ADDITIONAL CONDITIONS OF CONTRACT
FOR SOIL INVESTIGATIONS AT BHILAI STEEL PLANT

1.0 The following Additional Conditions of Contract shall be read in conjunction with General Conditions of Contract. If there are any provisions in these Additional Conditions of Contract, which are at variance with the provisions of General Conditions of Contract, the provisions in these Additional Conditions of Contract shall take precedence.

2.0 GENERAL INFORMATIONS

In Bhilai Steel Plant (BSP) Augmentation of Raw Material Receipt & Handling Facilities with New OHP, is proposed to be done in Part- B under Package- 061. This project also consists of construction of Structural steel / RCC framed structures for Junction houses, Conveyor galleries, Wagon tippler building, Stacker Reclaimer foundations, Track Hopper building, MCC Sub- stations & external development work etc.

Bhilai Steel Plant (BSP), is located at Bhilai in Durg district of the state Chhattisgarh in central region of India. Bhilai is about 12 kms from Durg. Bhilai / Durg railway station are on the Howrah- Mumbai rail line of the Indian railways.

2.1 For the purpose of this Tender, the sub-strata has been assumed to be soil only. Therefore, the specifications are prepared assuming shell and auger / rotary boring depending upon the feasibility of operations.

3.0 SCOPE OF WORK:

The broad objective of this assignment is to carry out soil investigation as per relevant IS Standards including preparation of drawings in the manner described else where in tender enquiry.

The scope of services shall thus cover the following major tasks but shall not be limited to following:

3.1 Soil Investigation:

3.1.1 Scope

The scope of work includes field investigations, laboratory tests and preparation of Report/ Drawings (giving complete details of investigations, tests and recommendations).

It is specifically highlighted that the intended tenderers should acquaint themselves fully with the site conditions before submitting their bids.
The purpose of the sub-surface investigations is to arrive at the design parameters indicated below that shall be included in the Report with full background, justifications and calculations. All calculations shall be based on appropriate IS Codes with proper reference to clauses.

a) Mobilization of men, equipment, setting equipment and carrying out drilling of 100 – 150mm dia. Boreholes upto the specified depths or refusal, whichever is earlier.

(i) GL to 25m depth or refusal-2 or more boreholes as per site requirement to design the building.

(ii) GL to 30m depth or refusal-2 or more boreholes as per site requirement to design the building.

b) Depth of foundation of the Safe bearing capacity at founding level of raft and open foundations from shear and settlement consideration.

c) Recommending safe / allowable bearing capacities of soil for foundation based on existing soil condition.

d) Effect of water table on bearing capacities of soil shall be taken into Account.

e) Compactness of the top sub-strata revealed by CBR Test from the point of view of the constructing internal roads and pavements.

f) Any other pertinent information relating to foundation design considered necessary by the Contractor.

3.1.2 Laboratory Tests

The main tests in the laboratory shall include the determination of all relevant soil parameters, such as, classification (by particle size analy BIS), and (by triaxial tests), void ratio, permeability, Atterberg limits, water content, coefficient of consolidation (by Odometer), stress-strain modulus (by stress-strain curves from triaxial tests), unconfined compression tests for cohesive soils, CBR Test and Proctor Density Test. The laboratory tests shall also include chemical analysis of ground water for determining suitability for concreting (samples taken at depths of 3m, 9m, 12m and 15m) and analysis of water and soil samples to assess aggressiveness in relation to attack on concrete / reinforcement. The tests shall be done in case of soil sub-strata. Determination of CBR value of 150mm dia remoulded samples as per IS:2720 (Part 16) and IS:9669 and as per relevant BOQ item.

3.1.3 Field Investigations

The field investigations shall include boring with mechanically operated shell and auger / rotary type soil boring rig 150m dia bores, taking undisturbed samples and conducting Standard Penetration Tests, Static Cone Penetration Tests (using 10T capacity equipment with hydraulic pushing), observing ground water table and identification of soil strata. The bore-hole locations identified on the enclosed drawing are contemplated for depths ranging between 25 to 30m. These investigations are specified for soil sub-strata. Determination of Field
CBR value at 750mm depth below ground level as per IS:2720 (Part 31) and as per relevant BOQ items.

Shell and auger / rotary type boring shall be done at all bore holes up to wherever it is feasible. Thereafter, bore-holes shall be advanced through drilling unless instructed by the Engineer otherwise.

3.1.4 Report

A detailed Draft Report covering details of Laboratory Tests Field investigations and recommendations shall be submitted in 2 hard copies along with soft copy in CD / Pen drive.

After scrutiny and comments by the EPI / Client, a Final Report incorporating the comments shall be submitted in 6 hard copies along with soft copy in CD / Pen drive.

3.1.5 Codes and Standards

All field and laboratory work shall be carried out strictly in accordance with BIS specifications unless otherwise approved by the Engineer-in-charge. Where not specified, the latest edition of one or more of the following codes of practice shall be followed. In case of conflict between any of the codes mentioned below, the BIS Codes of Practice shall prevail unless otherwise approved by the Engineer-in-charge.

BIS:1498 Classification and identification of soil for general engineering purposes.
BIS:1888 Method of Load test on soils
BIS:1892 Code of practice for sub-surface investigations for foundations (includes pressuremeter)
BIS:2131 Method of Standard Penetration Test for soils (SPT)
BIS:2132 Code of Practice for Thin walled tube sampling of soils
BIS:2720 Part I to Part XXXXI - Method of test for soil
BIS:2809 Glossary of terms and symbols relating to soil engineering
BIS:4434 Code of Practice for in-situ vane shear test for soils.
BIS:4968 Method for sub-surface sounding for soils
  Part 1: Dynamic method using 50mm cone without bentonite slurry (DCPT)
  Part 2: Dynamic Method using cone & bentonite slurry (DCPT)
  Part 3: Static Cone Penetration Test (SCPT)
BIS:6929 Code of Practice for in-site permeability test
Part I: Test in observation
Part II: Test in bed rock

BIS:7422  Symbols and abbreviations for use in geological maps, sections and sub-surface exploratory logs.

Part I: Abbreviations.  
Part II: Igneous Rock  
Part III: Sedimentary Rock

BIS:9143  Method for the determination of unconfined compressive strength of rock materials.