

MASTER INDEX (TECHNICAL)

**TENDER : SITE ENABLING WORK, CONSTRUCTION
POWER AND CONSTRUCTION WATER**

UNITS : OFFSITE

TENDER No. : B348-000-81-41-CC-8002

**PROJECT : EPCM CONSULTANCY SERVICE FOR
SETTING UP OF HPG-2,BUTENE-1 AND
PSA UNITS AT BCPL LEPETKATA**

CLIENT : BCPL, LEPETKATA

JOB NO : B348

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- Notes: *
- Plot plan Layout is attached for reference. Execution shall be as per latest revision of equipment layout which shall be given to successful bidder.
- **
- Shall be given to successful bidder.
- ***
- Updated NDT specification for additional piping classes, (if any) shall be given to successful bidder.
- #
- The Operating Manual and Data Sheets shall be provided to bidders after completion of Non-Disclosure Agreement procedures

**SCOPE OF WORK & SUPPLY
(STRUCTURAL)**

**TENDER FOR SITE ENABLING WORKS, CONSTRUCTION WATER AND
CONSTRUCTION POWER**

TENDER No. B348-000-81-41-CC-T-8002

**PROJECT : EPCM CONSULTANCY SERVICES FOR SETTING UP OF HPG-
2, BUTENE-1 AND PSA UNITS**

OWNER : BCPL, LEPETKATA

JOB NO. : B348

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1.0 SCOPE OF WORK

The scope of work involved in general shall include construction of all civil & structural activities required for successful completion of works for Site Enabling Works for HPG-2, Butene-1, PSA units and offsite works of M/s BCPL.

Major civil and structural activities involved shall include but not be limited to the following:

- a. Dismantling of section of storm water drain (brick masonry/PCC) with and its base for all height and depth below grade and retrieval of serviceable materials from the debris and stacking the same at site as per the direction of Engineer-in-Charge.
- b. Construction of Electrical/ Instrumentation cable road crossings (through PVC pipe/ RCC box culvert/ RCC duct) including earthwork in excavation in all types of soils, cutting and making good of roads after completion of work, providing reinforcement steel, PVC pipes with concrete encasement, crossing indicators, backfilling with available/ borrow good earth including supply of all material, consumables, tools as required all complete.
- c. Construction of RCC pipe /Box culvert (as applicable) including providing PCC base, RCC encasement to pipes (if requirement), parapet walls including earthwork in excavation in all types of soils including soft rock, backfilling with excavated/ borrow good earth, transportation including supply of all other related material etc., all complete.
- d. Providing barricading structures with water curtain and Hc detectors for new proposed butane-I, PSA-2, HPG-2 unit and tankages area including painting of steels members, earthwork in excavation in all types of soils for RCC foundations for line/ straining posts, strut and sill beams, backfilling with excavated/ borrow good earth etc. including disposal of surplus earth all complete.
- e. Providing bore well (with sufficient depth in all type of soil including soft for new proposed butane-I, PSA-2, HPG-2 unit and tankages area including providing concrete floor collection and drainage system around tube well and connecting it to nearest storm water drain as shown in drawing including drilling for bore well, providing casing pipes, pumps, developing/ cleaning, testing and commissioning of bore well system all complete as per specification, standard, codes and direction of Engineer-in-charge.
- f. Site Development for Fabrication/open Storage area.
- g. Removal and Re-routing of existing fire water lines.
- h. Modification for firewall in tankage area and reconstruction of dyke wall.
- i. Barricading structures around the all new proposed unit and tankage area.
- j. Cutout making for Instrumentation and electrical cable entry for Substation and SRR/CR.

- k. Cable trench and T-support structures for Electrical and instrumentation.
- l. Earthwork in excavation including dewatering(if required) below ground level for all types of soil including soft rock .
- m. Shoring & strutting where ever required.
- n. Backfilling with selected available approved earth at all depths and disposal of surplus earth and debris to the area designated by the Engineer-in-Charge.
- o. PCC works including lean concrete at all depths below.
- p. RCC works in sub-structure for barricading foundation, etc. at all depths.
- q. RCC works in super-structure for columns for barricading, etc. at all heights.
- r. Usage of HYSD bars of grade Fe 500D (TMT) conforming to IS:1786 for reinforcement.
- s. Preparation of Bar bending Schedule as per the AFC drawing.
- t. Providing centering, shuttering in substructure at all depths and superstructure at all heights.
- u. Structural steel works with rolled steel, parallel flange sections and built-up sections or tubular sections, including fabrication, erection and preparation of detailed fabrication drawings .
- v. For the painting of structural steel works, EIL Specification shall be referred.
- w. Supplying and mixing of approved brand of bipolar concrete penetrating corrosion inhibiting admixture in concrete in substructure as per manufacturer's specification for protection of reinforcement against corrosion as per Specification.
- x. Removal and taking of temporary structure / supports, if provided by the contractor leaving the site clean and workable.
- y. Dismantling of PCC/ RCC/pavement/ Masonry / in parts / full if encountered during construction, including disposal of unserviceable item to the area designated by the Engineer-in-charge.
- z. Fabrication & placing/ erection of miscellaneous steel items like Anchor Bolts, Metal Insert Plates, Pipe Sleeves, Anchor Fasteners, Rungs, Hand railing, etc. as per EIL Specifications/as directed by Engineer-in-charge at any location wherever required.
- aa. Brick masonry in substructure for all depths and superstructure for all heights as per specifications.
- bb. Taking necessary statutory approvals from the related departments in the premises / local authorities / corporations before carrying out any activity, if required.
- cc. It shall be clearly understood that all the above works together with all incidental works to complete the work whether specifically mentioned or not shall be deemed to have been included in the scope of work.
- dd. Any other Civil Structural Works, not specifically mentioned herein, but required for the satisfactory and successful completion of the project as per directions of the Engineer-in-Charge shall also be in the scope of the contractor.
- ee. This scope of work is to be read in conjunction with the other scope of works enclosed in the tender document.

ff. The contractor shall ensure that no damage of any kind is done during work execution. In case of any damage done by the contractor the same shall have to be rectified at his own cost & time.

gg. Submission of As-built drawings in soft copy (AutoCad).

2.0 **SCOPE OF SUPPLY OF MATERIALS**

2.1 Owner's scope: Nil.

2.2 Contractor's scope: Procurement and supply of all materials (consumables/ non-consumables) required for the execution of Civil Structural works under this contract shall be in the scope of the Contractor.

3.0 **SPECIFIC REQUIREMENTS TO BE FULFILLED BY THE CONTRACTOR**

Note: In case of any contradiction between these Specific Requirements and Requirements/ Specification specified elsewhere in the tender document, the Specific Requirements given below shall have precedence.

- 3.1 Mandatory use of mechanical excavators for excavation, however manual excavation for minor foundation can be taken up after due approval of Engineer-in-Charge.
- 3.2 Mandatory installation of weigh batching plant of adequate capacity for concrete or use of ready mix concrete as per the directions of engineer-in – charge.
- 3.3 Mandatory use of concrete conforming to approved design mix
- 3.4 Mandatory use of bipolar concrete penetrating corrosion inhibiting admixture in concrete.
- 3.5 Generally the use of one of the following type of cements shall be considered:
 - a) 43 Grade Ordinary Portland Cement (OPC) conforming to IS:8112.
 - b) Portland Pozzolana Cement (PPC, fly ash based) conforming to IS:1489 Part 1.
 - c) Portland Pozzolana Cement (PPC, calcined clay based) conforming to IS:1489 Part2.
 - d) Portland Slag Cement confirming (PSC) to IS:455.
- 3.6 Fabrication of Anchor bolts to be taken on priority to ensure placement of the same at the time of concreting.
- 3.7 Dewatering wherever required shall be carried out by the contractor at his cost.
- 3.8 The contractor shall ensure the required founding strata confirming to soil recommendation for all foundations and bring it to the notice of engineer-in – charge, if the founding depth encountered is different from that specified in the drawings.

a) Foundation recommendation may be considered for high mast lighting system:

A foundation pit of 1500 mm deep shall be excavated having size more than 250 mm (all round) than the foundation dimensions. Base of the foundation pit shall be compacted to 95% of maximum laboratory density as per IS 2720 Part-VIII before filling the pit for 500 mm thick with sand-gravel mix(1:1) laid in layers of maximum 150 mm thick and compacted to 85% relative density. On this compacted fill, foundation for these structures may be placed at a depth of 1000 mm from FGL for foundation width up to 2.0 m and for pressure not exceeding 5.0 T/m². Minimum width of foundation shall be 1.0 m. Factor of Safety of 3 has been taken for design. Maximum basic wind speed is 50 m/s

4.0 LIST OF ATTACHMENTS

4.1 LIST OF EIL SPECIFICATIONS

S. NO.	SPECIFICATION NUMBER	REVISION	DESCRIPTION OF SPECIFICATION
1	6-68-0001	5	Standard specification civil and structural works -General scope
2	6-68-0002	5	Standard specification civil and structural works -Materials.
3	6-68-0003	5	Standard specification civil and structural works -Earthwork.
4	6-68-0004	7	Standard specification civil and structural works -Plain & Reinforced Cement Concrete
5	6-68-0006	6	Standard specification civil and structural works -Structural steel works
6	6-68-0008	8	Standard specification civil and structural works -Miscellaneous Steel Works
7	6-68-0009	4	Standard specification civil and structural works -Brick Masonry
8	6-68-0012	5	Standard specification civil and structural works -Demolition & Dismantling
9	6-68-0013	4	Standard specification civil and structural works -Miscellaneous Items
10	6-68-0017	1	Standard specification - civil & structural works - bipolar concrete penetrating corrosion inhibiting admixture
11	6-65-0055	4	Standard specification for erection of tube well
12	6-65-0014	1	Standard specification for road & flexible pavements (upto WMM layer)
13	6-65-0016	4	Standard specification for classification of soil for earth work in site grading

14	6-65-0017	6	Standard Specification for site grading & rock cutting for site grading
15	6-65-0021	4	Standard specification for RCC pipe culverts and ERC crossings etc.
16	6-65-0035	3	Standard specification for misc. civil & structural works for U/G piping and other civil works.
17	6-65-0011	5	Standard specification for barbed wire fencing
18	6-65-0027	5	Standard specification for underground and above ground G.I. pipeline system (water services)
19	6-66-0046	4	Standard specification for water spray nozzle for cooling
20	6-65-0030	5	Standard specification for fabrication and laying of underground piping
21	6-78-0001	1	Specification for quality management system requirements from bidders.
22	6-78-0002	1	Specification for documentation requirements from contractors.
23	6-78-0003	1	Specification for documentation requirements from suppliers.
24	6-82-3100	0	Inspection & test plan (ITP) for civil, structural & architectural works (item rate contracts – with categorization)
25	6-82-6100	2	Standard Quality Assurance Plan (Item Rate contracts)
26	6-82-0001	9	Standard specification for health, safety & environment (HSE) management at construction sites

4.2 LIST OF EIL STANDARDS

S. NO.	STANDARD NUMBER	REVISION	DESCRIPTION OF STANDARD
1	7-68-0056	6	Metal Insert Plates
2	7-68-0061	6	Handrail fixing to RCC structure
3	7-68-0691	3	Detail of Sliding T-Support
4	7-65-0404	4	RCC pavement details

5	7-68-0417	7	M.S. Anchor Bolt Assemblies
6	7-65-0403	4	Detail of barbed wire fencing (with angle iron post)
7	7-68-0689	2	Shear connections welded type - beam to beam
8	7-68-0626	4	Cable trench.
9	7-65-0001	4	Abbreviations, legends and equipment symbols
10	7-65-0006	4	Cable crossings under road (PVC pipes).
11	7-65-0010	4	Road curves and crossings
12	7-65-0011	0	Cross section of road
13	7-65-0103	4	Pipe culverts for storm water drainage
14	7-65-0104	5	Box Culvert for type I, II, III and IV
15	7-65-0106	5	Box Culvert for type V & VI
16	7-65-0420	4	Installation details of fire water hydrant

4.3 JOB SPECIFICATIONS

NIL

5.0 DRAWINGS

S.N.	DRAWING NO.	REV. NO.	NO. OF SHEETS	TITLE
1.	B348-000-17-44-0001	D	1	Overall Plot Plan
2.	B348-000-81-41-16901	A	1	Barricading structure
3.	B348-000-81-41-14401	A	1	Barricading structure

ADDENDUM TO STRUCTURAL SPECIFICATIONS & SOR

6.0 PREAMBLE TO SCHEDULE OF QUANTITIES

- 6.1 Depth of Foundation in general shall be 2.5m below FGL. (This data is for general guidance of the Contractors; however deviation from the noted depth shall not form a basis for any extra claim).
- 6.2 The maximum approximate height of structure shall be 12m (This data is for general guidance of the Contractors; however deviation from the noted height shall not form a basis for any extra claim).
- 6.3 The exposure condition for the tender shall be considered as **Very sever exposure**. The minimum cement content for Plain Cement Concrete & Reinforced Cement Concrete shall be as per IS:456. However, the maximum cement content shall not exceed 450 kg/cu.m.
- 6.4 As per Existing Geotech report, ground water table varies from 1.3 to 4.4m below existing ground level. The expected water table depth may fluctuate. The quoted rate of excavation shall include requirement of dewatering etc. for completion of total works including concreting, backfilling etc. and no extra amount is payable on this account.
- 6.5 Environment for selection of painting system shall be considered as **Industrial**.
- 6.6 Item description provided in Schedule of Rates (Short Description) is in brief, while quoting and filling the rate in these Schedule of Rates (Short Description), Bidder shall take into consideration complete scope of work/item description as mentioned in Schedule of Rates (Detailed Description) for the relevant item. The rate quoted in Schedule of Rates (Short Description) shall be deemed to include all activities of work mentioned in item description of Schedule of Rates (Detailed), scope of work, specifications, standards etc. & stringent of all shall govern.
- 6.7 During the performance of the work the contractor at his own cost, shall keep structures, materials adequately braced by guys, struts or otherwise approved means which shall be supplied and installed by the contractor as required till such time the installation work is satisfactorily completed. The provided guys, shoring, bracing strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by him or other agencies.
- 6.8 Various tolerances required as marked on the drawings confirm to codal requirements and as per specifications and as directed the Engineer-in-Charge shall be maintained. Verticality shall be maintained at every stage and the same shall be verified with Theodolite / Total Station.

7.0 SCHEDULE OF RATES

For schedule of rates of civil structural works refer **Document No.B348 -000-81-41-CC-SOR-8002-0**

JOB SPECIFICATION & SCOPE OF WORK (ELECTRICAL) FOR SITE ENABLING WORKS INCLUDING CONSTRUCTION WATER & POWER (TENDER NO. B348-000-81-41-CC-T-8002)

PROJECT : EPCM CONSULTANCY SERVICES FOR SETTING UP OF HPG-2, BUTENE-1 AND PSA UNITS AT BCPL, LEPETKATA
CLIENT : M/s BCPL-LEPETKATA
LOCATION : LEPETKATA, DIBRUGARH, ASSAM
CONSULTANT : ENGINEERS INDIA LIMITED
JOB NO. : B348

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1.0 GENERAL

1.1 INTRODUCTION

- 1.1.1 This section defines the electrical scope of work for site enabling works including construction power system and associated miscellaneous works covered under this tender. The intent of this specification is to define the requirements for the supply, installation, testing and commissioning of the construction power distribution system and associated miscellaneous works consisting of various electrical equipment, lighting system, earthing system, cabling system and other miscellaneous works covered under the scope of this tender for EPCM CONSULTANCY SERVICES FOR SETTING UP OF HPG-2, BUTENE-1 AND PSA UNITS AT BCPL, LEPETKATA.
- 1.1.2 The work shall be carried out to the best workmanship like manner, in conformity with these specifications, approved drawings/ construction drawings and the instructions of the owner or Engineer-in-Charge from time to time.
- 1.1.3 The contract shall include clearing of temporary constructions, waste materials and loose earth, which might get collected in and nearby the work site during execution of work and after final completion under this contract.

1.2 STANDARDS

- 1.2.1 The work shall be performed in conformity with these specifications and other specifications / standards / Codes of Practice specified or referred to in the tender. In case of any conflict, the most stringent one shall be followed and Owners/ EIL decision in this regard shall be final and binding. It is contractor's responsibility to bring the same to the notification of EIL.
- 1.2.2 In addition, the work shall also conform to the requirements of latest editions/ amendments of the following:
- The CEA guidelines and rules framed there under.
 - The fire insurance Regulations.
 - Indian Petroleum Rules.
 - The regulations laid down by Electrical Inspectorate (CEA).
 - The regulations laid down by the Factory Inspector.
 - The regulations laid down by the Chief Controller of Explosives.
 - The regulations laid down by Oil Industries Safety Directorate (OISD).
 - Applicable Codes of Practice of the Bureau of Indian Standards
 - Any other regulations laid down by the Central, State or Local Authorities from time to time during the execution of this contract.

It is the responsibility of the Contractor to highlight any contradictions between various documents at the bid stage itself. In case of any deviation/conflicts, the following order of decreasing precedence shall govern.

- a.) Statutory regulations
- b.) Job specification and datasheets
- c.) EIL Standard specifications, installation standards, etc.
- d.) Codes and Standards

Owner's concurrence shall however be sought before taking a decision in the matter

1.3 GUARANTEE

- 1.3.1 The contractor shall guarantee the installation for satisfactory operation against any defects of workmanship and materials (supplied by the contractor) for a period as specified elsewhere/ for a period of 12 months from date of issue of completion certificate. Any damage or defect connected with the erection of materials, equipment or fittings supplied by the contractor that may be discovered at the time of issue of the completion certificate, or arise or come to light thereafter, shall be rectified or replaced by the contractor at his own expense as deemed necessary and as per the instruction of Owner or Engineer-in-Charge within the time limit specified by the Owner or Engineer-in-Charge.
- 1.3.2 The above guarantee shall be applicable for the quality of the work executed as well as for all equipment/ cables/ fixtures/ fittings/ other materials supplied by the contractor.

1.4 SITE CONDITION

- | | | | |
|----|--|---|--|
| a. | Maximum/ Minimum Ambient Temperature | : | |
| b. | Equipment design temperature (IS-9676) | : | 40 °C |
| c. | Soil Resistivity | : | As per Soil investigation report |
| d. | Altitude above mean sea level | : | Less than 1000m above msl |
| e. | Seismic Zone | : | As per IS-1893 |
| f. | Humidity | : | 95% at 40°C |
| g. | Environment | : | Dusty, Tropical and Corrosive as found in Hydrocarbon Industry |

1.5 UTILIZATION VOLTAGES

- | | | | |
|------|---|---|---------------------------------|
| i. | Voltage available for construction activities | : | 415 V AC $\pm$ 10% |
| ii. | Normal Lighting / Power Panels | : | 415 V AC $\pm$ 10% TPN |
| iii. | Convenience outlets | : | 240 V AC $\pm$ 10% Single Phase |

1.6 BRIEF DESCRIPTION OF ELECTRICAL SYSTEM

The construction power of HPG-2, Butene-1 and PSA units and offsite at BCPL, LEPETKATA, includes, but is not limited to, the following:

Power Supply/ Distribution System

To fulfill the construction power requirement of Butene-1, HPG-2, PSA and associated offsite facilities of BCPL Lepetkata, Assam, power at 415V shall be provided by Owner from existing substation 2, substation 3 and offsite substation.

Contractor scope starts from supply and termination of cables from Owner's 415V switchboard to feeder pillars and supply of 415V feeder pillars for meeting the construction power requirement.

Location of feeder pillars shall be finalized during detail engineering.

Feeder pillars with padlocking facility, rated for 415V, 400A, 50KA (1 sec) shall be provided as per enclosed specifications, data sheets and drawings. These shall be fed from 415V outgoing feeder of MV switchboard located in the nearby substation.

For construction power requirement, 415V feeder from existing switchboard shall be identified and provided by BCPL from substation 3 (for Butene Unit), from Substation 2 (for HPG and PSA) and from offsite substation (for tankage area).

2.0 SCOPE OF WORK

- 2.1 The electrical scope covered under this tender includes complete electrical works pertaining to construction power system and associated miscellaneous works including lighting, earthing, cabling with major items as listed below :
- 2.2 New 415V Feeder pillars for construction power system with timer based lighting feeders.
- 2.3 New flood light masts of 30m height along with associated feeder pillar.
- 2.4 Relocation of 1 No existing Flood light mast.
- 2.5 Preparation of cable, lighting and earthing layout for the scope covered under this tender.
- 2.6 All associated work related to civil, structural, etc., are also included in the contractor's scope.

3.0 SUPPLY, INSTALLATION, TESTING AND COMMISSIONING

Scope of work shall include supply, installation, testing and commissioning of all equipment and systems to meet the requirement defined in specifications & data sheets attached with the tender and required for completion of the job including but not limited to the following. Detailed scope of work and quantities shall be as per Schedule of Rates enclosed with the tender.

- 3.1 Supply, installation, testing and commissioning of Outdoor "Kiosk" type feeder pillar distribution boards of ratings 415V, 400A, 50KA (1Sec) with padlocking facility.
- 3.2 Supply, Installation, Testing and commissioning of Grounding system including G.I. earth electrodes in test pits, PVC insulated Al earthing cables, wire ropes, earth strips, earth plate, etc.
- 3.3 Supply, laying and termination of 1100 V grade armoured power, control and lighting cables with Al/ Cu conductor, PVC insulated, extruded PVC sheathed (FRLS Type) cables with cable glands, lugs etc.
- 3.4 Supply, Installation, Testing and commissioning of straight through joints for 1.1 kV grade, Al/ Cu conductor power, control and lighting cables including all accessories.
- 3.5 Supply and installation of G.I. pipes for cable protection above ground, floor sleeves, and supports wherever necessary.
- 3.6 Supply and installation of Cable markers/ identification tags (SS-304), G.I. saddles, saddle bars and associated accessories.
- 3.7 Supply and installation of Nickel plated Single / double compression brass cable glands (Thread type: ET) & tinned copper lugs.
- 3.8 All other cabling accessories i.e. GI cable trays complete with structural supports, horizontal and vertical bends, conduits, etc. as required.
- 3.9 Supply, installation, testing and commissioning of telescopic tubular flood lighting High mast lighting system with LED fixtures for both hazardous areas and safe area.
- 3.10 Supply, Installation, Testing and commissioning of Lighting fixtures (Safe Area).
- 3.11 Supply and installation of all other hardware like nuts, bolts, washers, spring washers, grouting bolts etc. necessary for completion of job. All hardware shall be of SS-304.
- 3.12 Construction of ERC & SCRC including laying of PVC Pipes as per EIL Standard number 7-65-0006 and IS: 4985 including supply of all materials.
- 3.13 Construction of buried Precast Plain Concrete protection slabs for buried underground cables.
- 3.14 Supply and installation of Miscellaneous material like sand, bricks, plain cement concrete, bitumen etc. for minor civil works
- 3.15 Supply & filling of stone dust in Cable trenches including providing of brick protection by second class brick and concrete slabs as per instruction of engineer-in-charge.
- 3.16 Any other material though not specifically mentioned above but required for completion of the work as per specifications, drawings and instruction of Engineer-in-charge

Note: Quantities given in SOR are tentative. Contractor shall take approval of Engineer-in-charge / Owner before ordering of equipment / materials

4.0 EQUIPMENT / MATERIAL SUPPLIED BY EIL / OWNER

- 4.1 Disconnection, dismantling of existing high mast lighting system with feeder pillar and relocation of same with all associated equipments including installation, testing and commissioning of existing high mast lighting system with feeder pillar at new location inside refinery premises.

5.0 MISCELLANEOUS REQUIREMENTS

- 5.1 Scope of supply of glands & lugs and making of termination for all items rated up to 1.1kV, supplied by the contractor shall be part of the equipment under respective SOR item only, whether specifically mentioned or not in the item.
- 5.2 All MV power & control cables to be supplied shall have FRLS properties.
- 5.3 The job includes repairing of all civil works damaged during installation of electrical facilities and civil works connected with grouting of equipment, lighting poles, cable markers, earth pits etc.
- 5.4 Coordination between various agencies/ equipment vendor/ other contractors working at site and providing all assistance and interface connections as per drawings to enable others to take up testing and commissioning activities of their equipment/ systems.

- 5.5 Supply and installation of all other accessories not specifically mentioned herein but nevertheless necessary for completion of job.
- 5.6 Engineering and preparation of specifications and drawings for electrical equipment and installation wherever applicable/ required by owner and submitting the same to owner for review.
- 5.7 Preparation of field testing and commissioning procedures
- 5.8 Correction and submission of all owners' drawings for as - built status. (Hard and soft copies based on native AUTOCAD files provided to contractor).
- 5.9 Obtaining clearance and approvals for installation/ drawings from Central Electricity Authority / any other statutory authority for energizing the complete electrical facilities covered under this tender
- 5.10 It may be noted that no separate payment shall be made for any statutory approvals and the cost shall be deemed to be built in the rates quoted for various SOR items.
- 5.11 Other activities listed in data sheets/ vendor data requirement formats.
- 5.12 Any other item/ work/ activity which is not specifically listed but is necessary for completeness of electrical system as per specifications, drawings and instructions of Engineer-in -charge.

6.0 TECHNICAL SPECIFICATION FOR FEEDER PILLAR

- 6.1 Feeder pillar shall be 3-phase, 4-wire, 400A, 50KA (1Sec) suitable for outdoor.
- 6.2 Feeder pillar fixed type, free standing floor mounted type with 300mm festoon height.
- 6.3 Feeder pillar shall be IP-55, dust and vermin proof.
- 6.4 Paint shall be as 631 of IS-5.
- 6.5 Main busbar and earth bus bar sizing calculations shall be provided for the fault current specified and same shall be as per type test design.
- 6.6 Incomer feeder shall be provided with kWH meter.
- 6.7 CBCT shall be provided in outgoing feeders.
- 6.8 All wiring shall be done with FRLS, PVC insulated copper conductor wires having 660/1100 V grade. CT circuit wiring shall be done with 2.5mm² copper conductor. Other circuit wiring shall be done with minimum 1.5 mm² copper conductor.

7.0 CO-ORDINATION WITH OTHER CONTRACTORS/ AGENCIES

- 7.1 It is the responsibility of the contractor to coordinate and provide all necessary assistance to other contractors/ agencies/ vendors involved in the complex for proper and timely execution of the works.

8.0 SPECIFIC REQUIREMENTS

- 8.1 Various electrical works covered under this contract like equipment installation, cabling, lighting and earthing works, etc. shall be performed in accordance with the EIL standard specifications & installation standards enclosed with the tender document. (Certain clauses of specifications which are applicable to equipment or systems not covered under this contract shall be omitted).
- 8.2 Installation, testing and commissioning of equipment shall be performed in accordance with supplier's instructions and directions of the engineer-in-charge.
- 8.3 For construction power requirement, 415V feeder from existing switchboard shall be identified and provided by BCPL from substation 3 (for Butene Unit), from Substation 2 (for HPG and PSA) and from offsite substation (for tankage area).
- 8.4 Main incoming cables from existing substation 3/ Substation 2/ offsite Substation to feeder pillar installed by Contractor shall be laid on existing overhead cable trays. However where the existing cable trays are not available the same shall be laid in buried trenches. The cable trenches shall be excavated and back-filled after laying of the cables by the contractor only. The exact cable route shall be provided to the successful bidder.

- 8.5 Makes of electrical materials/ components/ equipments shall be selected out of the list given in the tender. All electrical equipment shall be brand new with state of the art technology and proven record. No prototype shall be offered. The make and type of equipment, if not specified in this tender shall be subject to OWNER / EIL approval.
- 8.6 All electrical equipment shall be said to be installed and mechanically complete after circuit testing and loop simulation is complete. Due care and consideration shall be given to the installation of all equipment, material and facilities.
- 8.7 Contractor shall coordinate with manufacturer of other equipment wherever required and shall freely and readily supply all technical information for this purpose as and when called for.
- 8.8 All equipments supplied by the contractor shall be supplied with nickel plated brass cable glands (where required) and tinned copper lugs and accordingly the quoted rates for the items in SOR shall be deemed to include the cost of these cable glands and lugs. The cable glands shall be single compression type and double compression type for indoor and outdoor equipment respectively.
- 8.9 All outdoor lighting fixtures & fittings shall be with IP-65 enclosure. Terminal blocks for these shall be bolted type. Also all fixing/mounting hardware shall have MOC as SS-304.
- 8.10 All other Electrical equipment, materials and work not explicitly mentioned but nevertheless required to fulfil the following minimum requirements shall be deemed to be included in the scope of the CONTRACTOR with no additional cost and time implication to OWNER / EIL
 - a) Achieving the plant equipment and personnel safety.
 - b) To meet the equipment and environment safety.
 - c) To suit site facilities and environmental conditions.
 - d) To meet the requirement of statutory approving authority
 - e) To co-ordinate with other CONTRACTORS and agencies involved in at site for other activities and site work.

8.11 LIGHTING SYSTEM

- 8.11.1 All lighting fixtures shall be suitable for the area in which they are installed.
- 8.11.2 All lighting fixtures shall also have independent earth terminal outside the enclosure.
- 8.11.3 For LED fixture, integral junction box shall be provided with 3 nos. cable entries for loop-in, loop-out and associated wiring to fixture. Alternatively 2 nos. cable entries for loop-in and loop-out shall be provided with internal wiring for driver and lamp.
- 8.11.4 All lighting fixtures shall be supplied complete with associated LED lamp and driver.
- 8.11.5 LED Driver shall be suitable for surge protection upto 2 kV surges.
- 8.11.6 Flameproof LED type lighting fixtures shall fulfill the following requirements:
 - a) Power factor shall be ≥ 0.95 .
 - b) For FIXTURE luminous efficacy shall be minimum 100 lumen per watt.
 - c) LED lamps and Drivers shall be provided with min. 5 years warranty period. Driver shall have valid BIS certification and the same shall be furnished during drawing review stage.
 - d) The LED light fixtures should be tested for luminous lux level as per IES-LM-79. Type test certificates shall be furnished in compliance to same. Type test certificates for LM-79 for all fixtures shall be from a NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited Lab or UL Laboratory.
 - e) The LED's used in the lighting fixtures should be tested for the service life as per IES-LM-80. Type test certificates shall be furnished in compliance to same.
 - f) The LED Driver shall comply with the requirement of IEC 61347-2-13.
 - g) All fixtures shall be suitable for installation in Zone-1/Zone-2 areas. Flameproof LED lighting fixtures shall comply with the requirement of IEC 60079-1 & 0.
 - h) Fixture life time (L70) shall be > 50000 hrs. at ambient temp of 40 deg C.
 - i) LED fixtures shall be complete with internal reflectors. No external reflector is envisaged for LED.
 - j) LED Lighting fixture beam angle shall be 120 deg/ 90 deg depending upon fixture location and mounting height.
 - k) Vendor shall indicate the following parameters as a minimum in fixture drawings:

- Offered Fixture Wattage and LED Wattage
- Actual Consumption of Fixture
- Driver Consumption
- Fixture Life time
- Luminous Efficacy of fixture
- Lumen Output of Fixture
- Tolerance for Voltage and wattage rating
- Power factor of Fixture
- Beam Angle of Lighting Fixture
- Weight of Fixture
- LED LAMP and Driver Warranty Period
- Driver Surge Protection
- Compliance to IEC-61347-2-13 for LED Driver
- BIS Certification no. for Driver
- Driver Make and Model No.
- LED Make and Model no.
- LED type i.e. COB (Chip on Board) or Multichip etc.
- Quantity of Fixtures
- No. of Cable entries for Fixture along with quantity of FLP Cable glands and FLP Stopper plug.
- PESO/CIMFR/BIS License certificates numbers along with dates.
- Filled up Table -1 below

TABLE - 1

	LED-5 (Flood light 90W)	HML-FIXTURE (1x400W)
Offered Model No.		
Voltage Rating		
Lumens output (Lumens)		
Fixture		
LED		
Luminous efficacy (Lm/watt)		
Fixture		
LED		
Wattage		
Fixture		
LED		
L70 life at 40 deg C		
Fixture		
LED		
Overall Power factor		
Type test certificate availability		

1.	LED-5	Weather Proof flood light LED lighting fixture (Min 90W) suitable for use in safe area complete with LED lamp, LED driver, reflectors, mounting hardware, clamps & brackets etc. (Light Output i.e. LUMENS of fixture min. 100 LM/ Watt.)
2.	HIGH MAST LED FIXTURE	Flood light LED lighting fixture complete with LED lamp (1X400W), LED driver, reflectors, mounting hardware, clamps & brackets etc. (Light Output i.e. LUMENS of fixture min. 100 LM/ Watt.)

9.0 STATUTORY APPROVAL OF WORKS

- 9.1 Contractor shall make an application on behalf of the owner for submission to the Electrical Inspectorate along with copies of required certificates complete in all respects and submit to the engineer-in-charge for onward transmission well ahead of time so that the actual commissioning of system/ equipment is not delayed for want of inspection by the Inspector. Contractor shall arrange the actual inspection of work by the Electrical Inspector. Necessary coordination and liaison work in this respect shall be the responsibility of the contractor.
- 9.2 The Inspection and acceptance of work as above shall not absolve the Contractor from any of his responsibilities under this contract.
- 9.3 Any other statutory approval of works required for the electrical installation (such as Factory Inspector, CCOE, etc.) is also included in contractor's scope.

10.0 INSPECTION, TESTING AND COMMISSIONING

- 10.1 Site inspection, testing and commissioning of electrical installation shall be carried out as per enclosed Specification no. 6-51-0087 and Inspection and Test Plans listed in the list of attachments.
- 10.2 All the equipment installed by the contractor shall be tested and commissioned, as required and no separate payments shall be made unless otherwise specified in the Schedule of Rates. Contractor shall carefully inspect all equipment before receiving them from owner/ EIL for installation purposes. Any damage or defect noticed shall be brought to the notice of the engineer-in-charge at that time.
- 10.3 Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the contractor shall carry out the rectification at his own cost.
- 10.4 The contractor shall carry out all the tests as enumerated in the tender and technical specifications and technical documents which may be furnished to him during performance of the work.
- 10.5 Before the electrical system is made live, the electrical contractor shall carry out suitable tests to establish to the satisfaction of Engineer-in-Charge/ Owner/ EIL that the installation of equipment, cabling/ wiring and connections have been correctly done and are in good working condition and that the system/ equipment will operate as intended.
- 10.6 All tests shall be conducted in the presence of Owner/ EIL/ Engineer-in-Charge or his authorized representative unless he waives this requirement in writing. Contractor shall arrange testing equipment, as required to carry out the tests. Test results shall be recorded on approved Performa and certified records of the tests shall be submitted to Owner/ EIL/ Engineer-in-Charge.
- 10.7 Owner/ EIL/ Engineer-in-Charge shall have the right to get the defects rectified at the risk and cost of the contractor if he fails to attend to the defects immediately as desired.
- 10.8 Contractor shall also inform Owner / Engineer-in-charge, well in advance in case services of any OEM (Equipment manufacturer) is required. Contractor shall do necessary coordination for mobilization of OEM specialist after obtaining permission of Owner / Engineer-in-charge.
- 10.9 Contractor shall furnish site acceptance test (SAT) procedures from the equipment supplier and get it approved from OWNER / EIL before carrying out the same at site.
- 10.10 Contractor shall prepare detailed testing, pre-commissioning and commissioning procedures for the entire installation. These shall include Performa for defining activities and recording of test results.
- 10.11 The following equipment/ items as included in Contractor's scope of supply shall be tested and inspected by EIL/owner or his authorised representative before dispatch at the manufacturer's works. Test certificates duly signed by EIL/ Owner/ Owner's authorized representative shall be submitted by the contractor as part of the final document
 - High mast lighting system

11.0 SYSTEM TESTS AND START-UP.

- 11.1 Complete testing of power distribution system in the plant would be carried out under the supervision of the owner/ EIL/ engineer-in-charge. The contractor shall provide as part of the works and within his quoted rates, on round the clock basis, skilled personnel and supervisors to carry out the plant testing.

The number and category of skilled personnel to be deployed by the contractor shall be decided by the engineer-in-charge and the contractor shall abide by his decision.

- 11.2 During start-up of the plant, the Contractor's responsibilities would be limited to attending to the defects attributable to him in the plant as and when they are brought to his notice. Defects shall be rectified at the risk and cost of the contractor if he fails to attend to these defects immediately.
- 11.3 After the operating conditions are fully achieved in all the plants and the requirement as stated in General Conditions of Contract are fulfilled, the contractor would be eligible for applying for a completion certificate.
- 11.4 Where the works are carried out at the cost of the contractor, the engineer-in-charge would recover the actual cost incurred towards, labour, supervision and materials, consumables or otherwise, plus 10% towards overheads, from any pending bill of the contract or the security deposit.

12.0 DRAWINGS

- 12.1 The drawings accompanying the tender document are indicative of the nature of work and issued for tendering purpose only. The purpose of these drawings is to enable the tenderer to make an offer in line with the requirements of the owner. However, no extra claim, whatsoever, shall be entertained for any variation between the 'Approved for Construction (AFC)' and 'Tender Drawings' regarding any changes. Construction shall be carried out as per drawings / specifications issued / approved by the engineer-in-charge during the course of execution of work. Detailed construction drawings on the basis of which actual execution of work is to proceed will be furnished to the contractor progressively based on the detailed construction program evolved after the award of work and also based on construction progress achieved by the contractor.
- 12.2 Prospective tenderer shall be deemed to have studied the drawings enclosed with tender or displayed for scrutiny and fully understood the nature and magnitude of the work before submitting the bids.
- 12.3 Where the contractor has to prepare drawings for fabrication, contractor shall submit the drawings to engineer-in-charge and the approval in writing of the engineer-in-charge shall be obtained before commencing fabrication.
- 12.4 After the job completion, contractor shall prepare 'As-Built' drawings. Final certified 'As- Built' drawings shall be submitted by the contractor to owner in bound volumes and in soft files/ CDs (refer instruction given in vendor data requirement document).
- 12.5 Contractor shall submit equipment manufacturer's drawing for supply items like compact substations, feeder pillars etc. for the review of Engineer-in-Charge in five sets of prints and the approval in writing of the Engineer-in-Charge shall be obtained before commencing manufacture. However, it is to be understood that the review of drawings shall not absolve the basic responsibility of contractor to check total compliance to specifications included in tender document. Final drawings in bound volumes in ten sets shall be submitted by contractor to owner.
- 12.6 In addition to above mentioned as-built documents, Contractor shall provide the following documents relevant to the supplied equipment as required for operation, maintenance and staff training
 - a.) Design documents, certificates relating to type/acceptance/special tests, installation manuals, field testing procedures.
 - b.) Operating instructions including description of start-up procedures and descriptions of conditions of use.
 - c.) Maintenance instructions including preventive maintenance instructions/periodic inspection programmes, procedures for removing/replacing all parts and accessories, list of spare parts and consumables together with the information required for ordering them from manufacturers. Sub-suppliers of individual components shall be clearly identified. Communication addresses shall be indicated for each reference.

13.0 APPROVED MAKES OF EQUIPMENT & COMPONENTS

- 13.1 Contractor shall restrict the makes of materials/ components supplied by him to the following

-
- 13.2 Contractor may procure materials from any of Owner/ EIL approved vendors. However, current validity and range of approval as per EIL enlistment letter, workload, stability and solvency need to be verified by the contractor before placement of order.
- 13.3 Contractor can offer components of makes other than specified in the tender during order execution, in case of non-availability of material from EIL approved vendors. The alternate make of components will be evaluated post order, based on the satisfactory track record and test certificates to be furnished by the contractor. In case the alternate makes are not found acceptable, components shall be supplied strictly as per above vendor list.
- 13.4 For items for which vendors are not listed above, make of components will be evaluated post order, based on the satisfactory track record and test certificates to be furnished by the contractor.