry in specified courses, complete with raking out joints, doing independent double legged scaffolding, complete as per specifications etc. at all heights, depths and leads. Etc. complete. All material supply in scope of contractor.

1.1.9 PLASTERING WORKS:-

- a. **INTERNAL PLASTER:-** Providing and applying 12 mm thick finish cement plaster at all heights in 1:3 (1cement and 3 fine sand) cement mortar with Recron 3s fibers of Reliance Industries Ltd. including provision of PVC wire mesh at junction of dissimilar materials, scaffolding, chipping, roughing up the concrete, curing & finishing smooth. The plaster surface shall be rubbed with 'iron plate', till the surface shows cement paste in line and level complete. It shall include for scaffolding and curing etc.
- b. **EXTERNAL PLASTER:-** Providing and applying 18 mm thick cement plaster in two layers at all levels with under layer 12 mm thick cement plaster 1:4 (1 cement: 4 coarse sand) and top layer 6 mm thick cement plaster 1:4 (1 cement: 4 fine sand) including scaffolding, chipping, roughening the concrete surface, curing, providing drip course etc. all complete as directed by the Engineer-in-Charge. Sika or equivalent water proofing admixture and Recron 3s fibers of Reliance Industries Ltd to be mixed with each coat of plaster wherever required. PVC wire mesh to be added at junction between RCC & brick work.

1.1.10 BRICK MASONRY:-

- a. Providing, supplying and laying in position brick wall 230/345mm thick in 1 : 6 cement and approved coarse sand mortar in foundation for all depths including supply of first

class bricks (Class-7.5) approved by the Engineer in charge, all materials , labour T & P etc, and also including scaffolding, staging, curing, racking out joints, leaving necessary weep holes, openings and making them good, hacking sides and bottoms of old faces for bonding etc. including finishing smooth as directed at all levels.

- b. All material supply in scope of contractor.
- c. Water absorption shall be as per IS 3495:1992.

1.1.11 MURRUM FILLING :-

- a. Providing and Filling of good quality of murrum brought from outside and as directed by Engineer in Charge. The material shall be free from lumps and clods, roots and vegetations, harmful salts and chemicals, organic materials, etc. Murum filling shall be done in layers not exceeding 250 mm in loose thickness each layer being watered, rammed and properly compacted to achieve a dry density of not less than 90% of proctor's dry density at optimum moisture content as per IS-2720 (Part-VII). The work of back-filling will be accepted after the Engineer is satisfied with the degree of compaction achieved.

1.1.12 CHAIN LINK FENCING :-

- a. Providing and fixing PVC coated G.I. chain link fencing of min 10 SWG (including PVC coating) of mesh size 50 mm with galvanized MS angle (50 x 50 x 6) . The diameter of the steel wire for chain link fence (excluding PVC coating) shall not be less than 10 G. All fence post including stay post and straining posts shall be of 75 x 75 x 6 MS galvanized angles placed at 2.5 m c/c & tension wire of 3 mm. All nuts, bolts, fasteners, clamping strips, clamps, clips, etc. shall be hot dip galvanized. Weight of zinc coating shall be at least 610 g/sq m.

1.1.13 PILING WORK:-

- a. Mobilization towards plant, equipment and personnel for cast in situ bored piling work, under the scope of this contract Sufficient no of hydraulic rigs/As per tender to be mobilized for completion of entire job as per the time schedule provided in the tender document. Contractor shall mobilize sufficient spares; cutting tools (e.g. flat teeth bits, round shank bits, holders, etc) to avoid any stoppage of work.
- b. Boring in all types of soil & installing cast-in-situ RCC vertical bored piles of specified diameter and of specified length for working piles and test piles as per the owners design, drawings, specification including cost of labour, materials, using ordinary portland cement 53 grade (excluding reinforcement) with associated plants, tools & tackles etc. all complete as per the direction of Engineer-In-charge. (Grade of concrete M30.)
- c. Provision of permanent/temporary liner / bentonite slurry to arrest collapse of sides in the bore. Permanent liner shall be provided if mandated by foundation/soil consultant.
- d. Breaking of piles up to cutoff levels and removal of debris shall be covered under the scope.
- e. For socketing, Boring in gryeish basalt, weathered rock, fissured rock, soft rock, shale

etc. for socketing as directed and to the satisfaction of Engineer-in-charge. specification including cost of labour, materials, using ordinary portland cement 53 grade (excluding reinforcement) with associated plants, tools & tackles etc. all complete as per the direction of Engineer-In-charge. (Grade of concrete M30.)

- f. After all the piles have been chipped to cut off level, pile integrity testing shall be carried out on all piles and report submitted for approval.

The above specification is intended for the general description of quality, workmanship etc. desired for various items of work under the contract. The specifications are not, however, intended to cover minute details and all work shall be executed according to the spirit of the specification and in absence thereof, according to the relevant latest Indian Standard specification; in absence of the latter, the work shall be executed according to the best prevailing local public works department practice or to the recommendations of the American or British Standard specification as may be desired by the Engineer.

All the Civil works shall be executed/tested/recorded in accordance with Field Quality Assurance Plan (FQAP) of AEML-T.

1.1.14 GUARANTEED TECHNICAL PARTICULARS:-

Sr. No.	Descriptions	AEML Requirements	Technical Particulars (Shall be Filled by Vendor)
1	PCC	Grade of PCC shall be M15 with minimum Cement content 240 kg/CUM as per IS 456-2000. Cement shall be 53 grade Ordinary Portland Cement conforming to IS-12269.	
2	RCC for general civil works	Grade of RCC shall be M30 with minimum Cement content of 320 kg/CUM as per IS 456-2000. Cement shall be 53 grade Ordinary	

CHEMBUR 2ND FEED

TURNKEY TENDER DOCUMENT

		Portland Cement conforming to IS-12269.	
3	RCC for cast in situ piles	Grade of RCC shall be M30 with minimum Cement content of 400 kg/CUM as per IS 456-2000. Cement shall be 53 grade Ordinary Portland Cement conforming to IS-12269.	
4	Reinforcement	Grade of Reinforcement shall be Fe 500 confirming to IS 1786-2008 and of make TISCO, SAIL, RINL or equivalent	
5	Structural Steel	Structural steel shall be confirming to IS 2062-2006	
6	Galvanization	Structural steel shall be hot dipped galvanized with 90 microns	
7	Others if any	To be provided by vendor	