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***Project: Gopalpur Palm Resort –  
Swosti Group***

*Request for Proposal:*

*Supply, Installation, Testing & Commissioning of 2 X 750 kVA  
prime rating Radiator cooled diesel generating set and Allied  
Works - at Gopalpur Palm Resort for Swosti Premium  
Ltd., Gopalpur, Ganjam,*

*on*

*Item Rate Contract Basis*

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## INTRODUCTION

### **Background**

Swosti Premium Ltd., a leading hospitality group in Odisha, the owner and developer of a hospitality project titled Gopalpur Palm Resort located at Gopalpur, Odisha(hereafter referred to as “The Client”) is undertaking the development of a world-class hospitality destination under the brand “**Gopalpur Palm Resort**” at Gopalpur-on-Sea, District Ganjam, Odisha. The project envisions a premium coastal resort comprising a luxury hotel of B+G+9 storied building with 124+ keys, banquet and MICE facilities, restaurants, landscaped areas, spa & wellness, swimming pools, and associated amenities.

In pursuit of delivering a high-standard facility within a fixed timeframe, Swosti Premium Ltd. intends to select a reputed Original Equipment Manufacturer(OEM) for Supply, Installation, Testing & Commissioning of 2 X 750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam on Item Rate **Contract** Basis.-

### **Project Summary**

<b>Pkg. No.</b>	<b>Name of Work</b>	<b>Estimated Cost</b>	<b>Construction Period</b>	<b>Maintenance Period</b>
05	Supply, Installation, Testing & Commissioning of 2 X 750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam,	₹ 180 Lakhs*	6(Six) Months	1 Year (DLP)+ 5 (Five) Years Paid

\*Estimated Cost is exclusive of GST and based on current project planning and scope.

### **Scope of Work**

The selected Bidder (hereafter referred to as the “**Contractor**”) shall be responsible for the following deliverables as per the terms of the Item Rate contract:

- **Supply, Execution, Testing & Commissioning** based on issued GFC drawings
- **Procurement & Execution** of materials, manpower, equipment, and tools
- **MEP related facilitation with Civil Contractor in Coordination** with PMC as per client-appointed agency's requirement.

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## **PREAMBLE**

- 1 The work shall be carried out strictly in compliance with this tender and design requirement. The onus of demonstrating satisfactory performance of entire system shall be sole responsibility of the contractor and supplied material shall be as per specifications and approved shop drawings. Relevant Indian Standards shall be adhered. It is to be understood that all liabilities and risks arising out of the stated conditions of contract shall be covered by contractor and Owner/Consultant shall be indemnified.
- 2 The unit rate for all items in the BOQ shall be quoted in Indian Rupees (INR) and include cost of equipment, wastage, accessories, tools, appliances, labour, installation, testing & commissioning upto satisfactory handover.
- 3 The contractor shall ensure that unit price of each item includes cost of Equipment, materials, fixing accessories, appliances, tools, plants, transport, labour and incidentals required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of work called for in the item and as per Specifications and Drawings.
- 4 The contractor to ensure that all waste and debris is collected and satisfactorily disposed off from site.
- 5 The contractor shall ensure that unit price of each item includes loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fixing in position and insurance upto satisfactory handover including security.
- 6 The specifications and drawings shall be read in conjunction to the Bill of Quantities. In case of conflict between Bill of Quantities and other documents including the specifications, the most stringent shall apply. The interpretation of the Architect / Consultant /Project Manager shall be final and binding
- 7 The quantities mentioned in the BOQ are for contractor guidance only.The actual procurement of material shall be done only after written approval of shop drawings & technical submittals. This shall also apply to the Contractor's requisition for Owner supplied materials. The contractor shall be solely responsible for material supplied at site.
- 9 The contractor shall ensure work is carried out in conformity with the approved shop drawings and taking cognizance of latest architectural and other disipline drawings. The execution at site should be based on coordinated shop drawings or after obtaiing written approval of Project Manager/Architect/Consultant.
- 10 The progress of work shall be in accordance with approved pert chart which will be prepared by Contractor at the time of award of work and duly revised from time to time.
- 11 All shop drawings will be made on Autocad or Revit as per Project Manager requirement. Coloured prints shall be provided for site work. The shop drawings will clearly indicate requirement of hangars, supports, quantities and instructions for installation.
- 12 The information contained in this bid document, or any other information subsequently provided to Bidders—whether verbally, in documentary form, or by any other means—by or on behalf of the Client or any of its employees or advisers, is provided to the Bidders on the terms and conditions set out in this bid and such other terms and conditions subject to which such information is provided.
- 13 This bid document is not an agreement, nor is it an offer or invitation by the Client to any prospective Bidder or any other person. The purpose of this bid is to provide interested Bidders with information that may be useful in formulating their Proposals pursuant to this bid process. • This document includes statements that reflect various assumptions and assessments made by the Client in relation to the Services. Such assumptions, assessments, and statements do not purport to contain all the information that each Bidder may require. This bid may not be appropriate for all persons, and it is not possible for the Client, its employees, or advisers to consider the objectives, technical expertise, and particular needs of each party who reads or uses this bid.
- 14 The assumptions, assessments, statements, and information contained in this document may not be complete, accurate, adequate, or correct. Each Bidder should therefore conduct its own investigations, analysis, and due diligenG.M(B D),Swosti Premium Ltd and should check the accuracy, adequacy, correctness, reliability, and completeness of the information contained in this

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bid and obtain independent advice from appropriate sources. Information provided in this bid to Bidders covers a wide range of matters, some of which depend on interpretations of law. The information provided is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Client accepts no responsibility for the accuracy or otherwise of any interpretation or opinion on the law expressed herein.

- 15 The Client, its employees, and advisers make no representation or warranty and shall have no liability to any person, including any Bidder, under any law, statute, rule or regulation, or under the principles of tort, restitution, or unjust enrichment, for any loss, damage, cost, or expense which may arise from or be incurred or suffered on account of anything contained in this bid or otherwise, including the accuracy, adequacy, correctness, reliability, or completeness of this document, or any assumption, statement, or information contained in or deemed to form part of this bid, or arising in any way in this selection process.
- 16 The issuance of this bid document does not imply that the Client is bound to select any Bidder for the provision of the Services, and the Client reserves the right to reject all or any of the Proposals without assigning any reasons whatsoever. •The Client may, in its absolute discretion—but without being under any obligation to do so—update, amend, or supplement the information, assessment, or assumptions contained in this bid.
- 17 The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Proposal, including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Client, or any other costs incurred in connection with or relating to its Proposal. All such costs and expenses shall remain with the Bidder, and the Client shall not be liable in any manner whatsoever for the same or for any other costs or expenses incurred by a Bidder in the preparation or submission of the Proposal, regardless of the conduct or outcome of the selection process.

**Swosti Hotels**

(A Unit of Swosti Premium Ltd.)

Corporate Office: Swosti Premium,  
Jaydev Vihar, Bhubaneswar – 751013, Odisha

Email: [info@swostihotels.com](mailto:info@swostihotels.com)

Website: [www.swostihotels.com](http://www.swostihotels.com)

**File No.: PMC/SPL/GPR/2025/01**

**Letter No.: 002 / Gopalpur, Date: 10th March 2026**

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## **LETTER OF INVITATION**

Swosti Premium Ltd, on behalf of Gopalpur Palm Resort (A Unit of Swosti Premium Ltd), invites sealed bids for the Supply, Installation, Testing & Commissioning of 750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam, on a Item Rate Contract Basis for selection of a qualified agency to whom the project may be awarded.

The bid documents will be made available from 10.04.2026 10.00 am IST to 28.04.2026 5 pm IST at designated link or upon request physically from Swosti Corporate Office, Bhubaneswar or through official mail ID .Bid document can be downloaded from the website - <https://www.swostihotels.com/tenders.html>

The completed proposals shall be submitted in hard copy (physical submission) at the address specified in the bid document no later than 3:00 PM on **29.04.2026**.

Three days before the scheduled Pre-Bid Meeting the intending bidders are requested to visit the site for accessing bid document and submit their queries in written form via their official mail ids or through registered postal service addressed to Swosti corporate office.

The Pre-Bid Meeting will be held on **27.04.2025 at 1.00** PM via Zoom/Physical mode. Meeting link/Venue shall be shared subsequently.

All received proposals will be opened at **6:00 PM on 29.04.2026** in the presence of authorized representatives of the bidders (not mandatory), at the venue communicated via email.

Swosti Premium Ltd reserves the right to reject any or all bids without assigning any reason thereto and shall not be liable for any costs incurred by bidders in the preparation or submission of proposals.

All subsequent corrigenda, clarifications, or updates (if any) will be circulated through official communication only via:

gm.communications@swostihotels.com

pmc.swosti@arkitechno.com

**Gopalpur Palm Resort**

**(A Unit of Swosti Hotels)**

**gm.communications@swostihotels.com**

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**Swosti Premium Ltd. Gopalpur Palm Resort Project,Gopalpur,Ganjam**

DATED: 10.04.2026

**DETAILED TENDER NOTICE**

1. Last Date & Time of issue of tender documents from 10.04.2026 to 28.04.2026
2. Last Date & Time of receipt of tender 29.04.2026 upto 3.00 p.m.

G.M(B D),SWOSTI PREMIUM LTD Swosti Premium Ltd ,Bhubaneswar on behalf of Swosti Premium Ltd invites sealed item rate tenders from eligible contractors for similar works.

Name of work: **Supply, Installation, Testing & Commissioning of 2 X 750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam,**

Estimated cost of work put to tender : Rs. 180 Lacs

Time of completion : 6 Months

Earnest Money Deposit: **Rs. 1,80,000/- (Rupees One Lacs Eighty Thousand only)** is to be submitted with tender document as earnest money. The above payment shall be made in the shape of deposit at pay order/demand draft of a scheduled bank issued in favour of **Swosti Premium Ltd payable** at New Delhi.

Works to be completed in coordination with the main Civil & MEP Interior works contractor. No extra for non-availability of fronts or coordination with main agency shall be payable on account of the same.

Tender documents can be downloaded from SWOSTI PREMIUM LTD website ([www.Swosti Premium Ltd .ac.in](http://www.Swosti Premium Ltd .ac.in)) and submitted with non-refundable DD of **Rs. 11800/-** in favour of **Swosti Premium Ltd** as cost of tender.

- 1) The tenders shall be placed in sealed envelopes with a name of work and due date written on the envelope and addressed to the G.M(B D),SWOSTI PREMIUM LTD SWOSTI PREMIUM LTD. Complete tender documents shall be submitted by the approved contractors in **two envelopes**. **1<sup>st</sup> envelope** shall contain the earnest money in the shape of Demand Draft / Pay Order of a scheduled Bank requisite shape as per condition & eligibility criteria and cost of tender as stated above along with “Technical Bid “ and supporting documents . The **2<sup>nd</sup>** sealed envelop shall contain the ”Financial Bid” . Both the sealed envelops shall be contained in another envelop , sealed and super scribed with the “Name of the Work”, the name and detailed address of the bidder as well as contact phone number & e-mail id. This sealed envelop has to be submitted at designated place as indicated in the bid document.
- 2) The eligible contractors who have carried out similar works in Reputed Private Hotel Chain/Govt Depts/PSU/Reputed Pvt sector /MNCs are to submit the experience certificates for the works and registration certificates with Govt. Depts. if any. The said certificates along with the EMD be enclosed in Envelope-1.

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- 3) Experience of having successfully completed similar works during last seven years ending on the 31.12.2025. **The Similar works shall mean works of Minimum 1500 kVA capacity DG Set.** The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from date of completion to last date of receipt of tenders.

Three similar works not less than 40 % of est.cost	Rs 72.00 lacs each Or
Two similar works not less than 60 % of est cost	Rs 108.00 lacs each Or
One similar work not less than 90 % of est cost	Rs 172.00 lacs each

The work of similar nature should have been executed under Central/State/Autonomous/Central PSU/State PSU/local authority/Reputed Hotelier Group formed under any Act in Central/State .

- 4) **The bidder should be Original Equipment Manufacturer or authorized dealers of OEM and certificate/corroborative documentary evidences are required be submitted along with the bid.**
- 5) The applications not supported with requisite experience certificates, GST registration certificate and ITCC in Envelope-1 shall not be entertained
- 6) Solvency certificate for Rs. 70 lacs from any nationalized /scheduled bank. The applicant shall submit the solvency certificate, not older than six months prior to 30<sup>th</sup> September 2025, issued by any scheduled bank, in original.
- 7) Average Annual Turnover over HVAC works should be at least Rs 360 lacs during immediate last 3 consecutive financial years ending 31<sup>st</sup> Mar 2025.
- 8) Should not have incurred any loss in the more than two years in the last five years ending 31<sup>st</sup> Mar 2025.
- 9) Company should not have been barred / blacklisted for taking up similar work in any organization- A certification to this effect on the letter head of the bidder.
- 10) Performance certificates issued by past employers must be submitted by the vendors for the works, in support of their experience.
- 11) Bidder shall furnish list of the supervisory persons and other technical persons he wishes to deploy in this job along with their experience details.
- 12) Letter of Authority for signing and negotiation of bid.
- 13) The 2<sup>nd</sup> **envelope** shall contain the financial bids including Priced Schedule of Quantities sealed,
- 14) The 1<sup>st</sup> envelop should contain Form of Tender, Conditions of Tender, Articles of Agreement, Brief Specifications, Condition of contract, Drawings all duly signed by the authorized signatory of the firms.

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1<sup>st</sup> and 2<sup>nd</sup> envelopes are to be put in a single envelope duly super-scribed the name of work, and addressed to G.M(B D),SWOSTI PREMIUM LTD and with their address. In case the tenderer does not fulfill the laid down eligibility criteria or fails to deposit the earnest money in prescribed form, financial bid shall not be opened.

Tenderers shall seal the tender after affixing their initials and put stamp on each and every page of tender document before submission. The tender of the contractor, who submits in-complete tender document or submits more than one tender for one work, shall not be considered at all.

Tenders will be received by the **G.M(B D),SWOSTI PREMIUM LTD up to 3.00 P.M on 29.04.2026** and will be opened by him or his authorized representative in the office of Registrar, SWOSTI PREMIUM LTD on the same day at **6.00 P.M.**

First the Technical Bids will be opened and screened. The bids shall be examined whether the EMD is in order and the bidder meets the minimum eligibility criteria specified above. . Those bidders whose EMD is in order, meets the minimum eligibility criteria, has submitted all the required documents and meet the technical requirements shall be considered for opening of financial bid. Conditional tenders would not be accepted. Financial bids in respect of contractors who do not fulfill above criterion shall not be opened.

15) No Xerox / certified copies of tenders shall be accepted, if submitted these tenders shall be rejected.

16) **Pre- bid meeting** - A pre bid meeting will be held as on **18<sup>th</sup> April 2026** at 1.00 PM - Any doubts or queries of the potential bidders will be addressed during the hybrid meeting. Venue: Hotel SWOSTI PREMIUM LTD /Zoom Link.

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### **SECTION-1 INSTRUCTION TO BIDDERS (ITB)**

1. The time allowed for carrying out the construction work will be 6 months from the 7<sup>th</sup> day after the date of written orders to commence the work.
2. The site for the work is available.
3. During execution of works, because of some unforeseen circumstances to enable him to complete the work as per terms of the contract, shall not relieve the contractor from any liability or obligations under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents or workmen as fully as if they were the acts, defaults or neglects of the contractor, his agents or workmen.
4. The Contractor shall be required to deposit an amount equal to 3% of the tendered value of the work as performance guarantee in the form of an irrevocable bank guarantee bond of any scheduled bank or State Bank of India in accordance with the form prescribed or in the form of fixed deposit receipt etc. within 15 days of the issue of letter of acceptance. The performance guarantee shall have the validity up to 31st Jan 2027.
5. Tenderers are advised to inspect and examine the site and its surrounding at their own cost and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risk, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at own cost all materials, tools and plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specification of the work to be done, local condition and other factors having a bearing on the execution of the work.
6. The Accepting Authority -SWOSTI PREMIUM LTD does not bind himself to accept the lowest or any other tender and reserves to him/herself the authority to reject in whole or part, any or all of the tenders received without the assignment of any reason. All tenders in which any of the prescribed conditions are not fulfilled or for any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.

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7. Canvassing, whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the contractor who resort to canvassing will be liable to rejection.
8. The Accepting Authority reserves to himself the right of accepting the whole or any part of the tender and the tender shall be bound to perform the same at the rates quoted.
9. Tenders shall remain open for acceptance for a period of 60 days from the date of opening of the tenders. If any tenderer withdraws his tender before the said period for issue of letter of acceptance, whichever is earlier or makes any modification in the terms and condition of the tender which are not acceptable to the SWOSTI PREMIUM LTD , then SWOSTI PREMIUM LTD shall, without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely besides black listing of the tenderer.
10. The notice-inviting tender shall form a part of the contract document. The successful tenderer/contractor shall, sign the necessary contract documents consisting of the notice inviting tender, all the documents including additional conditions, specification and drawings, if any forming the tender as issued at the time of invitation of tender and acceptance thereof with any correspondence leading thereto within the time specified in the letter communicating the acceptance of the tender. In case of delay, the earnest money may be forfeited and the tender cancelled or the contract enforced as per the terms of the tender and the invitation to tender and the tenderer shall thus be bound by the condition of contract even though the formal agreement has not been executed and signed within the specified time by the tenderer.
11. The work shall be carried out as per general of conditions of contract (Tender Contract) and form part of the agreement/document.
12. Contract is liable to be terminated by the SWOSTI PREMIUM LTD without payment of any compensation, if subsequent to the acceptance of tender the contractor is black- listed by, or enters into partnership of any black listed contractor of the SWOSTI PREMIUM LTD or any other department, or Govt. or its, undertakings.
13. Cost of Bidding
  - 13.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.
14. Clarification of Bidding Documents
  - 14.1** A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing/mail at the Employer's address indicated in the invitation to bid not later than 7 days before the Date of Submission of Tenders. Email- [admin-project@Swosti Premium Ltd.ac.in](mailto:admin-project@Swosti Premium Ltd.ac.in)

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15. Currencies of Bid and Payment

15.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees. All payments will be invariably made in Indian Currency (Indian Rupees.)

16. PROTECTION OF ENVIRONMENT AND OTHER LAWS:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and other local Acts/ Laws/ rules made there under, regulations, notifications and bye-laws of local authorities or any other law, bye-laws, regulations that may be passed or notification that may be issued in this respect in future by the State/ Local authority.

17. Evaluation of Bids Received : Detailed at following section

For and on behalf of the  
Swosti Group of Hotels, Resorts, Travels & Educations  
GM Corporate Communications.  
Cell- 9938244538  
Email: [gm.communications@swostihotels.com](mailto:gm.communications@swostihotels.com)

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### Bid Data Sheet

#### Bid Identification No.: SWOSTI/GPR/TENDER/CCW/05/2026-27

The Swosti Premium Ltd., invites sealed, offline bids from reputed and experienced civil construction firms for the following work on lumpsum basis contract. Project details are as under:

#### Tender Summary

Sl. No.	Particulars	Details
1	Name of Work	<b>Supply, Installation, Testing &amp; Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam,on a Item Rate Contract Basis</b>
2	Project Location	Plot No. 182/552/617 & 184/618, Khata No. 102 (AJA), Gopalpur-on-Sea, Ganjam District, Odisha
3	Nature of Contract	Item Rate Contract
4	Estimated Project Cost	₹180 Lalhs (One Hundred Eighty Lakhs Only)
5	Time for Completion	06(Six) Calendar Months from date of LOA
6	Number of Packages	01 (One)
7	Eligibility	Reputed OEM having successfully completed similar scale works. <b>Relevant Project Experience must include:</b> <ul style="list-style-type: none"><li>•IT/Office Buildings</li><li>•Commercial or Hospitality Projects</li></ul>
8	Cost of Tender Document	₹11,800/- (Including GST)(Non-refundable, to be paid via Demand Draft(DD) in favor of "Swosti Premium Ltd.")- Including GST
9	Availability of Tender Documents	From <b>17.04.2025 to 28.04.2025 up to 5.00 PM</b> – a) From the Swosti Hotels website - <a href="https://www.swostihotels.com/tenders.html">https://www.swostihotels.com/tenders.html</a>
10	Seeking Queries on RFP Document(Through email/Letter)	<b>18.04.2025 upto 3:00 PM</b> a) E-mail id. <a href="mailto:manoj@manoj.com">manoj@manoj.com</a> b) Address : Swosti Hotels Corporate Office: Swosti Premium, Jaydev Vihar, Bhubaneswar – 751013, Odisha
11	Pre-Bid Meeting	<b>18.04.2025 at 1:00 PM</b> at Swosti Corporate Office, Bhubaneswar/Zoom Link in virtual mode
12	Last Date of Submission of Bids	<b>29.04.2025 up to 3:00 PM</b> (Sealed Envelopes at Swosti Corporate)
13	Opening of Technical Bids	<b>29.04.2025</b> at 6:00 PM in presence of PMC & Client

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Sl. No.	Particulars	Details
14	Technical Presentation (By technically qualified bidders)	Not Applicable
15	Opening of Financial Bids	Exact date and time shall be informed to qualified bidders atleast 48 hours of date of opening.
16	Mode of Tender	Offline, Physical Submission – Two Envelope System (Technical + Financial)
17	Bid Validity	90 Days from Last Date of Submission of Bids
18	Communication Email	<a href="mailto:manoj@arkitechno.com">manoj@arkitechno.com</a> <a href="mailto:pmc.swosti@arkitechno.com">pmc.swosti@arkitechno.com</a>

The bids must be submitted in hard copy (manual mode) in two separate sealed envelopes contained in another sealed envelope, marked clearly as “Technical Bid” and “Financial Bid”, mentioning the name and address of bidder, superscribed with title of work put to bids, along with all documents as prescribed in the bid document hereunder.

The client reserves the right to cancel the bidding process and/or reject any or all bids without assigning any reason there to. Corrigendum to bidding process/bid document if issued, subsequent to pre-bid meeting, shall be shared directly with bidders seeking clarification on or before pre-bid meeting/ participating in pre-bid meeting via email provided by them.

*Authorized Signatory*

Mr. Nihar Ranjan Sahoo, GM Corporate Communications.

Swosti Group of Hotels, Resorts, Travels & Educations

Cell- 9938244538

Email: gm.communications@swostihotels.com

Gopalpur Palm Resort Project  
On behalf of Swosti Premium Ltd.

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## Evaluation Criteria

(Clause 1.1 of Instructions to Bidders – Gopalpur Palm Resort Project)

### INTRODUCTION

- This Evaluation Criteria outlines the method by which bidders for the bids received will be evaluated based on their technical and financial qualifications, experience, project-specific understanding, organizational setup, and resource readiness.
- The evaluation will be conducted in accordance with the Instructions to Bidders (ITB) and is applicable to **Cover-I: Technical Bid**. Only those bidders who qualify under the technical evaluation will be considered for the opening and evaluation of their **Cover-II: Financial Bid**.

### EVALUATION OF TECHNICAL BID (COVER-I)

The Technical Bid will be evaluated based on the following five main criteria:

Sl. No	Evaluation Criteria	Maximum Marks
a	Financial Strength	25
b	Experience in Similar Nature of Work	25
c	Working Methodology and execution of similar nature of work(DBR)	25
d	Key Personnel	25
	<b>Total</b>	<b>100</b>

### Criteria/Sub-Criteria of TECHNICAL EVALUATION

#### **Financial Strength – 25 Marks**

Component	Max. Marks	Evaluation Basis
(i) Annual Financial Turnover (as per Bid Data Sheet)	20	70% marks for minimum eligibility criteria; 100% for twice the minimum. In between – on pro-rata basis.
(ii) Liquid Assets (as per Clause of Bid Data Sheet)	5	70% marks for minimum eligibility criteria; 100% for twice the minimum. In between – on pro-rata basis.

#### **Experience in Similar Nature of Work – 25 Marks**

Description	Max. Marks	Evaluation Basis
Completion of Similar Projects of Bid Data Sheet)	25	70% marks for minimum eligibility; 100% for twice the minimum. In between – on pro-rata basis.

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**Methodology and Work Program – 25 Marks**

Bidder shall submit a detailed Design Basis Report covering approach to execution of civil works. Assessment will be based on content, specificity, and alignment to project needs.

Component	Marks
Technical Specifications for Materials & Workmanship	10
Project Execution Schedule / Work Programme	10
Approach & Methodology (project-specific)	5
<b>Total</b>	<b>25</b>

**Key Personnel – 25 Marks**

The following key personnel must be proposed and CVs submitted:

Position	Qualifications & Experience	Max. Marks	Evaluation Basis
<b>Project Manager(1 No)</b>	B.E./B.Tech Mech/Elect with 10+ years	15	Graduation (5), Experience ( Exp. 10 yrs-7 , Higher - 10)
<b>Site Engineer-HVAC (1 No)</b>	B.E. with 3 yrs/Diploma with 7+ years in Mech	5	Graduation (2),Dip- (1), Experience ( Exp. 7 yrs-2 , Higher - 3)
<b>Site Engineer-Elect (1 No)</b>	B.E. with 3 yrs/Diploma with 7+ years in Elect	5	Graduation (2),Dip- (1), Experience ( Exp. 7 yrs-2 , Higher - 3)

**GENERAL NOTES**

- Bidders must furnish all necessary supporting documentation for substantiating the information.
- Only those bidders who score **70 marks or more (out of 100)** in Technical Evaluation shall be considered for opening of their “Financial Proposal”

**Enhancement Factors for Past Financial Years (for Turnover/Experience Updating):**

Year Before	Enhancement Factor
One	1.10
Two	1.21
Three	1.33
Four	1.46
Five	1.61

[Type here]

## **SECTION-2-FORMS & FORMATS**

[Type here]

## **DOCUMENTS TO BE FURNISHED BY BIDDER**

1. Documents as specified in Section 1, must be submitted by the Bidder in the Formats mentioned in Section 2 along with the BID.
2. Any other document, if asked by Employer for clarification during evaluation, shall be submitted by the bidder.

### **CHECKLIST OF DOCUMENTS TO BE SUBMITTED IN TECHNICAL BID**

	<b>Criteria</b>	<b>Document to be submitted</b>	<b>Submitted (Yes/No)</b>
1	Cost Of Bid Document	DD/BC	
2	EMD/ Bid Security -	In the form of BG/Bid Security fee deposit details.	
3	Written power of attorney of the signatory of the Bid to commit the Bidder(If any)	Copy of power of attorney	
4	Whether Indian firms (Y/N)	Certificate of Incorporation	
5	OEM firms with proven track record of execution of similar HVAC Projects in IT buildings, commercial complexes, hospitality projects, or high-rise structures (G+9 or above).	Relevant Certificate	
6	Constitution or legal status of Bidder	Incorporation Certificate, Partnership Deed, Trade License, MoA, AoA	
7	Place of registration	Qualification Information	
8	Principal place of business	Qualification Information	
9	Major items of construction equipment proposed to carry out the Contract	Invoices of equipment / Lease agreement/Letter of Commitment	
10	Qualifications and experience of key site management and technical personnel proposed for the Contract	Detailed CV	
11	Reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five financial years	CA Certificate along with Audited Financial report for the relevant Financial Years	
12	Evidence of adequacy of working capital for this contract [access to line (s) of credit and availability of other financial resources]; Liquid assets and / or availability of credit facilities	Banker's certificate	
13	Authority to seek references from the Bidder's bankers	Bankers Details	

[Type here]

14	Information regarding any litigation or arbitration resulting from contracts executed by the bidder in the last five years or currently under execution	List of Litigation, if any	
15	Methodology & Programme.	To be submitted	
16	Bids from Joint venture - Bids from Joint ventures / Consortiums / Association of Parties are not acceptable	NA	
17	Annual minimum turnover	Turnover from HVAC Construction works certified by chartered Accountant	
18	The Firm should demonstrate making profit	CA/ Statutory auditor certificate	
19	Should have valid PAN and GSTIN	Scan copy of valid PAN and GSTIN	
20	Experience of successful completion of works / substantial completion of works (90% of the value of the contract to be considered as substantial completion) as referred in Bid Data Sheet C I.2.3).	Completion Certificate from Competent Authority mentioning all the details as per Bid Data Sheet/TDS Certificate for Pvt Sector Project	
21	Bid Validity Undertaking	Undertaking	
22	Affidavit	Affidavit by the bidder duly signed by the Notary Public and as specified in Section 2,	
23	Design Basis Report	NA	
24	Certificate of No Relationships	As per format given in Section-2 of the tender document	
25	Information Regarding Any Conflicting Activities and Declaration Thereof	As per format given in Section-2 of the tender document	
26	Proposal for Sub-Contract	To be mentioned	

[Type here]

**Undertaking by Tenderer**

I/We have read and examined and understood the notice inviting tender, schedules, Specifications applicable, drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, special conditions, & all other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I / We hereby tender for the execution of the work specified for the SWOSTI PREMIUM LTD within the time specified in schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in General Rules and Directions and Conditions of contract and with such materials as are provided for, by, and in respect in accordance with, such conditions so far as applicable.

We agree to keep the tender open for Ninety (90) days from the due date of its opening and not to make any modifications in its terms and condition.

A sum of Rs.....Rupees.....

.....)  
has been deposited in demand draft of a scheduled bank issued by a scheduled bank as earnest money. If I / we, fail to furnish the prescribed performance guarantee within prescribed period, I / we agree that the said G.M.(BD), SWOSTI PREMIUM LTD or his successors in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I / we fail to commence work as specified, I / we agree that Director, SWOSTI PREMIUM LTD or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by him towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered, up to maximum of the 25 percentage and those in excess of that limit at the rates to be determined in accordance with the terms of contract. Further, I / We agree that in case of forfeiture of earnest money or both Earnest Money & Performance Guarantee as aforesaid, I / We shall be debarred for participation in the re-tendering process of the work.

I / We hereby declare that I / we shall treat the tender documents drawings and other records connected with the work as secret / confidential documents and shall no communicate information / derived there from to any person other than a person to whom I / we am / are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated. ....

Witness:

Address:

Signatures of Contractor

Postal Address

Occupation:

[Type here]

## **LETTER OF SUBMISSION**

The GM Corporate Communications.  
Swosti Group of Hotels, Resorts, Travels & Educations  
Cell- 9938244538  
Email: gm.communications@swostihotels.com  
Gopalpur Palm Resort Project  
On behalf of Swosti Premium Ltd

Sir,

.I/We, the undersigned, have read and examined in detail specifications and all bidding documents and hereby declare that:

### **Price and Validity**

1. All the rates quoted in our proposal are in accordance with the terms and conditions as specified in the bid document. All the prices and other terms and conditions of this proposal are valid for a period of 90 calendar days from the date of opening of bid.
2. We do hereby confirm that our bid prices include all taxes/levies. GST indicated separately.
3. We hereby declare that if any tax law is altered, we shall pay the same.
4. The quoted rates are inclusive of ESI , PF and Green Tax no extra on such heads would be payable on such account.

### **Earnest Money**

We have enclosed EMD in the form of demand draft no..... , dated.....favoring Swosti Premium Ltd. payable at Bhubaneswar issued / drawn on ... Bank for Rs.\_\_/- (Rupees \_\_\_Thousand only), as desired.

Deviations

We declare that all the works shall be performed strictly in accordance with the technical specifications and other tender conditions with no deviations.

### **Qualifying Data**

We confirm that all information/data have been submitted as required in tender document.

We hereby declare that our proposal is made in good faith, without collusion for fraud and the information contained in the proposal is true and correct to the best of our knowledge and belief. I/We agree that in case any information is found to be incorrect the tender is liable to be rejected at any point of tendering process.

Bid submitted by us is properly sealed and prepared so as to prevent any subsequent alteration and replacement.

We understand that you are not bound to accept the lowest or any bid you may receive.

Thanking you,

Yours faithfully,

(Signature and seal of Tenderer with name, designation and contact no.)

[Type here]

## NON-BLACK LISTING DECLARATION

### **FORMAT OF UNDERTAKING, TO BE FURNISHED ON COMPANY LETTER HEAD WITH REGARD TO BLACKLISTING/ NON- DEBARMENT, BY ORGANISATION**

#### UNDERTAKING REGARDING BLACKLISTING / NON – DEBARMENT

To,  
SWOSTI  
PREMIUM LTD  
Bhubaneswar

We hereby confirm and declare that we, M/s -----, is not blacklisted/ De-registered/ debarred by any Government department/ Public Sector Undertaking/ Private Sector/ or any other agency for which we have Executed/ Undertaken the works/ Services during the last 5 years.

**Signature of Contractor**

**With stamp**

[Type here]

**GENERAL INSTRUCTIONS FOR SITE VISIT**

I, , aged years, son/daughter of , presently residing at and authorized by (name of tenderer) (“Tenderer”) to solemn this affidavit on behalf of the Tenderer, solemnly affirm on oath as hereunder:

The Tenderer confirms that the Tenderer has duly undertaken the visit of the proposed project site of SWOSTI PREMIUM LTD located at Gopalpur ,Ganjam

The Tenderer has inspected and examined its surroundings and has satisfied itself about the site conditions and site logistics. The Tenderer confirms that it is aware of the ground conditions and nature of the site, means of access to the site and the accommodation area required for establishing the labour camp. The Tenderer agrees and confirms it shall be solely responsible for arranging and maintaining the afore- mentioned at its own cost including all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the Work unless otherwise specifically provided for in the contract documents.

The Tenderer confirms and agrees that the submission of the tender implies that the requisite site visit has already been undertaken and that the Tenderer has acquainted itself with the local conditions and other factors having a bearing on the execution of the Work.

**DEPONENT VERIFICATION**

I, , aged years, son/daughter of , presently residing at and authorized by Tenderer verify that the information mentioned above is true and correct to the best of my knowledge and belief.

DEPONE

## LETTER OF ACCEPTANCE

(To be issued to the successful bidder on the letterhead of Swosti Premium Ltd.)

[Date: \_\_\_\_\_]

To,

[Name and Address of the Contractor]

Subject: Letter of Acceptance for Supply, Installation, Testing & Commissioning of Water Cooled Screw Chillers and Allied Works at Gopalpur Palm Resort for Swosti Premium Ltd., Gopalpur, Ganjam, on a Lump sum Contract Basis)

Dear Sir(s),

This is to notify you that your Bid dated \_\_\_\_\_ for execution of the following work on a Lumpsum basis:

Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd., Gopalpur, Ganjam

for the Contract Price of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only), as corrected and modified<sup>1</sup> in accordance with the Instructions to Bidders, is hereby accepted by Swosti Premium Ltd.

We note that as per your bid,  
 You do not intend to subcontract any component of work  
or

You propose to employ [Insert Name of Sub-Contractor] as sub-contractor for executing [Insert Work Component]

*(Delete whichever is not applicable)*

You are hereby requested to furnish a detailed Work Programme along with milestone-wise activity chart and cash flow forecast (S-curve) as per the Bid Data Sheet within 14 (fourteen) days from the issue of this Letter of Acceptance (LoA).

Further, you are required to furnish the Performance Security as specified in the Bidding Documents for an amount of Rs. \_\_\_\_\_, in the form prescribed, within 21 (twenty-one) days of receipt of this Letter of Acceptance.

Failure to comply with the above conditions may result in actions as specified in Clause 23 and 24 of the Bid Data Sheet.

We look forward to the successful execution of the project.

Yours faithfully,

\_\_\_\_\_  
Authorized Signatory  
Swosti Premium Ltd.  
Bhubaneswar

### NOTICE TO PROCEED WITH THE WORK

(To be issued on Letterhead of Swosti Premium Ltd.)

[Date: \_\_\_\_\_]

To,  
[Name and Address of the Contractor]

Subject: Notice to Proceed – Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam on a item rate Contract Basis)

Dear Sir(s),

Pursuant to your furnishing of the required Performance Security in accordance with Clause of Bid Data Sheet, and the execution of the Contract Agreement for the work titled:

“Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam on a Item Rate Contract Basis”

at a Bid Price of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only),  
you are hereby instructed to proceed with the execution of the said works effective immediately, in strict accordance with the terms and conditions of the contract documents.

We trust that you will mobilize your resources promptly and commence the work at site without delay as per the agreed programme and milestones.

Wishing you a successful execution.

Yours faithfully,

\_\_\_\_\_  
Authorized Signatory  
Swosti Premium Ltd.  
Bhubaneswar

### PERFORMANCE BANK GUARANTEE

To

\_\_\_\_\_ [name of Client]  
\_\_\_\_\_ [address of Client]

**WHEREAS** \_\_\_\_\_ [name and address of Contractor] (hereafter called "the Contractor") has undertaken, in pursuance of Contract No. \_\_\_ dated \_  
\_\_\_\_\_ to execute \_\_\_\_\_ [name of Contract and brief description of Works] (hereinafter called "the Contract").

**AND WHEREAS** it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract;

**AND WHEREAS** we have agreed to give the Contractor such a Bank Guarantee:

**NOW THEREFORE** we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of \_\_\_ [amount of guarantee]\* \_\_\_\_\_ (in words), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of \_ [amount of guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall also be operable at our \_\_\_\_\_ Branch at Bhubaneswar, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of Odisha Bridge & Construction Corporation Ltd details of which is as under:

Sl No.	Particulars	Details
1	Name of Beneficiary	Swosti Premium Ltd
2	Name of Bank	Union Bank Of India
3	Account No	128713100000061
4	IFSC Code	UBIN0578827

This guarantee shall be valid until 28 days from the date of expiry of the Defect Liability Period. Signature and Seal of the guarantor \_

Name of Bank \_\_\_\_\_ Address \_\_\_\_\_ Date \_

\* An amount shall be inserted by the Guarantor, representing the percentage the Contract Price specified in the Contract including additional security for unbalanced Bids, if any and denominated in Indian Rupees.

## BID SECURITY– Cover-IV

**Bid Security (EMD):** 8,50,000.00 INR

Affidavit (on Non-Judicial Stamp, attested by Notary Public)

Declaring authenticity of all submitted information and non-involvement in any corrupt or fraudulent practice.

**Authorized Signature:** \_\_\_\_\_

**Name & Title:** \_\_\_\_\_

**Name of the Bidder:** \_\_\_\_\_

**Company Stamp/Seal**

BANK CERTIFICATE

(To be issued by the Bidder's Bank on official letterhead and submitted by the Bidder in Cover-IV)

TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s. [Insert Name of Bidder] is a reputed company with good financial standing and banking conduct.

If the contract for the work, namely:

“Construction of Gopalpur Palm Resort – Core Civil Works (Lumpsum Package)”

is awarded to the above-mentioned firm, we confirm that we shall be in a position to provide overdraft / cash credit / fund-based credit facilities to the extent of:

₹ [Insert Amount in Figures and Words]

to meet their working capital requirements for executing the said contract.

SI No.	Particulars	Details
1	Name of Beneficiary	Swosti Premium Ltd
2	Name of Bank	Union Bank Of India
3	Account No	128713100000061
4	IFSC Code	UBIN0578827

**INFORMATION REGARDING ANY CONFLICTING ACTIVITIES AND DECLARATION THEREOF**

(To be submitted on Bidder's Letterhead)

To,  
The G M (B.D)

Swosti Premium Ltd.  
Bhubaneswar

Subject: Declaration Regarding Conflicting Activities

Dear Sir,

I, the undersigned, hereby declare that our firm/company is not engaged in any activities that can be termed as conflicting in nature with respect to this tender for the project titled:

"Supply, Installation, Testing & Commissioning of 750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd., Gopalpur, Ganjam, on a Item Rate Contract Basis)"

I also acknowledge that in case of any misrepresentation or concealment of facts related to this declaration, our proposal and/or contract shall be liable for rejection/termination by the Client, and the decision shall be binding upon us without any claim whatsoever.

Authorized Signatory: \_\_\_\_\_  
Name & Designation: \_\_\_\_\_  
Name of the Bidder: \_\_\_\_\_  
Stamp/Seal: \_\_\_\_\_  
Date: \_\_\_\_\_  
Communication Address: \_\_\_\_\_

**Note:**

Conflicting activities refer to any potential conflict of interest arising from prior, current, or proposed agreements, engagements, or affiliations with the Client that may impair the bidder's objectivity, integrity, or impartiality in the execution of the project.

\_\_\_\_\_

## AFFIDAVIT

*[To be submitted by the bidder in a non-judicial stamp paper duly signed by the Notary Public]*

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
  
2. The undersigned also hereby certifies that neither our firm M/s.....  
.....have abandoned any work on building in India nor any contract awarded to us by the State of Odisha for such works have been rescinded, during last five years prior to the date of this bid.
  
3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.
  
4. The undersigned understand and agrees that further qualifying information may be requested and agrees to furnish any such information at the request of the Department/ project implementing agency.

\_\_\_\_\_

Authorized Signature: Name & Title of Signatory:  
Name of Bidder :

## **SECTION-3**

### **BOQ,SPECIFICATIONS& TENDER DRAWINGS :**

#### **1. WORK DESCRIPTION**

The work shall be strictly carried out as per the scope listed in this document and in accordance with the specifications. The equipment & material supplied at site will also be selected out of the list of approved makes. Bill of quantity provided with the document is for contractor guidance. It is expected that after award of work, contractor shall prepare shop drawings for approval by the Consultant & Client representative and also submit technical documentation duly identifying shortlisted make of material/equipment along with its data sheets. Actual ordering shall be based on approved shop drawings & documents.

The work at site shall comply with the approved shop drawings and will meet the satisfaction of Client representative. The contractor shall be required to demonstrate satisfactory operation of entire system (including client supplied equipment installed by contractor) and furnish the required labour, material & tools to install & commission the system.

The broad scope of work for proposed DG system covered under this contract shall include supply, installation, testing & commissioning of the following:

- DG Set & Associated accessories
- Exhaust system, piping, controls etc.
- LT Cables & Cable trays
- Earthing System
- Testing Adjusting & commissioning of the entire DG installation.

Besides above, contractor shall also be required to undertake following:

- Obtain approval from Local Authorities prior & post installation for operation of system.
- Minor civil works which include making openings in walls & slabs and making good of the same.
- Commissioning of the plant including test reports to demonstrate satisfactory working prior to handing over.
- Provide as-built drawings and handing over document comprising of list of recommended spares, catalogues and service schedule for each equipment/material.
- Training of Client's staff.

## **2. SITE MANAGEMENT**

The Contractor shall be required to provide following staffing for the project:

- a. Design Engineer who will work with consultant for getting shop drawings, technical submittal and variation in quantity statement approved.
- b. Procurement team.
- c. Full time dedicated Engineer (minimum 10-year experience) & one supervisor posted at site.

The contractor shall submit organization chart and CV prior to starting work at site.

The Contractor shall have required stores, tools & plant, security and facility to transport materials to place of installation for speedy execution of work.

## **3. REGULATIONS & PERMITS**

Prior to starting work at site, the contractor shall obtain required permits/ licenses required for satisfactory execution and operation of the installation. All receipted amounts shall be reimbursed by Client on production of proof of payment by the contractor.

The executed work shall strictly confirm to applicable laws, regulations and Indian Standards which become applicable. In case the specifications and drawings contained in this document call for higher standard than those required by prevailing regulations, then these specifications & drawings shall become applicable. However, in case of any conflict or violation between the document/drawings and prevailing laws, then the applicable laws & regulations shall be governing & binding.

## **4. SHOP DRAWINGS**

A set of design drawings listed in this document are available at Consultant office and may be issued with the tender document. These design drawings are for reference of the contractor and indicate proposed arrangement and the extent of work covered in the contract. The data given in the drawings and specifications is as exact as could be procured, but its accuracy is not guaranteed. The contractor cannot execute work or scale these drawings for reference.

Following shall be the procedure followed by contractor while preparation of shop drawings:

- The contractor shall refer the design drawings for understanding the scope and proposed routes to be followed during execution.
- Collate latest architectural backgrounds from the Client representative/Architect/Consultant.
- Examine all related services drawings but not limited to structural, plumbing, electrical, HVAC, Interior, landscape and others including as-built works before starting the work. Any discrepancy must be report to the Client's site representative in writing and obtain approval for go-ahead.

- Within one week of award of work, the Contractor shall prepare a list of shop drawing along with submission schedule for approval of Client representative/Consultant. The list of drawings must include layouts for DG sets, Panel rooms, Cooling towers, detailed exhaust/water piping routing with exact location of supports, flanges, bends, tee connections, fittings etc; electrical panels inside/outside views, power and control wiring schematics, cable trays, supports and terminations.

Maximum headroom shall be maintained at all points and in case the same is inadequate, then written approval from Client representative must be obtained prior to execution at site.

These shop drawings shall depict information required to complete the Project as per specifications and as required by the Consultant/Client representative. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings.

Where the work under this contract is proposed to be installed in close proximity or is interfering with other trades, then based on client representative/consultant directions, the contractor shall prepare all services coordinated working drawings and sections at a suitable scale (not less than 1:50), clearly showing proposed installed in relation to the work of other trades.

- The contractor shall thereafter furnish six sets of detailed shop drawings to Client representative/Consultant for obtaining comments/approval. The Contractor will make unlimited number of re-submissions of shop drawings unless Client representative/Consultant/Architect approval is obtained.
- The Contractor will thereafter submit six sets of final shop drawings to the Client representative for their exclusive use and all other agencies.
- No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/equipment/installation.
- In case installation is carried out without following above process or obtaining a waiver to follow the procedure from Client representative, the work shall be rejected and contractor shall rectify the same at their own cost.
- Shop drawings shall be submitted for approval minimum four weeks in advance of planned delivery and installation of any material to allow Client representative/Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.

Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.

## **5. TECHNICAL DOCUMENTATION**

The contractor prior to supplying material at site, will submit the following documentation to Consultant/Client representative for approval:

- Manufacturer's drawings, catalogues, pamphlets and other documents in triplicate. Each item shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.
- Samples of all materials shall be submitted to the Client's site representative prior to procurement. These will be submitted in two sets for approval and retention by Client's representative and shall be kept in their site office for reference and verification till the completion of the Project. Wherever directed, a mockup or sample installation shall be carried out for approval before proceeding for further installation.
- Where the contractor proposes to use an alternate make or model of equipment other than that specified, all new drawings and detailing required thereafter shall be prepared by the contractor at his own expense including any re-design required for other discipline/trade. Any delay on such account shall also be at the cost of and consequence of the Contractor.

Contractor to refer Annexure – I for list of approved makes & materials for this project.

## **6. VARIATION IN QUANTITY STATEMENT**

After approval of major & relevant shop drawings, the contractor shall submit four copies of a comprehensive variation in quantity statement. This statement must be submitted prior to completing ordering of equipment and should identify imported/local materials in this contract as well as proposed spares/tools. The Consultant shall provide recommendation to Client representative for acceptance of anticipated variation in contract amounts and also advise Client to initiate action for procurement of spare parts and tools at the completion of project.

## **7. QUALITY ASSURANCE**

The contractor to ensure that all materials and equipment supplied shall be new and of best available quality conforming to the relevant Indian Standard Specifications and to these specifications. Makes shall be strictly in conformity with list of approved manufacturers as per Annexure - I. Owners reserve the right to reject any item which in their assessment is second hand

Any deviations from above shall be clearly highlighted prior to supply and shall be brought to the notice of the Client representative/Consultant for further instructions in the matter.

Prior to starting execution work at site, the Contractor shall verify the sufficiency of the size of the shaft openings, clearances and ceiling spaces for proper installation. Failure to communicate insufficiency of any of the above, shall constitute Contractor acceptance of the same. The Contractor shall locate all equipment in fully accessible locations which can be easily serviced, operated or maintained. The exact location and size of access panels, required for each concealed, valve or other devices requiring attendance shall be finalized and communicated in sufficient time. Failing this, the Contractor shall make all the necessary repairs and changes at own expense. Access panel shall be marked.

## **8. WORKS NOT COVERED UNDER THIS CONTRACT**

Following works are excluded from the scope under this contract. These shall be executed by respective contractor in accordance with approved shop drawings where these details must be highlighted. However, contractor shall be responsible for providing details and thereafter supervision to ensure satisfactory & timely execution of these associated items as they have a bearing on this contract.

### **Civil Works**

- RCC/PCC Foundations for major equipment only.
- Construction of tanks & sumps including water proofing.
- Masonry drain channels and sumps in plant room.

## **9. INTEGRATION WITH BUILDING AUTOMATION SYSTEM**

The scope shall include providing following for the interface to Building Automation System.

- Space in electrical panel for running of LV cables.
- RS 485/Modbus in DG Controller & Potential free taps in Electrical Panels.
- Auto/manual changeover switch with potential free contact at manual position.
- Installation of current transformer & Transducer along with wiring between Current Transformer & Transducer up to the terminal block

It is to be clearly understood that the final responsibility for the sufficiency, adequacy and conformity to the contract requirements lies solely with the contractor.

## **10. TESTING, ADJUSTING AND BALANCING**

Entire Electrical System shall be carried out by the contractor through a specialist team (different than erection team) as per Specifications and IS codes. Performance test shall consist of three days of 10 hour each operation of system for each season. The results for each season shall be submitted to Client representative/Consultant. The submittal shall include operational parameters marked on performance curves for each equipment along with test certificates and safety/control settings.

The installation shall be tested again after removal of defects and shall be commissioned only after approval by the Client's site representative. All tests shall be carried out in the presence of the representatives of the Construction Manager / Architect /Consultant and Client's site representative. After commissioning, the results shall be submitted for scrutiny in quadruplicate.

The installation shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Client's site representative. In case of rotating machinery sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside its own room, shall be considered objectionable. Such conditions shall be corrected by the Contractor at his own expense. The contractor shall guarantee that the equipment installed shall maintain the specified Noise Control levels.

## **11. PRE-COMMISSIONING CHECKS**

The contractor shall submit written test procedures for each item/ equipment, training manuals and final pre checklist to Commissioning agency for their review prior to commissioning. The Commissioning agent shall approve the pre-functional testing checklist and supervising/ witness the entire commissioning and testing process.

All standards check including the ones elaborated in the specifications to ensure that the installation of the DG sets and associated systems has been carried out satisfactorily shall be done on completion of installation. These shall include.

### **11.1 DG Sets**

- Checking of piping interconnections
- Checking electrical interconnections
- Checking of insulation resistance
- Checking of earthing
- Checking of instruments and controls.
- Checking of alignment
- Checking of vibration transmission to building structure.
- Checking of expansion joints.

### **11.2 Exhaust System**

- Checking of silencer operation
- Checking of surface temperature of exhaust piping

### **11.3 Fuel System**

- Checking of automatic operation of fuel transfer pumps.

### **11.4 General**

Upon completion of work the performance test shall demonstrate the following among other things:

- i. Equipment installed complies with specification in all respects and is of the correct rating for the duty and site conditions.
- ii. All items operate efficiently and quietly to meet the specified requirements.
- iii. All circuits are correctly protected and protective devices are properly coordinated.
- iv. All non-current carrying metal parts are properly and safely grounded in accordance with the specifications and appropriate codes of practice.

## **12. PERFORMANCE TESTING**

DG sets shall be tested at varying loads at manufacturer's works/ site prior to dispatch of the sets to site. The performance tests at the works shall be carried out in presence of authorized representative from the Clients side (two persons). Due notice for the programme of performance testing at works shall be given to the Clients to enable them to arrange for their representatives for this inspection to be at manufacturers works/ site for this inspection and testing.

The performance test on each DG sets shall be of minimum 4 hours duration or as per client requirement (Refer Annexure). It should also include measurement of noise and emission as per standards and CPCB II guidelines. Vibration measurement shall also be done as per engine manufacturer's recommendation and ISO – 8528 Part - 9.

All instruments, materials, consumables (fuel oil, lube oil etc.) load and labour required for carrying out of the test shall be provided by the Contractor.

Following test acceptance criteria shall be applicable.

a.	Fuel consumption at 50%, 75%, 100% and 110% load.	± 5% of guaranteed performance. Actual alternator efficiencies as determined in the manufacturer's works tests shall be used as the basis of calculation of specific fuel consumption ratio.
b.	Voltage regulation from no load to full load	± 1%
c.	Frequency regulation from no load to full load	± 0.5%
d.	Maximum lube oil temperature	± 5% of guaranteed performance
e.	Minimum lube oil pressure	± 5% of guaranteed performance
f.	Lube Oil consumption	± 5% of guaranteed performance

Also, following technical data shall be provided to Commissioning agent: -

- a. Minimum thermal efficiency of DG set.
- b. Auxiliary Power Consumption, kW or Watt.
- c. Fuel Consumption (Lt/ Hr) at 100%, 75% and 50% load.
- d. Fuel consumption tolerance (shall not exceed by 5%).
- e. Specific Fuel Consumption (Lt/ kWh generated)

### 13. COMPLETION CERTIFICATE

On completion of the installation, a certificate shall be furnished by the contractor, counter signed by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local authority.

The contractor shall be responsible for getting the entire installation duly approved by the local authorities concerned, and shall bear expenses if any, in connection with the same.

### 14. AS-BUILT DRAWINGS

Contractor shall submit following as-built drawings as and when work is completed:

- Six set of hard copies of all as-built drawings duly corrected and incorporating any modifications during execution.
- Two set of pen drive containing the drawings.

The drawings shall provide all layouts with DG Set, Panels, exhaust piping, fuel piping, Cable / bus ducts layouts, earthing, cable trays, location of all concealed accessories, wiring diagram, control diagram, Single line diagram, control schematic with detailed bill of materials, showing makes, types & description of all components & accessories and sequencing of automatic controls and other services.

## **15. MAINTENANCE MANUAL**

Upon completion and commissioning of works, the contractor shall submit a draft copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of typewritten operating instructions and maintenance manuals; one each for retention by Consultant and Client's site representative and two for Clients Operating Personnel. These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 4-year period of maintenance of each equipment.

The manuals shall include:

- i. Description of the work carried out / installed.
- ii. Operating instructions.
- iii. Maintenance instructions including procedures for preventive maintenance.
- iv. Manufacturers catalogues.
- v. Spare parts list.
- vi. Trouble shooting charts.
- vii. Drawings
- viii. Type and routine test certificates of major items.

Details of all bought out item should be part of this maintenance manual.

## **16. ON SITE TRAINING**

Upon completion of all work and all tests, the Contractor shall furnish necessary operators, labor and helpers for operating the entire installation for such periods so as to enable the Client's staff to get acquainted with the operation of the system. During this period, the contractor shall train the Client's personnel in the operation, adjustment and maintenance of all equipment installed.

## **17. DEFECTS LIABILITY PERIOD**

### **Complaints**

The Contractor shall receive calls for any and all problems experienced in the operation of the system under this contract, attend to these within 10 hours of receiving the complaints and shall take steps to immediately correct any deficiencies that may exist.

### **Repairs**

All equipment that requires repairing shall be immediately serviced and repaired. Since the period of Mechanical Maintenance runs concurrently with the defects liability period, all replacement parts and labour shall be supplied promptly free-of-charge to the Client.

## **18. UPTIME GUARANTEE**

The contractor shall guarantee for the installed system an uptime of 98%. In case of shortfall in any month during the defect's liability period, the Defects Liability period shall get extended by a month for every month having shortfall and no reimbursement shall be made for the extended period.

## **19. OPERATION & MAINTENANCE CONTRACT**

Contractor may be required to carry out the operation of the installation during and after the defects liability period. Further, it may also be required to carry out all-inclusive maintenance of the entire system for a period of four years beyond the defects liability period.

### **Operation Contract:**

It will involve round the clock operation for 24 hours a day wherein work will include but not limited to operation of installation, maintaining log books, complain register and summary of operation.

The terms of payment shall be monthly at the end of each month on pro-rata basis.

### **All Inclusive Maintenance Contract:**

The work will involve routine preventive maintenance with monthly status report. Entire installation shall be painted every two years. 98% uptime of all systems is expected under this contract wherein up time shall be assessed every month and in case of shortfall during any month the contract shall be extended by a month. No reimbursement shall be payable for the extended period.

Adequate number of persons to the satisfaction of the Client representative shall be provided including relievers wherein statutory compliances such as of EPF, ESIC and other applicable labour legislations shall be to contractor account. No overtime shall be payable. Routine shut downs shall be permitted with prior permission of the Owner.

Payment shall be Quarterly at the beginning of each quarter on pro-rata basis.

## **20. GREEN BUILDING COMPLIANCE**

Following actions shall be required by Contractor:

Contractor will provide full support in complying to Green Building requirements for the desired level of Green Building Rating in the project.

Contractor shall implement the recommendations provided by Green Building Consultant and provide support during the site inspections.

Contractor shall provide respective documentation including but not limited to specification sheets, manufacturer cutsheets, Test Certificates, Brochures, purchase records, manufacturer declarations, calculations, site photographs, commissioning reports.

Contractor is encouraged to designate an individual in their existing team who will be responsible for regular coordination with respective site people to ensure implementation of required green building measures and ultimately provide the required documentation for aspired Green Building Rating.

In case of any deviations in implementing recommended green building measures and/or using specified material/equipment/system, contractor will have to inform Owners/ Services Consultant/ Green Building Consultant/ Architect as applicable for their formal approval.

In case of any additional requirement to comply with Green Building rating as identified during construction/installation/commissioning based on the actual site conditions/ construction activities, Contractor shall implement the same.

## **21. BIM Implementation**

It is expected that Contractor shall prepare all shop drawings in latest version of Revit only and coordinate with other contractors to provide a clash free model. Thereafter, all shop drawings shall be provided in PDF, 2D CAD plans and critical sections in 3D. The drawings shall be submitted in hard copy in A0/A1 size at 1:100 scale including all annotations, heights, bottom of duct/pipe/tray etc complete in all respect as required.

## **22. Smart Operation & Maintenance Implementation**

Offline QR code shall be prepared and provided for following equipment and plant rooms and pasted on each MEP equipment / MEP room:

- a. HVAC Plant room layout & schematic framed in the HVAC Plantroom.
- b. Substation layout & Schematic framed in the Main Panel Room
- c. DG area layout & schematic framed in the Main Panel Room
- d. Plumbing Plant room & Schematic framed in the Plumbing Plantroom
- e. Fire Pump room layout & Schematic framed in the Fire Fighting Plantroom
- f. STP room layout & Schematic framed in the STP Plantroom
- g. SLD for AHU/Fans Panels laminated & pasted on top of respective Panel.
- h. Floor Electrical Panel Schematics & DB Schedules laminated & pasted on top of respective Panel.
- i. UPS room layout & schematic framed in the Main UPS Room
- j. Fire Alarm Schematic & floor layouts, Sprinkler layout & Fire Suppression Schematic drawings framed in the Fire Control Room.

Each QR code shall provide offline 3D as-built drawing with equipment, piping, ducting, cable tray, lighting, sockets, fixture & fittings, detector schedules, DB schedule, Electrical Panel details etc. QR code shall also provide details like operation & maintenance instructions, SOPs, trouble shooting, OEM catalog etc.

**ANNEXURE – I**  
**List of Approved Makes**

<b>S. No</b>	<b>Equipment/Material</b>	<b>Approved Manufacturer Name</b>
1.	DG Sets	Cummins MTU Perkins CAT Kohler Kirloskar
2.	Alternator	AVK Stamford CAT Leroy Somer
3.	MS Pipes	UPTO 300 mm - TATA JINDAL STAR ABOVE 300 mm- SAIL JINDAL STAR MSL
4.	Noise Control Silencer / Muffler (Residential Type Silencer)	Intertec Sound Control India
5.	Earthing System	Allied Power Dehn Obo Betterman Cape Electric JMV
6.	Air Circuit Breakers / Moulded Case Circuit Breaker / MPCB / Contactors	ABB Mitsubishi Siemens Schneider Electric Legrand
7.	Control Transformer / Potential Transformers (Epoxy Cast Resin)	Automatic Electric Gilbert & Maxwell Matrix
8.	Indicating Lamps LED type and Push Button	Schneider Electric Siemens ESBEE ABB
9.	Digital Meters	Siemens Schneider Electric ABB Secure Neptune
10.	Terminal Blocks	Connect well Wago Elmex

<b>S. No</b>	<b>Equipment/Material</b>	<b>Approved Manufacturer Name</b>
11.	Batteries	Exide Standard Furukawa Amaron Cummins Pulselite
12.	Battery Charger	Exide Nelco Amaraja Cadalyne
13.	LT Panels & Distribution Boards	Adlec Control System SPC Electrotech Neptune Advance Shivalic Power
14.	Sandwich Busduct	Schneider Legrand L&T Anant Power C&S
15.	PVC Insulated FRLS Wires	RR Kabel KEI Finolex Batra Henlay Polycab
16.	Cable Trays & Raceways	Profab Sai Metal Craft Indiana Gratings Advance Niedex
17.	Accessories for Supporting system	Hilti Fisher Hira
18.	Exhaust Pipe Insulation	Rockwool UP Twiga
19.	Acoustic Insulation	Mikron – Mikasha International Rockwool
20.	SS bellows	Alfa flex Kanwal
21.	Flexible coupling with SS guard	Kanwal Advani Resistoflex
22.	FS Cables	Bonton Fusion Polymer Frtek Batra Henley Leoni
23.	LT Cables	Polycab KEI Grandlay CMI Rallison Bonton
23.	Double Compression Cable Glands with earthing links	Dowells Comet

**ANNEXURE – II**  
**PART LIST OF CODES & STANDARDS**

The installation in entirety shall comply with latest codes/standards published by National Building Code of India, IEEE, Bureau of Indian Standards (BIS) as well as local regulations from departments like Pollution Control Board, Electrical inspectorate, Fire Authorities, Airport Authority of India (AAI), High rise committee, Indian Electricity rules etc. Some of the standards are mentioned here below for reference:

IS 398 (part-1 7 2)	Aluminium stranded conductors
IS 694	PVC insulated cables for working voltage up to 1100V
IS 732	Code of practice for electrical wiring installation
IS 1255	Code of practice for installation and maintenance of power cables up to 33 kV rating
IS 1646	Electrical installation fire safety of buildings (general) Code of practice
IS 2147	Degree of protection provided by enclosures for low voltage switchgears and control gears
IS 2148	Specification for double compression cable glands
IS 2551	Danger Notice Boards
IS-2705(Parts 1 to 4)	Specification for Current transformer
IS 3043	Code of practice for earthing
IS 4146	Application guide for voltage transformers
IS 5578	Marking and arrangement of bus bars
IEC-61439	Specification for Low voltage switchgear and control gear assemblies
IS 10118	Code of practice for selection, installation and maintenance of switchgear and control gear
IS 12943	Specification single compression cable gland
IS 15652	Specification for rubber mats for electrical purposes
IS 1651 & 1652	Stationary cells and batteries lead acid type
IEC 60034	Rotating Electrical machines
ISO 8528	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Set
IS 1001	Performance of constant speed IC engines for General purposes
IS 2253	Designation for type of construction and mounting arrangement of rotating electrical machine
IS 4691	Degree of protection provided by enclosures of Rotating Electrical Machinery
IS 4728	Terminal marking of rotating electrical machines
IS 7132	Guide for testing 3 ph. Synchronous machines
BS 5514 / ISO 3046	Reciprocating Internal Combustion Engine
IS 4722	Specification for rotating electrical machines
IS 1822	Motor starters AC, of voltage not exceeding 1000 Volts
IS 7816	Guide for testing of insulation, resistance of rotating machines

## ANNEXURE – III SCHEDULE OF TECHNICAL DATA

S. No.	Description	Unit	Desirable Values / parameters	D&B Vendor Proposal / compliance.
I.	<b><u>DIESEL ENGINE</u></b>			
1.	General			
1.1	Manufacturer		To be confirmed by vendor – Refer approved list	
1.2	Model no.		To be confirmed by vendor	
1.3	Type of Engine		Diesel Engine	
1.4	Engine rating – Prime (minimum)	KWe		
1.5	Operating Duty		Prime Power (confirming to ISO 8528 /1- Duty condition 3B)	
1.6	Operating speed	RPM	1500	
1.7	Over speed trip	RPM	1650	
1.8	Design life	Hours	To be confirmed by vendor	
2.	Engine Details			
2.1	No. of cylinders and arrangement	No.	To be confirmed by vendor	
2.2	Cylinder bore x stroke	mm x mm	To be confirmed by vendor	
2.3	Total piston displacement volume	m <sup>3</sup>	To be confirmed by vendor	
2.4	No. of stroke per cycle		To be confirmed by vendor	
2.5	Compression ratio	ratio	To be confirmed by vendor	
3.	Starting System		Electronic Starter	
4.	Fuel Consumption			
4.1	Fuel grade		High speed Diesel	
4.2	Fuel Consumption at NTP			
a	100% loading (Ltrs/hr)	Ltrs \ hr	To be confirmed by vendor	
b.	75% loading (Ltrs/hr)	Ltrs \ hr	To be confirmed by vendor	
c.	50% loading (Ltrs/hr)	Ltrs \ hr	To be confirmed by vendor	
4.3	Day oil tank capacity	Litre	990 ltrs	
5.	Bearing			
5.1	No. of bearing		To be confirmed by vendor	
5.2	Method of lubrication		Forced feed lubrication	

S. No.	Description	Unit	Desirable Values / parameters	D&B Vendor Proposal / compliance.
6.	Engine Lubrication			
6.1	Oil grade		To be confirmed by vendor	
6.2	Oil consumption at rated output	Ltrs \ hr	To be confirmed by vendor	
7.	Fuel oil System			
7.1	Fuel oil storage tank capacity	Litre		
7.2	Fuel oil transfer pump			
	a. Type and number			
	b. Capacity	LPM	To be confirmed by vendor	
	c. Head	MLC	To be confirmed by vendor	
	d. Drive motor power	kW	To be confirmed by vendor	
7.3	Is the system complete with strainer, valves, fittings, unloading hoses etc.		To be confirmed by vendor	
8.	Engine Cooling			
8.1	Method of cooling provided		Engine driven/electrically operated Radiators or Heat exchanger with cooling towers or Remote radiators	
8.2	Details of cooling system provided		To be confirmed by vendor	
8.3	Heat Rejection to Cooling System	kW	To be confirmed by vendor	
9.	Exhaust System			
9.1	Silencer		Residential Silencer	
9.2	Piping construction detail		To be confirmed by vendor	
9.3	Exhaust piping diameter	mm	To be confirmed by vendor	
9.4	Back pressure	kPA	To be confirmed by vendor	
9.5	Exhaust gas flow rate	CFM	To be confirmed by vendor	
9.6	Heat rejected to exhaust system	kW	To be confirmed by vendor	
9.7	Exhaust temperature (Max)	Deg C	To be confirmed by vendor	
<b>II</b>	<b><u>RADIATORS</u></b>			
1	Entering coolant temperature	Deg C	To be confirmed by vendor	
2	Leaving coolant temperature	Deg C	To be confirmed by vendor	
3	Fan capacity & Static pressure	CFM	To be confirmed by vendor	

S. No.	Description	Unit	Desirable Values / parameters	D&B Vendor Proposal / compliance.
III	<b><u>ALTERNATOR</u></b>			
1	Manufacturer		To be confirmed by vendor	
2	Protection class		IP 23	
3	Rated apparent Power	KVA		
4	Rated power factor	Cos phi	0.8	
5	Rated active power	kW		
6	Rated voltage	kV		
7	Rated frequency	Hz	50	
8	Number of phases		3 PH & N	
9	Rated speed	Rpm	1500	
10	Voltage variation range	%	+ / - 0.5 %	
11	Frequency variation range	%	+/- 0.1 %	
12.	Generator Performances			
12.1	Regulation under condition of rated speed, voltage and output			
	a. At 0.8 p.f. lag (guaranteed)	%	To be confirmed by vendor	
	b. At 1.0 p.f	%	To be confirmed by vendor	
12.2	Reactance			
	a. Direct axis transient, saturated	%	To be confirmed by vendor	
	Direct axis transient, unsaturated	%	To be confirmed by vendor	
	Direct axis sub-transient, saturated	%	To be confirmed by vendor	
	Direct axis sub-transient, unsaturated	%	To be confirmed by vendor	
	Negative sequence reactance	%	To be confirmed by vendor	
	Zero sequence reactance	%	To be confirmed by Vendor	
	Synchronous reactance	%	To be confirmed by vendor	
	Capacitance of generator stator wdg to ground		To be confirmed by vendor	
	Vibration limits (on shaft rated speed)		To be confirmed by vendor	
	Maximum permissible short time unbalanced load (load and time)	% & Sec.	To be confirmed by vendor	

S. No.	Description	Unit	Desirable Values / parameters	D&B Vendor Proposal / compliance.
12.3	Insulation (Rotor winding)			
	a. Type of insulation		To be confirmed by vendor	
	b. Class of insulation		Class H	
12.4	Automatic Voltage Regulator			
	Make		To be confirmed by vendor	
	Type		To be confirmed by vendor	
	Voltage Regulator Range		+ / - 0.5 %	
12.5	Control & Relay Panel			
	Make		To be confirmed by vendor	
	Type		To be confirmed by vendor	
	Dimension		To be confirmed by vendor	
	Degree of protection		IP 52	
12.6	PLC Scheme provided.	Yes/No	YES	
<b>IV</b>	<b><u>DG SET OVER ALL DETAILS</u></b>			
1	DG set overall dimension (L x W x H)	mm	To be confirmed by vendor	
2	DG set overall weight			
	Static weight	kG	To be confirmed by vendor	
	Dynamic weight	kG	To be confirmed by vendor	
3	Max. noise level at a distance of 1.0 m	dB(A)	As per CPCB norms	
4	Efficiencies at rated voltage frequency and power factor - Min			
	a. At 100 % loading	%	To be confirmed by vendor	
	b. At 75% loading	%	To be confirmed by vendor	
	c. At 50% loading	%	To be confirmed by vendor	
5	Total Harmonic Distortion (THD) - Max			
	At 100 % load	%	3	
	At 50 % load	%	5	

**DG SETS – COST OF GENERATION**

ITEM	UNIT	DATA SHALL BE FURNISHED BY
		TENDERER AGAINST EACH ITEM
Make of Engine		
Make of DG set		
Engine Model		
DG set rating	KVA	
DG set rating	kW	
Average Load factor	%	
Units generated per hour	kwh/ hour	
Number of hours per year	hours/ annum	
Number of units generated per year	kwh/ annum	
<b>Fuel Cost</b>		
Fuel rate	Rs per litre	
Fuel consumption	Litres/ hour	
Number of units per litre of Diesel	Kwh/ litre	
<b>Fuel cost</b>	Rs per kwh	
<b>Lube Oil Consumption Cost</b>		
Lube oil consumption	litres/ hour	
Cost of Lube oil	Rs per litre	
Lube Oil consumption cost	Rs per hour	
<b>Lube Oil consumption cost</b>	Rs per kwh	
<b>Lube Oil Replacement Cost</b>	Rs per litre	
Lube Oil replacement period	Hours	
Lube Oil replacement quantity	Litres	
Lube oil replacement	litres/ hour	
Lube oil replacement cost	Rs/ hour	
<b>Lube Oil replacement cost</b>	Rs per kwh	
<b>Maintenance Cost</b>		
"B Check" maintenance period	Hours	
"B check" maintenance kit cost	Rs	
<b>"B Check" maintenance cost</b>	Rs per kwh	
"C Check:" maintenance period	Hours	
"C Check:" maintenance kit cost	Rs.	
<b>"C Check" maintenance cost</b>	Rs per kwh	
"D Check:" maintenance period	Hours	
"D Check:" maintenance kit cost	Rs.	
<b>"D Check" maintenance cost</b>	Rs per kwh	
Air Cleaner element change period	Hours	
Air Cleaner Element cost	Rs	
<b>Air Cleaner Element replacement cost</b>	Rs per kwh	
<b>Total Cost per kwh generated</b>		

Signature of Tenderer

## **DG SETS – TEST PROCEDURE**

DG Set shall be duly tested at factory as per manufacturer's standards and procedures detailed as under: -

- 1) Before testing, following details shall be recorded on test report: -
  - i) Engine S. No.
  - ii) Alternator S. No.
  - iii) Engine Model and Make
  - iv) Alternator Model and Make
  - v) Engine and Alternator Rating
  - vi) Date of Testing
  - vii) Cooling System Type
  - viii) Rated Speed, Voltage & KW Rating
- 2) Check the tightness of all bolts and necessary connections before starting the DG sets.
- 3) Start the DG set and run at idle for few minutes. If any leakage occurs, rectify them and note down the parameters on test report.
- 4) Raise the load gradually and allow the performance parameters to reach steady state conditions and note down the following parameters on test report:
  - i) Speed in RPM
  - ii) Load in KW
  - iii) Current in Amps
  - iv) Voltage
  - v) Frequency (Hz)
  - vi) Lube Oil Pressure
  - vii) Lube Oil Temperature
  - viii) Regulation of Voltage & Speed

Above parameters shall be recorded at following loads and duration: Idle

Run	-	05 mins
25% Load	-	15 mins
50% Load	-	30 mins
75% Load	-	30 mins
100% Load	-	60 mins
110% Load	-	60 mins

The DG sets shall be tested with standard test bench facilities as per ISO-8528-6.

During testing all controls/operating safeties will be checked and proper record will be maintained.

Any defect / abnormality noticed during testing shall be rectified. The testing shall be declared successful only when no abnormality /failure are noticed during testing.

Cost of all Fuel, lubricants etc. required for performance testing as per above at Vendors works shall be borne by Vendor. However all cost of travel and lodging of client's representative shall be borne by client. Load for testing at site shall be arranged by bidder at their own cost.

#### 5) Routine Tests

The engine and alternator and other major components shall undergo routine tests as per relevant IS/IEC Specifications and to be conducted at respective manufacturers works. The same shall be recorded and the Test Certificates duly approved by the Inspection team shall form part of the supply of equipment.

Vendor and their Suppliers shall carry out routine tests at the manufacturing unit, cost for which shall be borne by Supplier

#### 6) Site Tests

Bidder is required to provide first fill of lube oil and Fuel (Full day tank) with the DG sets. Load and Fuel required for site Tests shall be borne by OEM. Duration of test shall be 4 hour or 8 hours can then be decided later by client. The costs of man power and arrangement of staff for trial run/running in period will be borne by the bidder.

**TEST REPORT**

Description	Engine	Alternator	DG Set	Panel
Make				
Model				
Rating				
S. No.				

Rated Voltage:

Rated Speed:

Load built up test on resistive load bank (unity power factor)

Load %	Time Min.	Start Time	Stop Time	Volt (Line to Line)			Current (Amps)			Load (kW)	Frequency (Hz)	Lube Oil Pr. Bar	Lube Oil Temp (°C)	Speed RPM
0														
25														
50														
75														
100														
110														
Volt & RPM at no load Volt & RPM at full load Notes: Date: Tested By: Witnessed By:														

## TECHNICAL SPECIFICATIONS

### 1. SCOPE

The scope of this section consists of but not necessarily limited to the following:

- a. The contractor shall supply, deliver to site, hoisting into position, install, test and commission the generating sets together with the necessary controls and switchboards as specified and indicated in the Drawings. Protection circuits, control wiring and interlock circuits not specified or indicated in the Drawings, but deemed necessary for the safe operation of the generating system shall be provided without any additional cost to complete the system.
- b. Provide manufacturer's factory representative's services, including coordination, start-up and testing supervision at site.
- c. Testing (factory and field), start-up supervision, training and providing necessary documentation and tools for operation.
- d. Carry out performance test run at site.

### 2. SUBMISSION

For bidding

The bidder shall submit offer with the following documents in two sets.

- Schedule of deviations from technical specifications.
- List of proposed makes, for the items listed in the tender.
- Technical datasheets indicating overall dimensions & Catalogues of major items, highlighting the offered models.
- Design drawing of residential silencer.
- Day oil tank detailed design drawing.
- Structural support drawings.
- To submit power controller (Synchronization module) drawings along with operation logic.
- Supporting structure details of chimney e.t.c.
- Other documents and comments, if any.

For approval before construction/ erection

The Sub-contractor shall submit the following documents.

a. For all the supplies, the sub-contractor shall submit the following documents in 4 sets for approval.

- General arrangement drawings, with all dimensions, showing: space-requirements, weights (for transport and service conditions), requirements of civil works/ foundation, fixing and mounting facilities, connection devices, etc.
- Electrical drawings, showing: power and control single line and functional/ control multi line diagrams, terminal blocks, components' list with make, type, quantity, etc.
- Quality assurance plan and bar-chart showing manufacturing schedule.

The sub-contractor shall incorporate all comments and submit revised drawings in stipulated time till all drawings are finally approved for manufacturing.

Final

The sub-contractor shall submit the following documents, reflecting the true final as built situation, in 6 sets, and one soft copy in CD.

- a) The drawings including wiring diagrams as revised and "as built".
- b) Inspection and preliminary testing certificates and reports and shipping release.
- c) Test certificates of kWh meters from Government approved Lab or Electric Supply Co. of concerned area.
- d) Guarantee certificates.
- e) Instruction & maintenance manuals, Catalogues etc.
- f) Any other certificate/ report as called for by the Client/ Consultant.

### **3. Product**

DG set shall conform to following standards: - IS: 4722

BS: 5000

IS: 1460

ISO: 8528

BS: 5514

ISO: 3046

#### **3.1 Capacity**

Actual power output shall be as shown in drawings and in schedule of quantities. Diesel

Engine

The diesel engine shall be of the 4-stroke cycle, prime rating (as specified in SOQ), multi- cylinder direct injection, compression ignition type operating at a speed of 1500 rpm and

shall be silent, vibration free while in operation and comply Center/ State Pollution Control Board and shall conform to BS: 649/ 5514.

The engine shall be complete with Heat exchanger body jacket, lubricating oil pump, lubrication oil pressure gauge, tachometer, electronic type governor, integrated hours-run recorder, over-speed trip and all other necessary auxiliaries.

The brake horse power of the engine with all attached accessories as specified shall not be less than that which is required by the full load rating of the alternator at site operating conditions taking into consideration losses, plus a reserve factor of at least 10%.

### **3.2 Starting**

Starting system of the generator shall be of a heavy-duty electric motor complete with a 24 V D.C. heavy-duty battery of 300 AH or as recommended by manufacturer. The electric motor shall be capable of cranking the engine to achieve the rated speed in less than 10 seconds from the initiation of the starting process. The electric start battery shall be of adequate capacity for 3 successive starts. Time delay relays shall be incorporated to provide a rest period of 1-5 seconds (adjustable) before each successive start and a time lag period of 19-100 seconds (adjustable) before the system lock out due to failure of the 3rd start to crank up the engine.

The generator set shall be provided with a micro-processor-based control system which is manufactured to provide automatic starting, monitoring, synchronization, load management, DG protection relay and control functions for the generator set.

The control system shall include an engine electronic governor control, which shall function to provide steady state frequency regulation. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting. The governor control shall be suitable for use in paralleling applications without component changes.

### **3.3 Speed Regulation**

The governor shall be capable of regulating the speed of the engine within the limits approximately 10% of the rated speed within 4 seconds due to a sudden application or removal of a full load. The steady load speed shall vary within the limits of approximately 1% of the rated speed.

### **3.4 Cooling**

Inbuilt radiator cooled system shall be provided for cooling of engine as well as the body to minimize heat radiated into the enclosure.

### **3.5 Lubricator**

The lubricating system shall be by a positive displacement oil pump providing a positive force feed to all lubricating points.

### **3.6 Exhaust System**

Adequate sized piping and fittings shall be installed to carry the engine exhaust discharge into the atmosphere at a height as indicated in the drawings & as per the requirement of Center/ State Pollution Control Board or Pollution Control Committee as the case may be.

Galvanized M.S. structural support and vibration arrestors for D.G. set chimney to specify along with drawing for statutory clearance.

Mufflers shall be installed to reduce the engine exhaust noise to a maximum of 5 dBA above ambient noise level at nearest area accessible to the public within 3m from Generator Room and at least 2m above floor level. Flexible connection shall be provided between the engine and the fixed piping.

### **3.7 Fuel Piping and Fuel Tank Installation**

The complete system shall include engineering, supply, installation, testing and commissioning of tank for storage of fuel, pumps, piping, valves and control system.

### **3.8 Instruments**

An instrument panel mounted on the engine shall be provided and shall comprise the following flush-mounted instruments and gauges:

Lubricating oil inlet and outlet temperature  
Lubricating oil pressure gauge Tachometer,  
positive driven  
Hour counter.

### **3.9 Protection Devices**

Warning indication and automatic shut-down shall be provided for the following: Low oil

pressure shutdown and alarm  
Low and high coolant temperature alarm  
High coolant temperature shutdown Fail to  
crank shutdown  
Over cranking shutdown Over  
speed shutdown  
Low & high DC voltage alarm Low  
battery alarm  
Low fuel-day tank alarm  
High and Low AC voltage shutdown Under  
frequency shutdown  
Over current and alarm and shutdown Short circuit  
shutdown  
Ground fault alarm Overload alarm  
Emergency stop

Failure indication lights and alarm for all fault conditions shall be provided on control panel for restoring the operation to normal.

The starting circuit shall be disconnected in the event of any of the above shutdowns.

### **3.10 Alternator**

The alternator shall be brush less synchronous drip proof, self-ventilated and screen- protected and directly coupled on to the diesel engine by flexible coupling and shall be rated for site operating conditions and conform to BS 5000 (part99) or IS 4722.

The full load output voltage shall be 415 volts, 3 phase, 4 wire, 50 Hz at 0.8 power factor with neutral solidly earth with the frequency maintained at 50 Hertz at all time under any load condition including transient overload due to motor starting etc.

The rotor shall consist of the main alternator field poles the brushless exciter and its rectifier module, all bolted on a common alternator shaft. The rotor shall be mechanically and electrically balance up to 135% of the rated speed. The insulation of the alternator shall be non-hygroscopic, Class "H" on the exciter, Class "H" on the stator and Class H on the rotating pole pieces.

The rectifier module of the exciter shall be impregnated with epoxy resin and shall be capable of withstanding without damage or deterioration of the thermal, centrifugal and other stresses that is experienced during normal or short circuit conditions. Rectifiers shall be of silicon type.

The voltage build up shall be of self-excitation using the residual voltage of the alternator through a solid-state voltage regulator. The voltage regulator shall be capable of maintaining the voltage regulation to  $\pm 1\%$  independent of power factor, heating and 5% of speed variation. The voltage output of the alternator shall also be capable of manual adjustable to  $\pm 5\%$  of the rated voltage.

The response of the voltage regulator shall be less than 10 milli second. The voltage dip shall not exceed 15% when a rated continuous load is supplied to the unloaded alternator and the correction time shall not exceed 200 milli second. When the rated load is withdrawn, the voltage overshoot shall not exceed 20%.

The automatic voltage regulator and the exciter shall be manufactured to withstand 50% overload at a constant terminal voltage.

A permanent magnet generator (PMG) or equivalent system shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of motor current for not more than 10 seconds.

### **3.11 Generator Control Panel**

The generator control panel shall have all necessary instruments and accessories for operation and control of the generating set. On sensing the utility mains voltage dip to below said voltage, the control panel shall send a signal to start the generator. After 3 successive start and if the diesel generator is not started up, the alarm signal shall be activated.

The generator control panel shall consist of all AMF system, Auto-transfer switch, circuit breakers, protective relays if applicable and accessories required to control the generator operation and shall include but not limited to the following:

Voltmeters  
Ammeter

Frequency Meter Power  
factor meter  
Kilowatt meter with maximum demand indicator Kilowatt  
hour meter  
Hour run meter  
Start-stop and automatic mains monitoring system Emergency off  
push button  
Manual speed adjusting control reset for overload, alarm muting. Fully  
automatic trickle battery charger with voltmeter  
Indicating lamps for 'Mains Available', 'Mains on Load', 'Standby Available', 'Standby on Load',  
'Alarm', 'Mains Fail', etc.  
Audio and visual (flasher) alarm.

The start-stop and automatic mains monitoring system shall be equipped with the following:

Duty selector switch for 'off-automatic-test-manual' operation  
Manual start-stop push button switch  
Manual alternator circuit breaker 'On-Off' switch  
Cancel alarm switch Reset  
switch Indicating lamps  
Battery Status

### **3.12 Testing and Commissioning**

All the necessary comprehensive tests shall be performed to the approval and satisfaction of the Project Manager at the completion of installation. Before the commencement of acceptance testing, the installation shall be in a state of practical completion and shall have completed all of the preliminary testing and adjusted the equipment to its proper running order.

A full ten (10) days' notice of his readiness for carrying out acceptance tests shall be given to the Project Manager.

Prior to the date of giving such notice a complete details schedule of the tests to be carried out shall be submitted to the Project Manager for his approval and alterations and additions to the schedule are required to be made.

Notwithstanding his approval of the testing schedule the Project Manager may at any time before or during the testing period direct further tests to be carried out that he considers necessary.

Any variation to the programme for the testing period shall be at the discretion of the Project Manager.

Upon completion of all above tests, four (4) sets of the test results shall be submitted for the approval of Project Manager. All test reports submitted shall be endorsed by all parties witnessing the test including the contractor's and manufacturer's Qualified Personnel.

No acceptance tests shall be carried out except in the presence of the Project Manager or their authorised representatives appointed for the purpose.

The Contractor shall provide at his own cost all materials, including electric power, instrument test set, fuel, lubricants and other consumable, Load Bank required for the tests and adjustments of the equipment and for carrying out the acceptance tests and any re-tests that may be necessitated by failure of the installation or by any other causes within his control.

The Contractor shall ensure that the fuel supplied for use in acceptance tests is part of a batch for which certified test data is available. Two copies of the test certificate shall be supplied to the Project Manager prior to the commencement of tests.

During the testing period the Contractor shall appoint a qualified personal to carry out the checking and testing the testing instrument (equipment which are to be used for the test) including accurately calibrated test equipment for checking the accuracy of gauges and instruments forming part of or supplied with the installation.

Prior to commencement of testing a detailed list of the equipment shall be submitted to the Project Manager for his approval and no item on the list shall be removed from the site without his consent until the completion of testing.

### **3.13 Battery Charger**

#### General

The battery charger shall be Float cum Boost type SCR controlled. The charger shall have selector switch for Auto Float – Boost / Manual Float / Manual Boost Mode of operation. During Auto Float – Boost Mode, Automatic Changeover shall take place from Float Mode to Boost mode and Vice-Versa. This means that when the Batteries are fully charged the charging shall automatically change from Boost charge to trickle charge.

#### Construction Feature

The battery charger shall be housed in sheet steel cubicle of Angle Iron frame work with sheet steel panels of 1.6 mm thickness. Louvers shall be provided in the cabinet for the ventilation. The cubicle shall be painted in Siemens Grey shade RAL7032 of IS-5. Four wheels shall be provided at the base.

#### Performance

The D.C output voltage of Float / Boost charger shall be stabilized within  $\pm 2\%$  for AC input variation of  $230\text{ V} \pm 10\%$ , frequency variation of  $50\text{ Hz} \pm 5\%$  and DC load variation of 0- 100%. The voltage regulation shall be achieved by a constant voltage regulator having fast response SCR control. The ripple content will be within 3% of DC output nominal voltage.

There shall be provision to select Auto Float / Manual Float / Manual Boost modes. During Auto Float Mode the battery charging shall automatically changeover from Boost Mode to Float Mode and Vice Versa. During Manual Float / Boost modes it shall be possible to set the output volts by separate potentiometers.

The battery charger shall have automatic output current limiting feature. Components

The battery charger shall essentially comprise of the following

- 1 No. double pole ON/ OFF MCB at AC input.
- 1 No. pilot lamp to indicate charger ON.
- 1 No. Main Transformer: Double wound, naturally air cooled, having copper winding.
- 1 set single phase full wave bridge rectifier consisting of 4 Nos. SCRs, liberally rated, mounted on heat sinks and complete with resistor / condenser network for surge suppression.
- 1 No. rotary switch to select auto float/ manual float/ manual boost. During auto float mode automatic changeover shall take place from float mode to boost mode and vice versa.
- 1 set solid state constant potential controller to stabilize the DC output voltage of the float cum boost charger at  $\pm 2\%$  of time set value for AC input voltage variation of  $230\text{ V} \pm 10\%$ , frequency variation of  $\pm 5\%$  from 50 Hz and simultaneous load variation of 0- 100% and also complete with Current Limiting Circuit to drop the Float Charger output voltage upon overloads to enable the battery to take over.
  - 1 No. electronic controller to automatically changeover battery charging from boost to float and vice versa.
  - 1 No. DC ammeter and toggle switch to read charger output current and battery charge/ discharge current.
  - 1 No. moving coil DC voltmeter to read the DC output voltage.
  - 2 set potentiometer to adjust the output voltage during manual/ auto float and boost modes.
  - 2 No. double pole ON/ OFF MCB at DC output, 1 No. at charger output and the other at load.
  - 2 set DC output terminals. 1 set for the load and the other set for the battery.
  - Alarm Annunciation: Visual and audible alarm with manual accept reset facility shall be provided for the following
    - a. AC mains fail
    - b. Charger Fail
    - c. Load/ Output overvolt.

### Rating

AC Input	:	230 V + 10% AC 50 Hz single phase.
DC Output	:	To float/ boost charge batteries and also supply a continuous load.
Current Rating	:	30.0 Amps
Float Mode	:	27.0 V nominal (Adjustable) between 24-28.0 V.
Boost Mode	:	29.0 V nominal (Adjustable) between 24-32.0 V.
Voltage Regulation	:	$\pm 2\%$ for AC input variation of $230\text{ V} \pm 10\%$ . Frequency Variation of 50 Hz $\pm 5\%$ and DC load variation 0-100%

### Painting of Pipe Work

All pipe work, other than buried pipes, shall be painted immediately after installation with at least one coat of red primer and two (2) finishing coats of best quality aluminum paint. The colour will be determined by the Project Manager on site.

### Vibration Control

The complete generator assembly shall be isolated on static deflection unhoused spring- neoprene in series isolator with non-skid neoprene pads. Start-up and shut down rocking restraint snuffers shall be provided at four corners of base frame.

All fuel line pipes shall be cushioned with a layer of harness and neoprene pad at attached points.

All pipe work and engine silencers shall be suspended on static deflection spring-neoprene in-series hangers.

Detail calculation and proposal for justifying the size and provision shall be provided for Project Manager review prior to the installation.

## **3.14. TESTING**

### **FACTORY TEST SCHEDULE**

- i. Introduction
- ii. Preliminary Information Required
- iii. Pre-witnessing Check list
- iv. Confirmation of System Parameters
- iv. System Failure Mode Tests
- v. Equipment and System Operational Tests
- vi. System Load Acceptance Tests

### **INTRODUCTION**

The primary purpose of the tests scheduled within this document, represents the need for the installed system on site to meet the full expectations of the Specification.

The performed tests shall prove the synchronization of the sets and the safe reliable operation of the equipment under Normal site operating conditions: -

- Automatic and Manual start of the sets
- Verification of all safety shutdown circuits and alarms

**Note:** *All tests conducted shall be conducted using a reactive load bank arrangement at 0.8 lagging p.f.*

The programming of these tests becomes an integral and critical feature for the successful completion of the project; therefore Owners shall require a detailed programme of tests to be submitted in line with the project completion programme.

The co-ordination, documentation & management of the scheduled tests shall be undertaken by the selected suppliers.

## **PRELIMINARY INFORMATION REQUIRED**

To allow the scheduled witness tests to proceed, Owners shall require all the information as scheduled below to have been completed in order to meet the Contractual conditions of the Contract works. By conducting and preparing the attached information, Owners expect the tests to be completed expediently and successfully in line with the master Contract programme, this particular element of the project shall also be used to benchmark Contractor performance for selection upon future projects.

Owners expect all the scheduled information to be issued prior to the witnessing team attending the factory.

- Factory test schedules and results
- Record drawings for all equipment and systems
- Completed pre-commissioning and commissioning check lists
- Load bank completion certificate
- Specification compliance sheet to be issued

**Note:** *All information to be issued in bound format*

## PRE-WITNESSING CHECKS

- All associated test cabling to be complete
- All ancillary systems within the Generator enclosure to be completed.
- Visual checks to all system components and cabling.
- kW & kVAr sharing proven.
- All set controls circuits checked and operational.
- All emergency shutdown circuits checked and operational
- All interlocks and padlocks are in place.
- All protection devices are operational.
- All recording equipment is in place and functioning.

The tests shall be conducted at the full rating of each respective Generator set (i.e. full rating), at design load of each set with sets synchronized and under transient step load conditions, all as indicated within this document.

Various recording instruments i.e. Dranetz and multi-meter devices shall be connected into the system at the following locations: -

➤ Generator Test Synchronization switchboard : Dranetz multi meter c/w suitable C.T arrangements.

On completion of each test the corresponding signatory shall be included within the test sheets in order to confirm the acceptance of the tests.

## CONFIRM SYSTEM PARAMETERS

The Generator equipment shall be confirmed as follows in readiness for the test sequence:

- Confirm fuel oil transfer rates in l/ s
- Confirm battery voltages for starters
- Check alternator output voltage at No load and full load.
- Check current per phase on no load and full load.
- Check Neutral currents on No load and full load.
- Check frequency on no load and full load.
- Confirm kW & kVAr load sharing at full load.
- Check engine speed

## FAILURE MODE TESTS

The failure mode tests are to be conducted on successful completion of the system parameter checks and tests.

The tests to be conducted are as follows and shall be carried out on each generator by the manufacturer at 50% rated load of each set.

- Conduct fail to start test sequence by disabling fuel rack
- While set running fail fuel oil system
- Simulate reverse power and observe set shutdown.
- Fail control power supply and observe set shut down.
- Simulate E.P.O annunciation.
- Prove set shutdown with inlet outlet louvers failed.
- Repeat for all permutations of generators

- Verify all phase failure relay generator start signals.
- Simulate all engine shutdown alarms and observe shutdown
- Simulate specifically, engine over speed alarm and shutdown
- Fail one set of starters for each set during start sequence and observe transfer to alternate starter equipment in each case.

## **OPERATIONAL TESTS**

The function of the following test schedule is to confirm the operational abilities of the equipment under all possible scenarios and fault conditions.

The entire test scheduled below shall be conducted on each set

- With the complete equipment stationary conduct phase failure signals initiation.
- Conduct run down sequence upon reset of phase failure signals.
- Conduct manual start of the sets.
- On completion of heat run, load to be increased to 110% for 1 hr.
- During heat run check all enclosure temperatures
- Check all engine temperatures and alternator readings.

## **LOAD ACCEPTANCE TESTS**

The load acceptance test shall be conducted to confirm the load acceptance of the generator system under varying load steps and in all system configurations.

- Connect generator to load bank and increase load in stages, as the load bank will allow.
- Load the generator/ s to 100 % rated load and run for 1 hour.
- Reduce load by 50%.
- Reduce load by a further 50%.
- Apply remaining 25% load step.
- Reduce load by 100%.
- Apply 50% load step.
- Apply remaining 50% load step and run for 1 hour.
- Apply a further 10% load and run for 1 hr.

## **GENERATOR SITE TEST SCHEDULE**

### **Contents**

- i. Preliminary Information Required
- ii. Pre-witnessing Check
- iii. Confirm System Parameters
- iv. Failure Mode Tests
- v. Operational Tests
- vi. Load Acceptance Tests
- vii. Harmonic Tests

## **PRELIMINARY INFORMATION REQUIRED**

To allow the scheduled witness tests to proceed, Owners shall require all the information as scheduled below to have been completed in order to meet the Contractual conditions of the Contract works. By conducting and preparing the attached information, Owners expect the tests to be completed expediently and successfully in line with the master Contract programme, this particular element of the project shall also be used to benchmark Contractor performance for selection upon

future projects.

- Factory test schedules and results
- Record drawings for all equipment and systems
- Record drawings of the infrastructure
- Completed pre-commissioning and commissioning check lists
- Fuel system complete and certified
- All relevant snag lists complete

**Note:**

*All information to be issued in bound format As an integral part of the pre-commissioning exercises, it shall also be required to confirm certain conditions and systems within the boundaries of the project are available for use and are fully serviceable. The scope of these pre-commissioning checks shall include the systems, equipment and works that are required to complete the installation and for a complete Normal and Standby system to be available to support the load upon completion of the tests.*

*Upon completion of the scheduled tests, it is intended that the equipment and systems relevant to the generator system shall be made available to support Owners critical load, therefore, all test documentation, sign off sheets, and O & M manuals shall be presented to OWNERS within 72 hrs following successful completion of the tests.*

**PRE-WITNESSING CHECKS**

- All associated infrastructure cabling, Controls cabling to be completed
- All ancillary systems within the Generator enclosure to be completed.
- Visual checks to all system components and cabling.
- All infrastructure works to be complete or circuits isolated to allow test to commence.
- All earthing connections completed and tested
- All Builders work to be complete.
- kW & kVAr sharing proven.
- All set controls circuits checked and operational.
- All emergency shutdown circuits checked and operational
- All interlocks and padlocks are in place.
- Generator fuel oil system is complete, certified and functioning.
- All generator supplier site commissioning checks complete and certificates issued.
- All protection devices are operational.
- All recording equipment is in place and functioning.
- All necessary fire precautions have been taken.
- Generator manufacturers to be on site.
- Check all protective devices within the electrical distribution have been set correctly
- All electrical circuit test results issued and approved.
- Confirm all Utility incomers and generator incomers in correct sequence.

Upon issue of the above information and confirmation of the itemised pre-commissioning checks, the Certification tests shall commence as detailed.

**CONFIRM SYSTEM PARAMETERS**

Following commissioning of the relevant electrical infrastructure the Generator system shall be configured as follows in readiness for the test sequence: -

- Verifying alternator star point earth resistance < 1ohm
- Check earth loop impedance on generator configured distribution system.
- Confirm fuel oil transfer rates in l/ s
- Confirm battery voltages for starters
- Check alternator output voltage at No load and full load.
- Check current per phase on no load and full load.
- Check Neutral currents on No load and full load.
- Check frequency on no load and full load.
- Confirm voltages at furthest point under UPS test sequence.
- Confirm kW & KVAR load sharing at full load.
- Check engine speed
- Confirm all auto-change over time settings.

## **FAILURE MODE TESTS**

The failure mode tests are to be conducted on successful completion of the system parameter checks and tests.

The tests to be conducted are as follows and shall be carried out on the each generator by the manufacturer at 50% design load.

- Conduct fail to start sequence
- While set running fail fuel oil system
- Simulate reverse power and observe set shutdown.
- Fail control power supply and observe set shut down.
- Simulate E.P.O. annunciation.
- Prove set shutdown with inlet outlet louvers failed.
- Test auto-change over system at incoming switchboards.
- Verify all phase failure relay generator start signals.
- Simulate all engine shutdown alarms and observe shutdown
- Simulate specifically, engine over speed alarm and shutdown
- When both sets synchronized, Conduct Phase to earth fault at OWNERS input switchboard via protective device and observe generator performance.

## **OPERATIONAL TESTS**

The function of the following test schedule is to confirm the operational abilities of the system under all possible scenarios and fault conditions, and will require the whole electrical infrastructure to be complete to enable all the auto change over system to be included within the test.

The entire test scheduled below shall be conducted with the load bank connected via the UPS and all other essential loads connected via their respective distribution switchgear.

With the complete electrical system under Normal mains supply, conduct the following tests:-

- Fail Utility input and observe generator start sequence and auto-change over then re-instate.
- Fail Utility inputs simultaneously and observe generator start sequence and auto changeover then re-instate.
- Observe priority load scheduling arrangements on mains failure
- Conduct all above tests for each individual generator with 1 No. Generator isolated as if in maintenance.

## **LOAD ACCEPTANCE TESTS**

The load acceptance test shall be conducted to confirm the load acceptance of the generator system under varying load steps and in all system configurations.

These tests are required to be conducted individually and when all sets synchronized.

## **5. MEDIUM VOLTAGE 1.1 KV GRADE XLPE / PVC CABLES**

### General

The MV cables shall be supplied, inspected, laid, tested and commissioned in accordance with drawings, Specifications, relevant Standard Specifications and cable manufacturer's instruction.

### Material

The MV cables shall be cross linked polyethylene (XLPE) insulated PVC inner sheathed and FRLSZH PVC outer sheath of 1100 volts grade as asked for in the schedule of quantities. Cables up to 16 sq.mm shall be with copper conductor and 25sq.mm and above shall be with aluminium conductor.

The MV cables 25 sq. mm & above shall be cross linked polyethylene (XLPE) insulated PVC inner sheathed and FRLS PVC outer sheath of 1100 volts grade. Cables below 25sq.mm shall be with copper conductor, with HR PVC core insulation and sheathing.

Specifications of PVC insulated copper cable shall be as follows:

#### a. Conductor

Stranded compacted circular conductor shall be of electrical grade high conductivity copper below 25 sq.mm as per IS 8130 / 84

#### b. Insulation

The insulation shall be PVC; application shall be by extrusion process insulation confirming to IS 5831-1984. The thickness of insulation will be as per the relevant codes.

#### c. Laying-up

Insulated conductors of multi core cables shall be with thermoplastic fillers in the interstices. The phase identification of cores shall be by coloured strips.

#### d. Inner Sheath

Cores shall be surrounded either by a wrapped or an extruded PVC sheath. The thickness of the inner – sheath shall be as per relevant codes.

#### e. Armouring

The armouring shall be provided over the inner sheath. Single core cable shall have dia - magnetic armouring. Multi core cables shall have either galvanized round steel wires or flat steel strip armouring. Steel wires and strips for armouring confirm to IS:3975. The direction of lay of armouring shall be opposite to that of cores.

#### f. Outer Sheath

Single and multi-core cables are provided with an extruded FRLS grade PVC outer-sheath. The thickness of the sheath shall be as per IS: 1554-1988. The PVC compound for the outer-sheath shall confirm to Type ST1 of IS 5831. The colour of the outer sheath shall be black with marking at every meter.

Specifications for XLPE aluminium / copper cable shall be as follows:

#### a. Conductor

Stranded compacted circular conductor shall be of electrical grade high conductivity aluminium per IS 8130/84

#### b. Insulation

The insulation shall be of natural unfilled chemically cross linked polyethylene conforming to IS 7098. The thickness of insulation shall be as per the relevant codes.

#### c. Laying-up

Insulated conductors of multi core cables shall be with plastic fibre in the interstices. The phase identification of cores shall be by coloured strips.

#### d. Inner Sheath

The cores shall be surrounded by either a wrapped or by an extruded PVC sheath. The thickness of the inner sheath shall be as indicated in the relevant codes.

#### e. Armouring

The armouring shall be provided over the inner sheath. Single core cable shall have non- magnetic armouring. Multi core cables shall have either galvanized round steel wires or flat steel strip. Steel wires and strips for armouring confirm to IS:3975. The direction of lay of armouring shall be opposite to that of cores.

#### f. Outer Sheath

Single and multi-core cables are provided with an extruded FRLS grade PVC outer-sheath. The thickness of the sheath shall be as per IS: 1554-1988. The PVC compound for the outer-sheath shall confirm to Type ST2 of IS 5831. The colour of the outer sheath shall be black with marking at every meter.

Current ratings of the cables shall be as per IS: 3961. The Conductor shall be stranded Aluminum/Copper circular/ sector shaped and compacted. In multi core cables the core shall be identified by red, yellow, blue and black coloring of insulation.

Repaired cables shall not be used.

The cables shall be suitable for laying in racks, ducts, trenches, conduits and underground buried installation with uncontrolled back fill and chances of flooding by water.

Progressive automatic in line sequential marking of the length of cables in meters at every one

meter shall be provided on the outer sheath of all cables.

Cables shall be supplied in non-returnable wooden drums as per IS: 10418.

Both ends of the cables shall be properly sealed with PVC/Rubber caps so as to eliminate ingress of water during transportation, storage and erection.

The product should be coded as per IS:- 7098 Part-I as follows :-

Aluminium Conductor	A
XLPE Insulation	2X
Steel round wire armour	W
Steel strip armour	F
Steel Double round wire armour	WW
Steel Double strip armour	FF
Non-magnetic (Al.) round wire armour	Wa
Non-magnetic (Al.) strip armour	Fa
PVC outer sheath	Y

#### Inspection

All cables shall be inspected by the contractor upon receipt at site and checked for any damage during transit.

#### Joints in Cables

The Contractor shall take care to see that all the cables received at site are apportioned to various locations in such a manner as to ensure maximum utilization and avoid cable jointing. This apportioning shall be got approved by the Owner's site representative before the cables are cut to lengths. Where joints are unavoidable heat shrinkable type joints shall be made. The location of such joints shall be got approved from the Owner's site representative and shall be identified through a marker.

#### Jointing Boxes for Cables

Cable joint boxes shall be installed with heat shrinkable sleeve and of appropriate size, suitable for XLPE armoured cables of particular voltage rating.

#### Jointing of Cables

All cable joints shall be made in suitable, approved cable joint boxes and the filling in of compound shall be done in accordance with manufactures' instructions and in an approved manner. All straight through joints shall be done in epoxy mould boxes with epoxy resin.

All cables shall be joined colour to colour and tested for continuity and insulation resistance before jointing commence. The seals of cables must not be removed until preparations for jointing are completed. Joints shall be finished on the same day as commenced and sufficient protection from the weather shall be arranged. The conductors shall be efficiently insulated with high voltage insulating tape and by using of spreaders of approved size and pattern. The joints shall be completely topped up with epoxy compound so as to ensure that the box is properly filled.

#### Cable End Terminations

Cable end termination shall be done in cable terminal box using crimping sockets and proper size of

glands of double compression type

#### Bonding of Cables

Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armour clamp and gland. The clamps must grip the armouring firmly to the gland or casing, so that no undue stress is passed on to the cable conductors.

#### Cable Installation

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming kinks.

#### Laying of Cables on Cable Trays

The relative position of the cables, laid on the cable tray shall be preserved and the cables shall not cross each other. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius as recommended by the manufacturers. All cables shall be laid with minimum one diameter gap and shall be clamped at every meter to the cable tray. Cables shall be tagged for identification with aluminum tag and clamped properly at every 20M. Tags shall be provided at both ends and all changes in directions both sides of wall and floor crossings. All cable shall be identified by embossing on the tag the size of the cable, place of origin and termination.

**All cables passing through holes in floor or walls shall be sealed with fire retardant Sealant and shall be painted with fire retardant paint up to one meter on all joints, terminations and both sides of the wall crossings.**

#### Route Marker

Route marker shall be provided along straight runs of the cables not exceeding 30 meters also for change in the direction of the cable route and underground joints.

Route marker shall be of cast iron painted with aluminum paint. The size of marker shall be 100 mm dia with "Cable" and voltage grade inscribed on it

#### Fire retardant Cable Paint & Fire Barrier

The fire retardant paint / barrier shall be listed by independent test agencies such as UL, FM or OPL and be tested to, and pass the criteria of ASTM E 814 ( UL1479) standard test method for fire test through- penetration fire stops and ASTM E 1996 ( UL 2079) standard test method for fire resistive joint system/

#### Fire retardant cable Paint

The Fire resistant cable coating / painting shall be intumescent / ablative, water based compound, The coating shall expand up to 10 times, supplied in a manufacturer seal container indicating manufacturing and expiry dates. The coating material shall be non-toxic, asbestos free, & halogen free and shall have good mechanical strength. The colour of paint shall be white and density of coating shall be 1.3kg/ltr , coating shall have a snap time of 30 minutes, the expansion shall begin at 230 deg.C and it shall have a oxygen index of 41%.

Coating shall be applied by ordinary paint brush after cleaning the cables of dust and oil deposition. A minimum textured finish of 3 mm wet film thickness shall be achieved by applying the material in 2-3 layers leaving intervals of 2 to 8 hours depending upon the moisture and thickness, moisture and temperature hours between each coat.

## Fire Barrier sheet for floor and wall sealing

The framing & fixing part of fire barrier sheet shall be very simple & directly fixed around walls & floors by help of anchored bolts & washer. For 2-hour fire rating the fire barrier sheet shall be minimum 7.62 mm thick and shall be cut as per the profile of penetration and opening. The small gap left around the penetration shall be closed with fire rated soft & moldable putty. Fire barrier must be design on the intumescent technology to seal larger penetration through the fire rated walls & floors. Fire barrier must be a composite construction with the quality incorporated with organic/ inorganic fire resistive elastomeric sheet with specific gravity of 1.6 gm/ cubic centimeter.

## Testing of Cables

Cables shall be tested at works for all routine tests as per IS including the following tests before being dispatched to site by the project team.

- Insulation Resistance Test.
- Continuity test.
- Sheathing continuity test
- Earth test.(in armoured cables)
- Hi Pot Test.

Test shall also be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the Owner's site representative.

- Insulation Resistance Test (Sectional and overall)
- Continuity test.
- Sheathing continuity test
- Earth test.

All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Owner's site representative, results will be noted and signed by all present and record be maintained.

## Cables inside Building

Cables inside buildings shall be laid on the cable trays. All cables passing through walls shall run through GI Pipes sleeves of adequate diameter 50 mm apart maintaining the relative position over the entire length.

## **Cable Trays**

Ladder and perforated type Cable Trays shall be of Pre Galvanized bolted type and factory fabricated out of CRCA sheet with standard accessories like tee, bends, couplers etc. for different loads and number and size of cables as given below. All outdoor type cable trays shall be Hot dip galvanized cable trays as required.

Supply and fixing of perforated type cable trays of the following sizes:

- i. 600 x 40 x 40 x 2 mm thick
- ii. 450 x 40 x 40 x 2 mm thick
- iii. 300 x 40 x 40 x 2 mm thick
- iv. 150 x 40 x 40 x 2 mm thick

Note: Suitable length of 10 mm dia GI rod suspenders at 1800 mm interval shall be included in the item for perforated type cable tray.

### Specification for Hot Dip Galvanizing Process

(For Mild Steel Used for Earthing, Cable Trays, Junction Boxes etc for Electrical Installation.)

#### Quality of Zinc

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS:209-1992. Coating

#### Requirement

Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS:6745-1972 shall be 400 g/sqm.

The weight of coating expressed in grams per square metre shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.

The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs, rust stains bulky white deposits, blisters.

Mild steel flats / wires shall undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing.

## **6. EARTHING**

The system shall be TNS with four wire supply system (R, Y, B, N and. E) brought from the main Dg synchronizing panel. All the non-current carrying metal parts of DG set and accessories in electrical installation and, switchgear, distribution panels, and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All metal work such as pipe lines, ducts, cable trays, etc shall be bonded to earth.

All earthing shall be in conformity with IS: 3043 2018, and the basic system of earthing shall be TNS.

### **Earthing Conductors**

Earthing conductors shall be of copper for equipment neutral earthing and GI conductor for equipment body as well as other accessories earthing, as per as mentioned in Schedule of quantities.

## Sizing of Earthing Conductors

Earth conductor cross sectional area shall be calculated based on actual fault current calculated for individual DG set and MCC panel.

Each earthing station shall be connected underground for equipotential bonding & to minimize overall resistance of earthing path. It is advisable to connect all body earthing station together separately to form grid for equipotential bonding and neutral earthing station together separately to form grid for neutral earthing.

Earthing grids of electronic \ IT equipment shall be separate & shall not be connected to general earthing grids with prior consent from user. Electronic \ IT equipment earthing grids for various building scan be interconnected for equipotential bonding & to minimize overall resistance of earthing path

Earth conductor size (Sq.mm) =  $\sqrt{(I^2 \times t) / k}$  t: time to

withstand fault current in second k: material constant

I: Fault current in Amps

Material	Material Constant (k)
GI	80
Copper	205
Aluminium	126

## Connection of Earthing Conductors

All joints in tapes shall be with four rivets (minimum 2 nos. diagonally opposite in case of smaller width strip) and shall be brazed in case of copper and by welding bolting in case of GI, wires shall be connected with crimping lugs, all bolts shall have spring washers. Sub- mains earthing conductors shall run from the main distribution panel to the sub distribution panel. Final distribution panel earthing conductors shall run from sub-distribution panel.

Circuit earthing conductor shall run from the exposed metal of equipment and shall be connected to any point on the main earthing conductor, or its distribution panel. Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to distribution panel at which they originate, or otherwise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing. Where equipment is connected by flexible cord, all exposed metal parts of the equipment shall be earthed by means of an earthing conductor enclosed with the current carrying conductors within the flexible cord. Switches, accessories, lighting fitting etc, which are rigidly secured in effective electrical contact with a run of metallic conduit shall not be considered as a part of the earthing conductor for earthing purposes, even though the run of metallic conduit is earthed. The installation shall be complete in all respects for efficient and trouble-free service. All work shall be carried out in a first-class quality and neat workmanship. Grounding conductors shall be handled carefully to avoid kinking and cutting of the conductors during their installation. All exposed ground conductors run shall be taken in a neat manner horizontal, vertical and parallel to the building walls or columns and shall not be laid haphazardly. All connections to the grounding grid shall be made with earthing strip welded to grid and bolted at

equipment ends.

### **Prohibited Connections**

Neutral conductor, sprinkler pipes, or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures, metallic conduits and lightning protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system. The electrical resistance measured between earth connection at the main L T panel and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate or circuit breakers, and shall not exceed 1 ohm. All switches carrying medium voltage shall be connected with earth by two separate and distinct connections. The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in GI pipe of adequate size. The overlapping in strips at joints where required, shall be minimum 75 mm. The joints shall be riveted and brazed in case of copper and by welding / bolting in case of GI in an approved manner. Sweated lugs of adequate capacity and size shall be used for termination of all conductor wires above 6 sq.mm size. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily

substances and properly tinned. Equi-potential bonding of all metallic structures shall be done.

### **Earthing**

The following must always be ensured in earthing system.

All earths must be interconnected at the earth pits. This includes DG neutrals, DG body, Panel earths etc.

Extraneous conductive parts such as gas pipes, other service pipes and ducting risers and pipes of fire protection equipment and exposed metallic parts of the building structure.

The Contractor shall get the soil resistivity test done at his own cost of the area where earthing pits are to be located before starting the installation.

#### **Resistance to Earth**

The resistance of earthing system shall not exceed 1 ohm. Maintenance free

#### **Earthing Electrode System/ Chemical Earthing**

In maintenance free earthing copper bonded earthing rod electrode shall be of 14.35 mm in diameter and 3 meter length. The rod shall be placed in a 150 mm dia an augured hole in the ground and then surrounded by ground enhancement material in either a dry form or pre mixed in a slurry. Once set, ground enhancement material becomes hard and as such holds positively to the rod as well as surrounding ground.

Earth rod offered shall have passed the test required of BS7430/ ANSI/ UL467 and confirm to the adhesion of the copper coating to the steel core (Design feature that prevents the ingress of moisture and subsequently the integrity of the rod.

Minimum 0.25 mm thickness of copper shall be deposited over the steel core as per BS 7430/ UL 467. Average life of the ground rod shall be 30 years in most soil.

Ground enhancement material shall be as per IEEE-80 clause 14.5d with a resistivity of less than 0.12 ohm-meters. The ground enhancement material shall be permanent and not leach any chemicals in to the ground. The pH value of the ground enhancement material shall be 6.9 to 7.2 of 100 gm/ lit @ 20 Deg.C.

Minimum 25/30 Kg of ground enhancement material shall provide for each earth electrode.

Inspection chamber shall be of 400 x 500 mm with concrete base CI manhole cover with frame painted with bit mastic paint. 2 Nos. of 50 x 6 mm cross section & 300 mm long copper strip to be clamped with copper clad rod electrode have sufficient nos (But not less than 4 Nos.) of 10□ mm GI nuts & bolts for connection to the equipment / interconnection to the other pits to form equi-potential bonding.

## **7. BUSWAYS**

The specification covers design, manufacturing, supply, installation, testing and commissioning of Sandwich type bus bar trunking for use as feeder bus bars for interconnection between separate electrical equipment / load centers, and for use as plug in bus bar risers.

### **System details**

The busduct shall be suitable for operation in a 600/1000V system, with frequency of 50 Hz having 100% neutral and internal earth. The bus duct shall be designed for an ambient of 45 deg C (35 deg C average over a period of 24 hours) as per IEC-61439.

### **Standards**

The bus bar shall be designed and manufactured in accordance with the following international standards for bus bar trunking:

BS 5486 Part 2 : Requirements of bus bar trunking systems  
IEC 61439 : Requirements of bus bar trunking systems IEC  
60529 : Degree of protection

The bus duct shall conform to IEE/NEMA/BUI/JIS for seismic protection certification.

### **Testing**

The bus bars shall be type tested at a reputed international test laboratory (ERDA/ASTA or CPRI) for short circuit withstand. The test shall be for a minimum duration of 1 second. Tests shall be performed over a range of current ratings, covering the different frame sizes of the manufacturer.

Degree of ingress protection (IP rating) shall also be tested at any reputed independent laboratory. This test shall be for minimum IP52 for indoor application and IP65 for outdoor application for sandwiched bus bars.

### **Manufacturer**

The manufacturer must have an established track record in design and manufacture of sandwich and cast resin busbar trunking, and must have supplied bus bar systems for at least 5-10 years.

The manufacturer must have ISO 9001 certification for design, manufacture and testing of bus bar systems.

### **Design & Construction requirements**

General: The bus bars shall be of sandwich construction, non-ventilated design. It shall be possible to mount the bus bar system in any orientation, without affecting the current rating.

The bus duct shall consist of three phases and neutral bus bar permanently positioned dust and vermin proof and the degree of enclosure protection shall be IP 54 for indoor installation and shall be IP-65 for outdoor installation as per schedule of quantities.

**Bus bars:**

The bus bars shall of high conductivity Aluminum, as specified in the tender.

Unless otherwise specified, in the external surface of enclosures of bus bar compartment which shall be accessible but do not need to be touched during normal operation, maximum temperature rise limits of 40° C above ambient temperature shall be permissible for metal surface and of 50° C above ambient temperature for insulating surfaces as per applicable standards.

Where an earth conductor is required, it shall be a separate, integral earth conductor, of the same high conductivity material as per IEC 61439. In addition to this, enclosure shall have fixed arrangement to install 2 nos. of external earth strip along the run of the bus duct.

**Insulation**

The bus bars shall be insulated throughout their length by epoxy coating / Mylar. The insulation material used shall be of minimum Class B (130 deg. C). The insulation must comply to UL 94 V-O. It shall be Halogen Free.

**Housing**

The housing shall be made of extruded Aluminum case duly enameled/ electro-galvanized sheet steel, with an epoxy powder coated paint finish. The housing shall be profiled, to provide higher strength and efficient heat dissipation. The width of the housing shall preferably be the same for all ratings of bus bars, in order to provide interchangeability of tap off boxes.

**Joints**

The joints between sections shall be made so as to provide flexibility during installation and expansion / contraction of bus bar during operation. The joints shall be of the single bolt type

The joint construction must have the following features not limited to : Heat expansion  
of at least 3mm per joint.

The joint insulation must be of one-piece molded design and not have any cut edges which can absorb moisture.

The joint construction must allow a +/- 14mm adjustment at the time of installation, for ease of adjusting to site measurement variations.

The joint bolt must be insulated with a bolt insulator. The bolt insulator must be of molded one piece.

The joint system must be designed in a way that the Contractor cannot insert the bus duct length too far and damage the bolt insulator.

The bus bar ends shall not have holes or slots at the joints – the electrical continuity shall be through pressure plates, achieving a high area of joint cross section and expansion capability.  
It shall be possible to install and remove the joints without disturbing the bus bar run.

**Accessories:**

A full range of accessories like bends, end flanges, end feed units, and support brackets etc. shall be available

**Installation**

Bus ducts running along the wall shall be supported at intervals not exceeding 1.5 m. In case of

branching, there shall be support on all branches at a distance of 300 mm from the point of branching, Support shall not be less than 40 x 40 x 6 mm MS angle secured in an approved manner. Supports may also be provided in the form of brackets fixed to walls where the duct runs along the wall. In case of ceiling suspended bus ducts, supports made from 40x40x6 mm MS angle iron shall be provided. The horizontal distance between two such supports shall not be more than 1200 mm. The ducts support shall be suspended from suitable approved suspension devices provided in the ceiling. Fire barrier shall be provided at each floor/wall crossing as per relevant IS code

### **Test at Site**

The following tests shall be carried out at site and test results to be recorded:

- a. Insulation resistance shall be tested with 1000 V megger and shall be not less than 100 mega ohms.
- b. Earth continuity test.

## DRAWINGS

The contractor shall refer the tender drawings attached in this section.

Sr. No.	Drawing Title (GFCs)	Drawing No.
1	LOWER GROUND FLOOR LAYOUT	AEON/AC/T-01



RACK LEGEND	
[Symbol]	CONDENSATION
[Symbol]	ALUMINUM TUBE
[Symbol]	GLASSING
[Symbol]	COOL EXPANSION
[Symbol]	PIPE
[Symbol]	AIR SEPARATOR
[Symbol]	PIPE
[Symbol]	PRESSURIZATION
[Symbol]	CONDENSED WATER
[Symbol]	SUPPLY/RETURN SIDE
[Symbol]	CHILLED WATER
[Symbol]	SUPPLY/RETURN SIDE

HVAC LEGEND	
[Symbol]	FRESH/SUPPLY AIR GRILL
[Symbol]	EXHAUST AIR GRILL
[Symbol]	FRESH AIR DUCT
[Symbol]	EXHAUST AIR DUCT
[Symbol]	PRESSURIZATION AIR DUCT
[Symbol]	STP EXHAUST AIR DUCT
[Symbol]	FRESH AIR/EXHAUST AIR
[Symbol]	DUCT FLOW FAN
[Symbol]	HVAC SHAFT
[Symbol]	HVAC WINDWAY TRENCH



GENERAL TECHNICAL NOTES TO BE FOLLOWED AT ALL WORKING PARTS OF THE DRAWING.

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE INDIAN STANDARDS INSTITUTION (ISI).
2. ALL MATERIALS SHALL BE OF THE BEST QUALITY AND SHALL BE SUPPLIED BY THE CONTRACTOR.
3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
5. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
7. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
9. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.
10. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE DRAWING AND THE SPECIFICATIONS.

GENERAL NOTE:  
 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR REQUIRED FOR THE EXECUTION OF THE WORK.  
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR REQUIRED FOR THE EXECUTION OF THE WORK.  
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR REQUIRED FOR THE EXECUTION OF THE WORK.

NO.	DATE	REVISIONS	BY
01	26.12.20	DWG REVISED AS PER NEW ARCHITECT	
02	14.08.21	DWG ISSUE FOR APPROVAL	

REVISIONS

NO. DATE REVISIONS BY

PROJECT MANAGER

ARCHITECT

CLIENT

OWNER

DATE

SCALE

CHECKED BY

DATE

PROJECT

OWNER/PROJEC

SWOSTI PREMIUM LIMITED

P-1, JAYDEV VIHAR

BHUBANESHWAR, ODISHA - 751013

DRAWING TITLE

BASEMENT FLOOR PLAN

HVAC LAYOUT

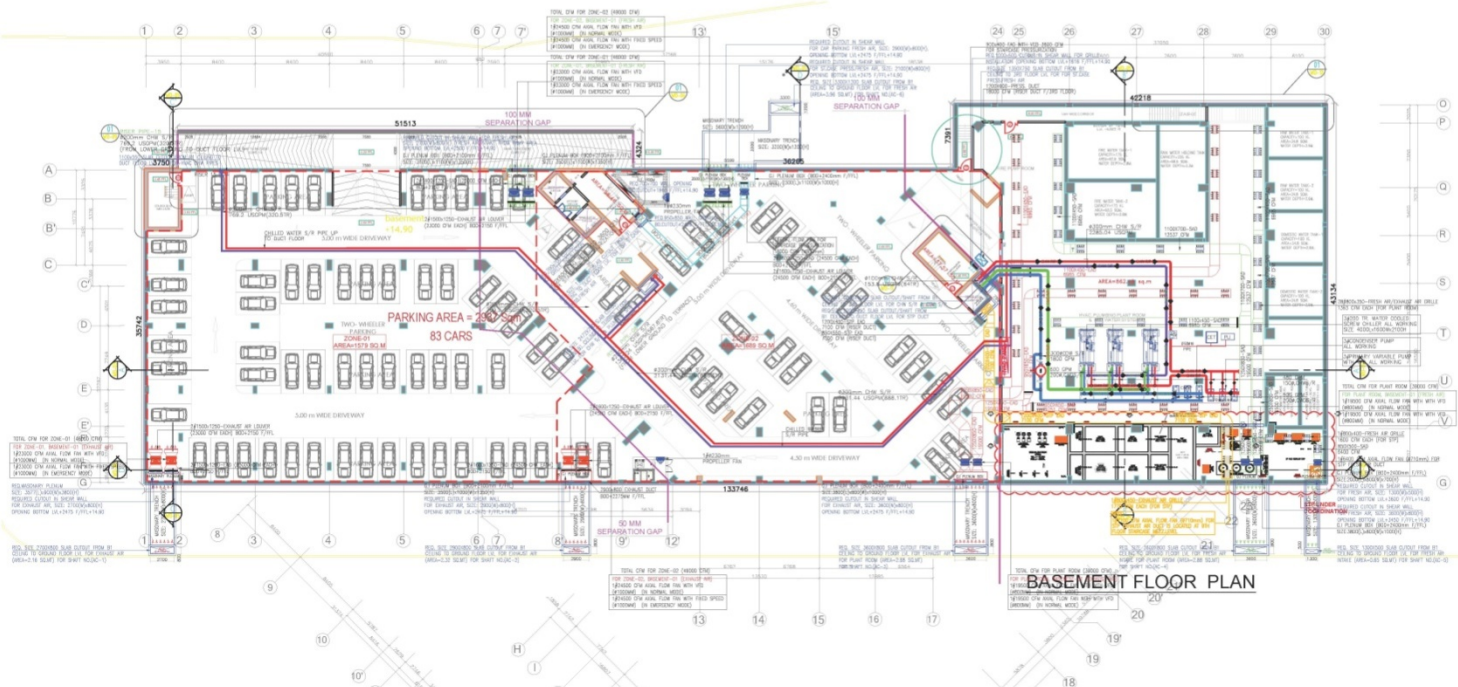
TENDER DRAWING

PROJECT NO. 24/2021

DATE OF FIRST ISSUE: 26/12/2020

SCALE: 1:500 (A4) 1:200 (A3) 1:100 (A2)

CHECKED BY: [Signature]



BASEMENT FLOOR PLAN

**SECTION-4**

**FINANCIAL PROPOSAL SUBMISSION FORM**

**(To be submitted in separate sealed Envelop)**

(On Company Letterhead)  
{Location, Date}

To

The General Manager (Communications)  
Swosti Premium Ltd.  
Gopalpur Palm Resort Project  
Email: gm.communications@swostihotels.com ear Sirs:

We, the undersigned, offer to provide the construction services for “Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam, on a Item Rate Contract Basis”, in accordance with your Request for Proposal dated \_\_\_\_\_ and our Technical Proposal.

“We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery. We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act, 1988 (as updated from time to time).”

Our attached Financial Proposal is for the amount of {Indicate the corresponding to the amount(s) currency(ies)}{Insert amount(s) in words and figures}, “excluding” of all indirect local taxes as in the Data Sheet. The estimated amount of local indirect taxes is {Insert currency} {Insert amount in words and figures} which shall be confirmed or adjusted, if needed, during negotiations. {Please note that all amounts shall be the same as indicated above.

Our Financial Proposal shall be binding upon us subject to the modifications resulting from Contract negotiations, up to expiration of the validity period of the Proposal, i.e. before the date indicated in the Data Sheet.

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: \_\_\_\_\_ Name and Title of Signatory: \_\_\_\_\_

In the capacity of: \_\_\_\_\_

Address: \_\_\_\_\_

E-mail:

**BOQ Supply, Installation, Testing & Commissioning of 2 X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam.**

Item No.	Description	Unit	Qty.	Rate	Amount
<b>A.</b>	<b><u>SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF DG SET INCLUDING ALL ACCESSORIES</u></b>				
1	Design, Manufacture, testing at works, supply, storing/forwarding to site, unloading, handling, inspection, shifting to base, installation, testing and commissioning of 750 kVA prime rating Radiator cooled diesel generating set along with base frame, Acoustic Enclosure, Alternator (capable of delivering true 600 kW output @ power factor 0.8), Static Excitation System, Lube Oil System, Electronic Governor including AMF cum Synchronization module (PCC-3.3 or equivalent), alarms along with 990 litre day oil fuel tank including with glass type level indicator and level controllers with potential free contacts, float valves etc (Tank shall be painted with 2 coats of red oxide primer outside), CT adopter box, AVM pads, AVR, base frame, hardware, 24 Volts Lead acid Batteries with battery charger suitable for 3 consecutive starts and block load, Engine control panel with accessories first fill of HSD, lube oil, hospital grade silencer, flexible connection bellow / expansion joints etc. including termination box (suitable for 1250 Amps 4P AL. Busduct) and space for differential 3 No. 1250 Amps PS class CTs complete with all associated equipment / work as per specifications & single line diagram. Alternator shall have Class F insulation and rated for 600 KW output. All equipment shall be rated for 50 Deg C ambient. DG Set shall be provided with 1250 Amps ACB Isolator panel inside the DG acoustic enclosure as per technical specification. The cost of the ACB isolator panel is included in the DG cost.	Set	2		
	<b>TOTAL CARRIED TO SUMMARY</b>				
<b>B.</b>	<b><u>EXHAUST PIPING SYSTEM</u></b>				
1	Providing, fixing, installing, testing and commissioning of exhaust pipe of following dia fabricated out of 5 mm thick MS plate and all fixing accessories and hardwires. Supplying and fixing of 75 mm thick Rockwool insulation (of 96 Kg. Per cubic RMT density) over the exhaust pipes of following diameter including cladding, wrapped in chicken mesh with aluminium sheet of 26 SWG and covering from outside complete, as required. Exhaust pipe shall be inclusive of required MS supporting structure for below said exhaust pipes including heat resistant paint etc. complete in all respect as required for successful operation of DG set in compliance with CPCB norms & SS Flexible bellows shall be provided at necessary location considering permissible back pressure as per OEM				
1.1	200 mm dia (Pipe size without insulation)	RM	20		
1.2	300 mm dia (Pipe size without insulation)	RM	20		
2	Obtaining clearance from Central Pollution Control Board (CPCB	Lot	1		

	IV) & State Pollution Central Authority in respect of noise level and emission level being within permissible level and obtaining clearance from Electrical Inspectorate for 2 No. 750 kVA DG sets				
3	The contractor is responsible to submit the drawings and other details as required by the local authorities for CEIG approval for electrical distribution planned & installed shall be responsibility of DG contractor. Owner's scope shall be limited to signing of documents. All officials fees as required for getting the approvals shall be reimbursed by Owner's on producing the proof.	Lot	1		
	<b>TOTAL CARRIED TO SUMMARY</b>				
	<b>C. CONTROL CABLES &amp; CABLE TRAYS</b>				
	The rate shall also include the following :				
1	Effecting adequate and proper connections at terminations.				
2	Providing all fixing accessories such as clamping devices nuts, bolts and screws.				
3	Wherever the cables are of aluminium and bus bars of copper bimetallic lugs shall be used.				
4	All cable shall be laid with one diameter gap.				
5	All cables shall be IS approved.				
6	Fire retardent paint one meter on both side of wall penetration and at termination as per specifications.				
7	All cutouts / Sleeves shall be sealed with fire redardant sealent as per specification.				
8	All cuts/perforations/folded sections where contact with wires/cables is expected shall be burr free.				
9	The cable tray shall be factory built. Only cutting to achieve assembly system length shall be permitted at site.				
10	Accurate fabrication formed section with tolerances of $\pm 2$ mm on width and $\pm 5$ mm on length expected.				
11	Dimensional and general arrangement drawing of the system are expected to be provided by tenderer / cable tray / duct supplier.				
12	The system shall be designed for installation with a temperature classification of + 60 deg.C.				
13	The cable tray systems shall be suitable for against corrosion.				
14	Details of fixing supports etc. shall be submitted for approval.				
	<b>C. CONTROL CABLES &amp; CABLE TRAYS</b>				
1	Supplying & laying of following 1100 volt grade XLPE insulated				

	PVC sheathed Copper conductor armoured/Unarmored cables as per specification <b>laid in trench, pipe, cable tray, hume pipe</b> ncluding cost of digging upto required depth, over a bed of sand, brick protection, route marker, back filling etc with suitable clamps including, saddles fixing bolts, connecting testing and commissioning complete in all respect as required as per site conditions.				
1.1	2C x 2.5 sq.mm. Cu Arm Multi strand Cable including termination	RM	200		
1.2	3C x 2.5 sq.mm. Cu Arm Multi strand Cable including termination	RM	500		
1.3	4C x 2.5 sq.mm. Cu. Flexible (Shielded) including termination	RM	300		
1.4	6C x 2.5 sq.mm. Cu Arm Multi strand Cable including termination	RM	250		
1.5	12C x 2.5 sq.mm. Cu Arm Multi strand Cable including termination	RM	250		
1.6	24 core 1.0 sq.mm braided temperature scanner cable for each including termination	RM	50		
2	Supply and fixing of Pregalvanized perforated type Bolted Construction GI cable trays of the following sizes as per specification. All supporting arrangement shall be included in the quoted price.				
2.1	600 mm x 40 x 40 x 2 mm thick	RM	RO		
2.2	450 mm x 40 x 40 x 2 mm thick	RM	RO		
2.3	300 mm x 40 x 40 x 2 mm thick	RM	RO		
2.4	150 mm x 40 x 40 x 2 mm thick	RM	RO		
	<b>TOTAL CARRIED TO SUMMARY</b>				
<b>D.</b>	<b><u>EARTHING SYSTEM</u></b>				
	Rates shall also include the following :				
1	All fixing accessories such as brass saddles, brass screws rawl plugs etc.				
2	Jointing by rivetting and brazing after rivetting in case of copper and welding / bolting in case of GI earthing.				
3	Cutting chases holes and making good the same wherever required.				
4	Effecting adequate and proper interconnections.				
5	Use of copper thimbles.				
6	Earthing system shall comply to IS:3043-2018.				
7	All earthing pits shall be interconnected.				
8	Copper earthing shall be provided for DG neutral only.				

9	GI earthing shall be provided for DG set body etc.				
<b>D. <u>EARTHING SYSTEM</u></b>					
1	Supply, Testing & Commissioning, fixing of following bare Copper / GI tapes / wires including all necessary fixing accessories, insulators and effecting connections as per specifications.				
1.1	32 x 3 mm thick Copper tape with heat shrinkable sleeves	RM	50		
1.2	40 x 6 mm thick GI tape	RM	50		
2	Providing and laying of advance maintenance free earthing consisting of 14.35 mm dia and 3 meter length copper bonded earth rod in 150 mm dia. in an augured hole in ground, surrounded by ground enhancement material as per specification. Inspection chamber shall be of 400 x 500 mm with concrete base CI manhole cover with frame painted with bitumastic paint. 2 Nos. of 50 x 6 mm cross section & 300 mm long copper strip to be clamped with copper claded rod electrode have sufficient nos ( But not less than 4 Nos.) of 10 mm dia. GI nuts & bolts for connection to the equipment / interconnection to the other pits to form equi-potential bonding. The pH value of ground enhance material shall be 6.9 to 7.2 of 1000gm / lit @ 20 deg.c.The minimum 30 Kg of ground enhancement material shall provided for each electrode. The complete earthing system shall be in accordance with IS 3043 and be provided with required material complete in all respect as per site requirement. Note : Warranty of Minimum 20 years shall be provided for maintaining the resistance.	No.	8		
3	Supply, laying, testing and commissioning of GI pipe under road / paved area crossing etc. including excavation back filling ramming and making good.				
a	100 mm dia pipe.	RM	RO		
b	150 mm dia pipe.	RM	RO		
<b>TOTAL CARRIED TO SUMMARY</b>					
<b>E. <u>BUS DUCT (IN SANDWICH CONSTRUCTION)</u></b>					
1	Supply , installation, testing and commissioning of 4 Pole with 100% neutral Bus duct 415V, 50 kA indoor Sandwich construction type, IP 54 Aluminium bus duct, totally dust and vermin proof with adequate including MS support structure from ceiling/wall/floor etc as required. The bus duct shall be rated for the following rating complete with all accessories made out of reinforced angle iron sheet steel It shall be equipped with equipment flanges at transformer and switch gear end. Bus duct shall be measured along the center line of bus duct between tips of equipment flanges. All other materials required shall be included as per standards.				

2	2 Nos. of Al earth bus bars (50 x 10 mm) to be run along with bus duct enclosure with one end tapped from ACB and other end to Transformer with proper flexibles at either ends, angle iron from ceiling/wall to support bus duct such that weight of bus duct is not transferred to the transformer or ACB complete with all accessories etc, Bus duct shall be of min 1.6 mm thicknes with minimum class B insulation.				
3	The cost shall include necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every meter, adopter box and copper flexible for joints. The rate shall include suitable angle iron supports for fixing of indoor bus ducts. Necessary Seismic bracing shall be included. Detailed Seismic design calculations shall be provided by the contractor.				
a	<b>From DG - 1 &amp; 2 to Main LT Panel</b>				
	The busduct shall be with the following:				
	1250 Amps TPN Straight run of outdoor busduct (including adaptor chambers, bellow etc) including 90 deg horizontal / vertical bend, tees etc. from DG Set - 1 & 2 to Main LT Panel.	RM	60		
	1250 amps TPN tinned copper flexible braided end connection on DG Set - 1 & 2 to Main LT Panel including aluminium laminations.	RM	4		
<b>Note</b>	The bus duct shall be provided with fire barriers at each of the floors/ room crossing.				
	The horizontal busduct shall be supported by GI hangers at every 1.5 mtrs. The vertical busduct shall be supported by Spring hangers not more than 3 mtrs apart.				
	The rate shall include all allied and implied item required for complete commissioning of the system.				
	<b>TOTAL CARRIED TO SUMMARY</b>				
<b>F.</b>	<b><u>SAFETY ACCESSORIES</u></b>				
1	Supply and fixing in position the approved "Shock Treatment Charts" written in English and Local Language. These charts shall be framed in teak wood frame and covered with glass. (1 No. each in DG room,)	No.	1		
2	Supply & Laying of non skid Electro mat 1mtr wide and 2 mm thick 1.1 KV grade IS 15652 as required including cutting to required length complete as per requirement of local electricity authorities.	RM	RO		
3	Providing and fixing LV danger notice plate of 200 X 150 mm, made of mild steel at least 2 mm thick and vitreous enameled white on both sidess and with incscription in single red colour on front side as required ( English & Local Languages.) (1 No. each in DG room)	Set	1		
4	Supply of First aid box containing material as prescribed by St. John Ambulance brigade OR Indian Red Cross complete as required.	Set	1		
5	Providing Single Line Diagram on 5mm thick Aluminium sheet in A1 Size duly laminated.	Set	1		
	<b>TOTAL CARRIED TO SUMMARY</b>				

<b><u>SUMMARY OF COSTS</u></b>			
<b>Sr. No.</b>	<b>Description</b>	<b>Amount</b>	
A.	SUPPLY, INSTALLATION, TESTING AND COMMISIONING OF DG SET INCLUDING ALL ACCESSORIES	RS.	
B.	EXHAUST PIPING SYSTEM	RS.	
C.	CONTROL CABLES & CABLE TRAYS	RS.	
D.	EARTHING SYSTEM	RS.	
E.	BUS DUCT (IN SANDWICH CONSTRUCTION)	RS.	
F.	SAFETY ACCESSORIES	RS.	
	<b>TOTAL</b>	<b>RS.</b>	

**Note:-**

1. Above Prices will not be part of Tender Evaluation
2. It will not be binding on SWOSTI PREMIUM LTD for entering into above Comprehensive Annual Maintenance Contract
3. If SWOSTI PREMIUM LTD decides to enter into the above Comprehensive Annual Maintenance Contract, a separate Contract Agreement shall be made, which will not be part of this Contract
4. Tenderers are expected to quote Reasonable Prices.

## **PAYMENT TERMS:**

### **Mobilization Advance:**

- Contractor will be paid any mobilization advance as indicated in contract data.

### **PAYMENT SCHEDULE**

The stage-wise payment to the Contractor shall be released based on the items of work executed as contained in the Bills of Quantities and rates agreed to thereto. Upon completion that item of work. Detail procedure are as below :

Preparation of R/A Bills :

- After satisfactory completion of each item of work, the bill shall be submitted with detailed measurements and invoice.
- Final bill along with no claim certificate should be submitted within 2 months from date of completion of work.
- Upon clearing the site of all debris, materials, temporary structures and machinery.
- Payments for supply/work done will be made in R/A bill based on monthly progress or work, verified with measurement by PMC/Authorised Engineer.
- R/A bills will be certified against final amounts as in contract.

### **Withholding of Payments:**

- Payment may be withheld if contractor fails to meet contractual obligations.
- Failure to pay workers' wages or bills of contractor.

### **SECURED ADVANCE :**

Any request for a secured advance may be requested for by Contractor along with invoice/ original shipping document copy of invoice and duly signed payment invoice. This may be considered by the Employer(Client) upon assessment by PMC/Engineer-in-Charge for items of non-perishable, non-fragile & non-consumable in nature and required for the work and in accordance with contract (Conditions & Technical Specifications), which have been brought to the site in connection with execution (having reference to an item of work in BOQ) and are adequately stored and/or protected against damage by weather or other causes and have not been incorporated in the work earlier. The amount of such advance shall be deducted from next/final payment. However, any secured advance for any material/equipment lying unutilized after 3 months/completion of work shall be recovered fully from the next/final bill.

### **Note:**

Each payment shall be certified by the Engineer based on physical progress at site against the approved GFC drawings.

No advance payment shall be made unless specifically agreed in the contract data or special conditions.

All payments are subject to retention, tax deduction at source, and recoveries as per the contract.

**SECTION 5: CONTRACT DATA, CONTRACT FORM**

**&**

**CONDITIONS OF CONTRACT**

## CONTRACT DATA

Clause	Description
<b>1. Name of Work</b>	Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam,– (Item Rate Contract)
<b>2. Name of the Client</b>	Swosti Group
<b>3. Client's Representative</b>	Project Management Consultant (PMC) – [Insert PMC Firm Name]
<b>4. PMC Contact Details</b>	Name: Designation: Project Manager – PMC Email: [Insert] Phone: [Insert]
<b>5. Site Location</b>	Gopalpur-on-Sea, Ganjam District, Odisha – 761002
<b>6. Scope of Work</b>	All Supply, Installation, Testing & Commissioning of 2X750 kVA prime rating Radiator cooled diesel generating set and Allied Works - at Gopalpur Palm Resort for Swosti Premium Ltd.,Gopalpur, Ganjam,as per drawings and specifications.
<b>7. Estimated Contract Value</b>	₹ [Insert Amount] (Inclusive of all costs except GST)
<b>8. Tender Type</b>	Item Rate-Fixed Price Contract
<b>9. Contract Type</b>	Item Rate
<b>10. Time for Completion</b>	[Insert duration – e.g., 6 months] from the date of Letter of Acceptance (LoA)
<b>11. Date of Commencement</b>	Within 7 (seven) days from issuance of LoA or handing over of site, whichever is later
<b>12. Defects Liability Period (DLP)</b>	12 months from the date of issuance of Completion Certificate
<b>13. Performance Security</b>	2% of Contract Value in the form of Bank Guarantee to be submitted within 7 days of LoA
<b>14. Retention Money</b>	3% of Running Account Bills; to be released after successful completion of the Defects Liability Period
<b>15. Mobilisation Advance</b>	No
<b>16. Schedule of Payments</b>	Item-based payments linked to actual progress of works (Refer to Section – Payment Terms)
<b>17. Liquidated Damages (LD)</b>	0.2 % <b>per day</b> of the value of balance work delayed <b>beyond the stipulated date of completion</b> , subject to a <b>maximum of 10% of Contract Value</b>
<b>18. Arbitration</b>	In accordance with the Arbitration and Conciliation Act, 1996; sole arbitrator to be mutually appointed
<b>19. Governing Law and Jurisdiction</b>	Laws of India; jurisdiction: Bhubaneswar, Odisha
<b>20. Insurance</b>	Contractor to provide insurance for Works, Workmen Compensation, Equipment, and Third-Party Liability to indemnify the Client from damage/Claims arising out all such items including loss arising out of natural calamity.
<b>21. Taxes and Duties</b>	Quoted price is inclusive of all taxes and duties except GST; GST shall be paid extra as applicable

Clause	Description
<b>22. Sub-contracting</b>	Permitted only with prior written approval of the Client / PMC
<b>23. Safety &amp; Compliance</b>	Contractor to comply with safety regulations, labor laws, and site protocols
<b>24. Force Majeure</b>	As per General Conditions of Contract
<b>25. Advance Payment</b>	10% of Contract Value, against submission of Bank Guarantee of 100% of amount; recoverable in equal instalments from running bills
<b>26. Secured Advance</b>	To be considered on request

## AGREEMENT

AN AGREEMENT is made this ----- BETWEEN the SWOSTI PREMIUM LTD ,Bhubaneswar, which expression shall include its successor, unless repugnant to or Excluded by the contract here of and assignees of and represented by its .....(the first party (hereinafter called the Authority) and by..... its sole proprietor/partners/Director and having registered office at (which expression shall be including his / its successor's heirs executors, representative and or assignees of the second party (hereinafter called the contractor}).

WHEREAS the Authority has, under tender Notification No. -----

WHEREAS the contractor has submitted tender for carrying out the work as above as per the tender document page ---- to ---- and has represented that in conformity with his / its obligation contained in the tender as modified by the correction slips and corrigendum contained he / it shall carryout the same truly, faithfully and honestly.

THE SAME has been accepted by both the parties on the terms and conditions, corrections, corrigendum contained in the tender as modified as well as the letter of acceptance , at a total Contract Price of Rs. Crores (Rupees Crores) excluding GST (To be paid extra as applicable ) as Issued party No.1 annexed here to as.

The same shall be binding on both the parties.

IN WITNESS WHEREOF, the parties have signed the deed of agreement on the date, month and year referred to above.

Date: At

New Delhi.

Signed by

Party No.1 Party No.2

WITNESS

1. Party No.1

2. Party No.2

## **Conditions of Contract**



## **GENERAL**

Terms, which are defined in the Contract Data and not defined in the Conditions of Contract shall keep their defined meanings. Capital initials are used to identify defined terms.

**Bill of Quantities** means the priced and completed Bill of Quantities;

**Compensation Events** are those defined in Document;

The **Completion Date** is the date of completion of the Works as certified by the Engineer.

The **Contract** is the contract between the Client and the Contractor to execute, complete and maintain the Works.

The **Contract Data** defines the documents and other information, which comprise the Contract;

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Client [obligations of the Contractor mentioned in the Contract Data].;

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Client and includes Technical and Financial bids;

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract;

**Days** are calendar days; months are calendar months;

A **Defect** is any part of the Works not completed in accordance with the Contract;

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date;

The **Client** is the party who will employ the Contractor to carry out the Works; [As mentioned in the Contract Data].

The **Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor's work, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, recommending extensions of time, and valuing the Compensation Events;

**Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works;

**Initial Contract Price** is the Contract Price listed in the Client's Letter of Acceptance;

**Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Client by issuing an extension of time;

**Materials** are all supplies, including consumables, used by the contractor for incorporation in the Works;

**Plant** is any integral part of the Works, which is to have a mechanical, electrical, electronic or chemical or biological function;The **Site** is the area defined as such in the Contract Data;

**Site Investigation Reports** are those, which were included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site;

**Specification** means the Specification of the works included in the Contract and any modification or addition made or approved by the Client;

The **Start Date / Date of Commencement** is given in. the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates;

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site;

**Temporary Works** are works designed, constructed, installed, and removed by the Contractor, which are needed for construction or installation of the Works;

A **Variation or Change in Scope** is an instruction given by the Client, which varies and change the scope of Works;

**Works** are what the Contract requires the Contractor to construct, install, and turn over to the Client, as defined in the Contract Data;

Year may be understood as financial year;

**“Approved Make”** means makes of items as specified in the “List of Approved Makes/Approved Manufacturers” in this RFP. However, a higher or equivalent make can be utilized after obtaining prior approval of “Engineer-In-Charge” in writing.

## **Interpretation**

In interpreting the Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their general meaning under the language of the Contract unless specifically defined. The Client will provide instructions clarifying queries about the Conditions of Contract.

If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

The documents forming the Contract shall be interpreted in the following order of priority:

- (a) Agreement
- (b) Letter of Acceptance, notice to proceed with the works
- (c) Contractor's Bid

- (d) Contract Data
- (e) Conditions of Contract including Additional & Special Conditions of Contract
- (f) Specifications
- (g) Drawings
- (h) Bill of quantities (optional) and
- (i) Any other document listed in the Contract Data as forming part of the Contract.

### **Languages and Law**

The language of the Contract and the law governing the Contract are stated in the Contract Data.

### **Engineer's Decisions:**

Except where otherwise specifically stated, the Engineer will decide contractual matters between the Client and the Contractor in the role representing the Client as per the provision of the contract.

### **Delegation:**

The Engineer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

### **Communications:**

Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

### **Sub-contracting:**

The Contractor may sub-contract any portion of work, up to a limit of 10% of contract value, with the approval of the Engineer but may not assign the Contract without the approval of the Client in writing. Sub-contracting does not alter the Contractor's obligations.

### **Other Contractors:**

The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Client between the dates given in the Schedule of other Contractors. The Contractor shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The Client may modify the schedule of other contractors and shall notify the contractor of any such modification.

### **Personnel:**

The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data besides those as listed to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

### **Client's and Contractor's Risks:**

The Client carries the risks which this Contract states are Client's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

### **Client's Risks:**

The Client is responsible for the excepted risks which are in so far as they directly affect the execution of the Works in India, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive.

### **Contractor's Risks:**

All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

### **Insurance:**

The Contractor shall provide, in the joint names of the Client and the Contractor, insurance cover **for the period as stated below against the events and** in the amounts and deductibles stated in the Contract Data for the following events, which are due to the Contractor's risks:

**A) From the starting date to the end of defect liability period:**

(a) Loss of or damage to the works

**B) From the start date till completion of the work as per agreement:**

(a) Loss of or damage to plant, materials and equipment,

(b) Loss of or damage of property (except the works, plant, materials and equipment) in connection with the contract, and

(c) Personal injury or death.

If all the items as listed above can be combined / grouped under one insurance cover like Contractor's, All Risks (CAR) Policy **covering all-natural calamities as per local conditions.**

Prior to seven days before the start date, the Contractor shall furnish to the Engineer notarized true copies of the certificates of insurance, copies of insurance policies and premia payment receipts in respect of such insurance for the Client's approval. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

If the contractor does not provide any of the policies and certificates required, the Client may affect the insurance which the contractor should have provided and recover the premiums the Client has paid from payments otherwise due to the contractor or, if no payment is due, the payment of the premiums shall be a debt due.

Alterations to the terms of insurance shall not be made without the approval of the Client.

Both parties shall comply with any conditions of the insurance policies.

## **Site Investigation Reports:**

The Contractor, in preparing the Bid, may rely on any site Investigation Reports referred to in the Contract Data, which are indicative and not exhaustive. The Client shall provide all available details to the Contractor (Bidder) for his information, if requested by him at least one week prior to the bid submission date. The bidder shall be responsible for interpreting all such data. After award of work, the Contractor shall carry out detail survey and investigation for preparation of detail designs as per the scope of work and time period stipulated.

To the extent which was practicable (taking account of cost and time), the Contractor (Bidder) shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Tender or Works. To the same extent, the Contractor (Bidder) shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have been satisfied before submitting the Tender as to all relevant matters, including (without limitation):

- (a) the form and nature of the Site, including sub-surface conditions,
- (b) the climatic conditions,
- (c) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects,
- (d) the Laws, procedures and labour practices of the Country, and
- (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.
- (f) availability of required materials

## **Queries about the Contract Data:**

The Client will clarify queries on the Contract Data if any during the Pre-bid references.

## **Contractor to Construct the Works:**

The Contractor shall construct and install the Works in accordance with the approved specification and drawings. All designs, drawings and specifications to be furnished by the contractor shall be approved by the Client before execution.

## **The Works to be completed by the Intended Completion Date:**

The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

## **Approval by the Engineer:**

The Contractor shall be provided Specifications and Drawings showing the proposed Temporary Works by the Engineer.

The Contractor shall be responsible for design of Temporary Works.

The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

The Contractor shall be provided approved design, drawings and specifications of all components of the building and all allied infrastructure works, except those for the temporary works.

**Safety:**

The Contractor shall be responsible for the safety of all activities on the Site.

**Possession of the Site:**

The Client shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Client is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

**Access to the Site:**

The Contractor shall allow the Client and any person authorized by the Client access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

**Instructions:**

The Contractor shall carry out all instructions of the Engineer pertaining to works, which comply with the applicable laws where the Site is located.

The Contractor shall permit the Client to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Client, if so, required by the Client.

**Disputes:**

That for the purpose of jurisdiction in the event of disputes if any of the Contract would be deemed to have been entered in to within the State of Odisha and it is agreed that neither party to the Contract will be competent to bring a suit in regard to the matter by this Contract at any place outside the State of Odisha.

**Procedure for Settlement of Disputes:**

In case of Dispute or difference arising between the Client and the contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled mutually.

## **TIME CONTROL**

### **Programme:**

Within **7 days of issue of letter of award**, the successful bidder shall submit to the Client detail work programme for approval showing the general methods, arrangements, order and timing for all the activities in the Works along with monthly cash flow forecast. The agreed work programme / milestones during such contract negotiation shall form part of the agreement.

An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

The contractor shall submit to the Client, for approval, an updated Programme at intervals no longer than 15days. If the Contractor does not submit an updated Programme within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue programme has been submitted.

The Client's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Client again at any time. A revised Programme is to show the effect of Variations and Compensation Events.

### **Extension of the Intended Completion Date:**

The Client shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

The Client shall decide whether and by how much to extend the Intended Completion Date within 15 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

The Engineer shall within 7 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Client his recommendation. The Client shall in not more than 15 days communicate to the Engineer the Client's decision.

**Delays Ordered by the Engineer:**

The Client may instruct the Contractor to delay the start or progress of any activity within the Works.

**Management Meetings:**

Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Client. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

**Early Warning:**

The Contractor is to warn the Client/Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the work resulting delay in the execution. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Completion Date.

The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

**QUALITY CONTROL****Identifying Defects:**

The Engineer shall check the Contractor's work regularly and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for defects and to uncover and test any work that the Engineer considers may have a Defect

**Tests:**

If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

**Correction of Defects:**

The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

Every time notice of a Defect is given; the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

### **Uncorrected Defects:**

If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

## **COST CONTROL**

### **Changes in the Quantities:(OPTIONAL)**

#### **Change of Scope (Variations) and Procedure for change of Scope:**

The Client may, require the Contractor to make modifications/alterations to the works before the issue of the completion certificate either by giving an instruction or by requesting the contractor to submit a proposal for change of scope involving additional cost or reduction in cost. Any such change of scope shall be made and valued in accordance with the provisions of this contract and the contractor, in that event, will have no further claim on the ground that had it been known / disclosed earlier he would have made such charges in other connected work in their design, construction which would have saved him some cost and given him other consequential benefits.

Change in scope may include;

- (a) Change in specifications of any item of works
- (b) omission/ deletion of any item of work from the scope of work
- (c) any additional work (such as addition of extra plinth area) which are not included in the scope of work including any additional test on completion

In the event of the Client determining that a change of scope is necessary, it shall issue notice to the contractor a notice specifying in reasonable detail the works contemplated there under ("Change in scope notice")

Upon receipt of change in scope notice, the contractor shall with due diligence, provide to the Client through the Engineer within seven days time such information as is necessary together with documentation in support of;

- (a) the impact, of any, which the change in scope is likely to have on the completion of the work
- (b) the options for implementing the proposed change of scope and the effect, if any, each on the cost and time thereof including the following details;
  - i. break down of quantities, unit rates and cost for different items of work
  - ii. proposed design for the change of scope
  - iii. proposed modifications, if any, to the construction period with updated work programmes (all

Variations shall be included in updated programmes produced by the Contractor).

Any change in scope shall be calculated on the basis of the following priority:

The total value of all change of scope of work shall not exceed 10% of total contract price for the construction work.

**Payments for Change of Scope (Variations):**

The Client shall assess the change in scope proposal and Contractor's quotation at the time of bidding in financial form and upon reaching an agreement; the Client shall issue the Change of Scope Order requiring the contractor to proceed with the performance thereof.

If the Contractor's quotation is unreasonable, the Client may order the Variation and make a change to the Contract Price which shall be based on Client's own forecast of the effects of the Variation on the Contractor's costs.

If the Client decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event, subject to condition that such variation shall not exceed 10% of the total contract price for the contract work.

The Contractor shall not be entitled to additional payment for costs, which could have been avoided by giving early warning.

**Payment Certificates:**

The Contractor shall submit to the Engineer statements of the value of the work completed.

The Engineer shall check the Contractor's statement within 15 days and certify the amount to be paid to the Contractor as per contract payment schedule after taking into account any credit or - debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth, including adjustment of advance.

The value of work executed shall be determined by the Engineer.

The value of work executed shall comprise the value of the quantities of the items as per the BoQ and work programme attached to the contract.

The value of work executed shall include the valuation of Change in Scope (Variation) and Compensation Events, if any.

The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

**Payments:**

Payments shall be adjusted for deductions for retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Engineer shall pay the Contractor the amounts as per the items of work executed and agreed rates thereto as well as payment schedule attached to the contract.

**Tax:**

The rates quoted by the Contractor shall be deemed to be exclusive of the GST and inclusive of Royalty, Income Tax, Labour CESS and all other statutory taxes that the Contractor will have to pay for the performance of this Contract. The Client will perform such duties in regard to the deduction of such taxes at source as per applicable law.

**Currencies:**

All payments shall be made-in Indian Rupees.

**Retention:**

The Client shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the works or settlement of final payment.

On completion of the whole of the works and issue of the completion certificate the performance security shall be repaid to the contractor. The retention amount shall be paid after the Defects Liability Period has passed and the Engineer has certified that all defects notified by the Engineer to the contractor before the end of the period have been corrected.

**Liquidated Damages:**

The Contractor shall pay liquidated damages to the Client at the rate as stated in the Contract Data that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Client may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not relieve the contractor from his / her / their obligation to complete the works or from any other duties, obligations or responsibilities which he / she / they may have under the contract.

If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate.

**Bonus Payment:**

Deleted

**Advance Payment:**

The Client may make advance payment to the Contractor for mobilization and cash flow support of the amounts stated in the Contract Data by the date stated in the Contract Data, only against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a Bank acceptable to the Engineer in amounts and currencies equal to 110% of the advance payment.

The Advance Payment shall not be released until the camp setup, mobilisation of key personnel, equipment and labour at site.

The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The contractor shall ensure that the Bank Guarantee remain enforceable until the advance payment has been fully repaid and accordingly renew it, from time to time, until the advance payment has been fully repaid.

If the terms of guarantee specify its expiry date, and the advance payment has not been re-paid by the date then 28 days prior to the expiry date, the contractor shall extend the validity of the guarantee until the advance payment has been fully repaid.

The advance payment shall be repaid through percentage deductions from the interim payments as follows:

**Securities:**

The Performance Security shall be provided to the Client no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employee

The performance security shall be denominated in Indian Rupees. The Performance Security shall remain valid up to the period as defined in the Contract Data.

**Cost of Repairs:**

Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions including the situation as stipulated in the RFP.

## **FINISHING THE CONTRACT**

**Completion:**

The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

**Taking Over:**

The Client shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

**Final Account:**

The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 30 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Client shall decide on the amount payable to the Contractor and issue a payment certificate, within 30 days of receiving the Contractor's revised account.

## Termination:

The Client may terminate the Contract if the other party causes a fundamental breach of the Contract.

Fundamental breaches of Contract include, but shall not be limited to the following:

- (a) the Contractor stops work for 15 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Engineer;
- (b) the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (c) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
- (d) the Contractor does not maintain a security which is required;
- (e) the Contractor has delayed the completion of works by the number of days for which the maximum number of liquidated damages can be paid as defined in the Contract data; and
- (f) if the Contractor, in the judgment of the Client has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition."

When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 54.2 above, the Engineer shall decide whether the breach is fundamental or not.

Notwithstanding the above, the Client may terminate the Contract for convenience.

If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site, as soon as reasonably possible.

### **Payment upon Termination:**

If the-Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done fewer advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Client exceeds any payment due to the Contractor, the difference shall be a debt payable to the Client.

If the Contract is terminated at the Client's convenience, the Engineer shall issue a certificate for the value of the work done, less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law. No extra cost will be paid by the Client for expenditure towards removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works and the Contractor's costs of protecting and securing the Works.

### **Property:**

All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Client, if the Contract is terminated because of a contractor's default.

### **Release from Performance:**

If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Client or the Contractor, the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

## **ADDITIONAL CONDITIONS OF CONTRACT**

### **1.WORK DESCRIPTION**

The work shall be strictly carried out as per the scope listed in this document and in accordance with the specifications. The equipment & material supplied at site will also be selected out of the list of approved makes. Bill of quantity provided with the document is for contractor guidance. It is expected that after award of work, contractor shall prepare shop drawings for approval by the Consultant & Client representative and also submit Technical documentation duly identifying shortlisted make of material/equipment along with its data sheets. Actual ordering shall be based on approved shop drawings & documents.

The work at site shall comply with the approved shop drawings and will meet the satisfaction of Client representative. The contractor shall be required to demonstrate satisfactory operation of entire system (including client supplied equipment installed by contractor) and furnish the required labour, material & tools to install & commission the system.

The broad scope of work for proposed HVAC system covered under this contract shall include supply, installation, testing & commissioning of the following:

Water cooled chiller (free supply)  
Constant primary & Variable secondary Pumping system.  
Smart Air handling units (AHU's).  
FRP Cooling towers.  
VFD's.  
Dedicated outdoor air system including heat recovery wheel.  
Mechanical ventilation systems.  
Chilled, Condenser and Drain piping with associated fittings, valves etc.  
Air distribution system.  
Associated electrical works.  
Kitchen ventilation.  
Basement car parking ventilation.  
Testing Adjusting & Balancing of the entire HVAC and mechanical ventilation installation.

Besides above, contractor shall also be required to undertake following:

Obtain fire approval from Local Authorities prior & post installation for operation of system by the land owner. Coordination for submission of required documents & demonstration of systems to obtain the Approval by the Contractor.  
Minor civil works which include making openings in walls & slabs and making good of the same.  
Commissioning of the plant including test reports to demonstrate satisfactory working prior to handing over.  
Provide as-built drawings and handing over document comprising of list of recommended spares, catalogues and service schedule for each equipment/material.  
Training of Client's staff.  
Documents related LEED requirement

## 2.SITE MANAGEMENT

The Contractor shall be required to provide following staffing for the project:

Design Engineer who will work with Consultant for getting shop drawings, technical submittal and variation in quantity statement approved.

Procurement team.

Full time dedicated 1 manager (minimum 15 year experience) and Engineer (minimum 10 year experience) & one supervisor posted at site.

The contractor shall submit organization chart and CV prior to starting work at site.

The Contractor shall have required stores, tools & plant, security and facility to transport materials to place of installation for speedy execution of work.

## 3.REGULATIONS & PERMITS

Prior to starting work at site, the contractor shall obtain required permits/ licenses required for satisfactory execution and operation of the installation. All receipted amounts shall be reimbursed by Client on production of proof of payment by the contractor.

The executed work shall strictly confirm to applicable laws, regulations and Indian Standards which become applicable. In case the specifications and drawings contained in this document call for higher standard than those required by prevailing regulations, then these specifications & drawings shall become applicable. However, in case of any conflict or violation between the document/drawings and prevailing laws, then the applicable laws & regulations shall be governing & binding.

#### 4.SHOP DRAWINGS

A set of design drawings listed in this document are available at Consultant office and may be issued with the tender document. These design drawings are for reference of the contractor and indicate proposed arrangement and the extent of work covered in the contract. The data given in the drawings and specifications is as exact as could be procured, but its accuracy is not guaranteed. The contractor cannot execute work or scale these drawings for reference.

Following shall be the procedure followed by contractor while preparation of shop drawings:

The contractor shall refer the design drawings for understanding the scope and proposed routes to be followed during execution.

Collate latest architectural backgrounds from the Client representative / Architect / Consultant.

Examine all related services drawings but not limited to structural, plumbing, electrical, HVAC, Interior, landscape and others including as-built works before starting the work. Any discrepancy must be report to the Client's site representative in writing and obtain approval for go-ahead.

Within one week of award of work, the Contractor shall prepare a list of shop drawing along with submission schedule for approval of Client representative/Consultant. The list of drawings must include layouts for Plant room, Pump room, Typical drawings showing exact location of supports, flanges, bends, tee connections, reducers, detailed piping drawings showing exact location and type of supports, valves, fittings etc; electrical panels inside/outside views, power and control wiring schematics, cable trays, supports and terminations.

Maximum headroom shall be maintained at all points and in case the same is inadequate, then written approval from Client representative must be obtained prior to execution at site.

These shop drawings shall depict information required to complete the Project as per specifications and as required by the Consultant/Client representative. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings.

Where the work under this contract is proposed to be installed in close proximity or is interfering with other trades, then based on client representative/consultant directions, the contractor shall prepare all services coordinated working drawings and sections at a suitable scale (not less than 1:50), clearly showing proposed installed in relation to the work of other trades.

The contractor shall thereafter furnish 6 sets of detailed shop drawings to Client representative/Consultant for obtaining comments/approval. The Contractor will make unlimited number of re-submissions of shop drawings unless Client representative/Consultant/Architect approval is obtained.

The Contractor will thereafter submit 6 sets of final shop drawings to the Client representative for their exclusive use and all other agencies.

No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/equipment/installation.

In case installation is carried out without following above process or obtaining a waiver to follow the procedure from Client representative, the work shall be rejected and contractor shall rectify the same at their own cost.

Shop drawings shall be submitted for approval minimum four weeks in advance of planned

delivery and installation of any material to allow Client representative/Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.

Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.

## 5. TECHNICAL DOCUMENTATION

The contractor prior to supplying material at site, will submit the following documentation to Consultant/Client representative for approval:

Manufacturers drawings, catalogues, pamphlets and other documents in triplicate. Each item shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.

Samples of all materials shall be submitted to the Client's site representative prior to procurement. These will be submitted in two sets for approval and retention by Client's representative and shall be kept in their site office for reference and verification till the completion of the Project. Wherever directed, a mockup or sample installation shall be carried out for approval before proceeding for further installation.

Where the contractor proposes to use an alternate make or model of equipment other than that specified, all new drawings and detailing required thereafter shall be prepared by the contractor at his own expense including any re-design required for other discipline/trade. Any delay on such account shall also be at the cost of and consequence of the Contractor.

Contractor to refer Annexure –II for list of approved makes & materials for this project.

## 6. VARIATION IN QUANTITY STATEMENT

After approval of major & relevant shop drawings, the contractor shall submit four copies of a comprehensive variation in quantity statement. This statement must be submitted prior to completing ordering of equipment and should identify imported/local materials in this contract as well as proposed spares/tools. The Consultant shall provide recommendation to Client representative for acceptance of anticipated variation in contract amounts and also advise Client to initiate action for procurement of spare parts and tools at the completion of project.

## 7. QUALITY ASSURANCE

The contractor to ensure that all materials and equipment supplied shall be new and of best available quality conforming to the relevant Indian Standard Specifications and to these specifications. Makes shall be strictly in conformity with list of approved manufacturers as per Annexure -II. Owners reserve the right to reject any item which in their assessment is second hand

Any deviations from above shall be clearly highlighted prior to supply and shall be brought to the notice of the Client representative/Consultant for further instructions in the matter.

Prior to starting execution work at site, the Contractor shall verify the sufficiency of the size of the shaft openings, clearances and ceiling spaces for proper installation. Failure to communicate insufficiency of any of the above, shall constitute Contractor acceptance of the same. The Contractor shall locate all equipment in fully accessible locations which can be easily serviced, operated or maintained. The exact location and size of access panels, required for each concealed, valve or other devices requiring attendance shall be finalized and communicated in sufficient time.

Failing this, the Contractor shall make all the necessary repairs and changes at own expense. Access panel shall be marked.

#### 8. WORKS NOT COVERED UNDER THIS CONTRACT

Following works are excluded from the scope under this contract. These shall be executed by respective contractor in accordance with approved shop drawings where these details must be highlighted. However, contractor shall be responsible for providing details and thereafter supervision to ensure satisfactory & timely execution of these associated items as they have a bearing on this contract.

#### 9. EXCLUDED FROM SCOPE OF WORK ASSOCIATED CIVIL WORKS

Following civil works associated with HVAC installation are excluded from the scope of this contract. These shall be executed by other agencies in accordance with approved shop drawings of and under direct supervision of the air conditioning contractor.

- i. RCC foundation for water chilling machine's pumps & centrifugal fans with angle iron frame work at the edges to protect these from damage.
- ii. RCC basin & supports & MS Joists for cooling towers.
- iii. PCC foundation blocks with angle iron frame work edging for all motor control center.
- iv. PCC foundation for pot strainers.
- v. PCC foundation blocks for all air handling units.
- vi. Air-tight fire doors with minimum one hour fire rating for plant room, AHU rooms, fan rooms and other equipment rooms.
- vii. Water proofing of floors of AHU rooms, air washer rooms and fan rooms.
- viii. Masonry drain channels and sumps with CI gratings in AC plant room including provision for sump pump and disposal.
- ix. Supply and fixing of G.I./wooden frame for mounting of grilles in masonry walls.
- x. Supply and fixing of GSS frame for mounting of grilles / diffusers in false ceiling / boxing.
- xi. Thermal insulation of terraces above air-conditioned areas exposed to sun.
- xii. Making of trenches and back filling the same after laying / pressure testing etc. of pipes.

#### ELECTRICAL SERVICES WORKS

All associated ELECTRICAL WORKS listed below are excluded from the scope of this contract. These shall be installed by other agencies in accordance with approved shop drawings of, and under direct supervision of the air conditioning contractor.

Providing power supply with earthing at the incoming of control panel in A/C plant room.

- ii. Providing power supply and earthing at the incoming MCCB in each air handling unit room.
- iii. Providing power and earthing at the incoming MCCB in each centrifugal fan panel and pump panel at locations called for on air conditioning Contractor's shop drawings.

iv. Providing 15 amps power outlet within 2 meter reach of each fan coil unit and VAV boxes at locations called for on air conditioning Contractor's shop drawings.

v. Providing 15 amps power outlet within 2 meter reach of each single phase propeller fan/inline fan at locations called for on air conditioning contractor's shop drawings.

vi. Providing wiring and earthing for sump pumps in air conditioning plant room.

#### PLUMBING SERVICES WORKS

All associated PLUMBING WORKS listed below are excluded from the scope of this contract. These shall be installed by other agencies, in accordance with approved shop drawings of, and under direct supervision, of the air conditioning contractor.

Providing soft water (Commercial hardness 0 ppm and PH 7+1) at air washers, humidifiers and at chilled water expansion tank.

Providing make up water for cooling tower as per RO water quality

iii. Disposal of condensate drain from fan coil units / ceiling suspended units beyond the condensate drain riser.

Providing sump pumps and necessary piping for drainage of air conditioning plant room and other machine rooms located below ground level.

Providing floor drains in cooling tower area and in air handling unit rooms.

Note : Preparation of shop drawings defining the Foundation details to civil contractor will be under HVAC Contractor scope of work.

#### 10. INTEGRATION WITH BUILDING AUTOMATION SYSTEM

The scope shall include providing following for the interface to Building Automation System.

Sockets /Nipples including shut-off valve for mounting sensors/transmitters on pipe lines.

Space in electrical panel for running of LV cables.

CT of 15 VA burden with potential free taps.

Auto/manual changeover switch with potential free contact at manual position.

Installation of motorized control valves with provision of counter flanges

Installation of current transformer & Transducer along with wiring between Current Transformer & Transducer up to the terminal block

Provision for mounting BAS sensors.

15 Amps. Power supply with MCB in all AHU panels and 32 Amps MCB on HVAC plant room panel for power supply to DDC Panel.

It is to be clearly understood that the final responsibility for the sufficiency, adequacy and conformity to the contract requirements lies solely with the contractor.

#### 11. TESTING, ADJUSTING AND BALANCING

Air and water balancing shall be carried out by the contractor through a specialist team (different than erection team) as per Specifications and ASHRAE Guidelines. Performance test shall consist of three days of 10 hour each operation of system for each season. The results for each season shall be submitted to Client representative/Consultant. The submittal shall include operational parameters marked on performance curves for each equipment along with test certificates and safety/control settings.

The installation shall be tested again after removal of defects and shall be commissioned only after approval by the Client's site representative. All tests shall be carried out in the presence of the

representatives of the Construction Manager/Architect /Consultant and Client's site representative. After commissioning, the results shall be submitted for scrutiny in quadruplicate.

All equipment installation shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Client's site representative. In case of rotating machinery sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside its own room, shall be considered objectionable. Such conditions shall be corrected by the Contractor at his own expense. The contractor shall guarantee that the equipment installed shall maintain the specified Noise Control levels.

## 12. COMPLETION CERTIFICATE

On completion of the installation, a certificate shall be furnished by the contractor, counter signed by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local authority engineer in-charge.

The contractor shall be responsible for getting the entire installation duly approved by the local authorities Engineer in Charge concerned, and shall bear expenses if any, in connection with the same.

## 13. AS-BUILT DRAWINGS

Contractor shall submit following as-built drawings as and when work is completed:

6 set of hard copies of all as-built drawings duly corrected and incorporating any modifications during execution.

Two set of pen drive containing the drawings.

The drawings shall provide plant room layouts, piping layouts, location of all concealed accessories/piping, wiring diagram, control diagram, Single line diagram, control schematic with detailed bill of materials, showing makes, types & description of all components & accessories and sequencing of automatic controls and other services.

## 14. MAINTENANCE MANUAL

Upon completion and commissioning of works, the contractor shall submit a draft copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of typewritten operating instructions and maintenance manuals; one each for retention by Consultant and Client's site representative and two for Clients Operating Personnel. These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 4 year period of maintenance of each equipment. The manuals shall include:

- i. Description of the work carried out / installed.
- ii. Operating instructions.
- iii. Maintenance instructions including procedures for preventive maintenance.
- iv. Manufacturers catalogues.
- v. Spare parts list.
- vi. Trouble shooting charts.
- vii. Drawings
- viii. Type and routine test certificates of major items.

Details of all the bought out item should be part of this maintenance manual.

## 15. ON SITE TRAINING

Upon completion of all work and all tests, the Contractor shall furnish necessary operators, labor

and helpers for operating the entire installation for such periods so as to enable the Client's staff to get acquainted with the operation of the system. During this period, the contractor shall train the Client's personnel in the operation, adjustment and maintenance of all equipment installed.

#### 16. DEFECTS LIABILITY PERIOD

##### Complaints

The Contractor shall receive calls for any and all problems experienced in the operation of the system under this contract, attend to these within 10 hours of receiving the complaints and shall take steps to immediately correct any deficiencies that may exist.

##### Repairs

All equipment that requires repairing shall be immediately serviced and repaired. Since the period of Mechanical Maintenance runs concurrently with the defects liability period, all replacement parts and labour shall be supplied promptly free-of-charge to the Client.

#### 17. UPTIME GUARANTEE

The contractor shall guarantee for the installed system an uptime of 98%. In case of shortfall in any month during the defects liability period, the Defects Liability period shall get extended by a month for every month having shortfall and no reimbursement shall be made for the extended period.

#### 18. OPERATION & MAINTENANCE CONTRACT

Contractor may be required to carry out the operation of the installation during and after the defects liability period. Further, it may also be required to carry out all-inclusive maintenance of the entire system for a period of four years beyond the defects liability period.

##### Operation Contract:

It will involve round the clock operation for 24 hours a day wherein work will include but not limited to operation of installation, maintaining log books, complain register and summary of operation.

The terms of payment shall be monthly at the end of each month on pro-rata basis.

##### All Inclusive Maintenance Contract:

The work will involve routine preventive maintenance with monthly status report. Entire installation shall be painted every two years. 98% uptime of all systems is expected under this contract wherein up time shall be assessed every month and in case of shortfall during any month the contract shall be extended by a month. No reimbursement shall be payable for the extended period.

Adequate number of persons to the satisfaction of the Client representative shall be provided including relievers wherein statutory compliances such as of EPF, ESIC and other applicable labour legislations shall be to contractor account. No overtime shall be payable. Routine shut downs shall be permitted with prior permission of the Owner.

Payment shall be Quarterly at the beginning of each quarter on pro-rata basis.

#### 19 BIM Implementation

It is expected that Contractor, if required shall prepare all shop drawings in latest version of Revit

only and coordinate with other contractors to provide a clash free model. Thereafter, all shop drawings shall be provided in PDF, 2D CAD plans and critical sections in 3D. The drawings shall be submitted in hard copy in A0/A1 size at 1:100 scale including all annotations, heights, bottom of duct/pipe/tray etc complete in all respect as required.

## 20. GREEN BUILDING COMPLIANCE

Actions required by Contractor:

Contractor will provide full support in complying to Green Building requirements for the desired level of Green Building Rating in the project.

Contractor shall implement the recommendations provided by Green Building Consultant and provide support during the site inspections.

Contractor shall provide respective documentation including but not limited to specification sheets, manufacturer cutsheets, Test Certificates, Brochures, purchase records, manufacturer declarations, calculations, site photographs, commissioning reports.

Contractor is encouraged to designate an individual in their existing team who will be responsible for regular coordination with respective site people to ensure implementation of required green building measures and ultimately provide the required documentation for aspired Green Building Rating.

In case of any deviations in implementing recommended green building measures and/ or using specified material/ equipment/ system, contractor will have to inform Owners/ Services Consultant/ Green Building Consultant/ Architect as applicable for their formal approval.

In case of any additional requirement to comply with Green Building rating as identified during construction/ installation/ commissioning based on the actual site conditions/ construction activities, Contractor shall implement

## 21 PERFORMANCE GUARANTEE

The contractor shall carry out the work in accordance with the Approved shop drawings, Specifications, Schedule of Quantities and other documents forming part of the Contract. Contractor shall carry out heat load calculation, Ventilation calculation & Smoke calculation & submit the same for client / consultants approvals. The contractor shall be fully responsible for the performance of the selected equipment (installed by him) at the specified parameters and for the efficiency of the installation to deliver the required end result.

The contractor shall guarantee that the HVAC system as installed shall maintain the inside conditions in the air-conditioned spaces as described under “Basis of Design” in the specifications.

Complete set of architectural drawings is available in the Architect/Consultant’s office and reference may be made to same for any details or information. The contractor shall also guarantee that the performance of various equipment individually, shall not be less than the quoted capacity; also actual power consumption shall not exceed the quoted rating, during testing and commissioning, handing over and guarantee period.

## **LABOUR:**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

## **COMPLIANCE WITH LABOUR REGULATIONS:**

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to the construction industry are given below. The Contractor shall keep the Client indemnified in case any action is taken against the Client by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Client is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Client shall have the right to deduct any money due to the Contractor including his amount of performance security. The Client/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Client.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Client at any point of time.

## **SPECIAL CONDITIONS OF CONTRACT**

### **SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.**

- a) **Workmen Compensation Act 1923:** - The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b) **Payment of Gratuity Act 1972:** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

- c) Employees P.F. and Miscellaneous Provision Act 1952: - The Act Provides for monthly contributions by the Client plus workers @ 10% or 8.33%. The benefits payable under the Act are:
  - (i) Pension or family pension on retirement or death, as the case may be.
  - (ii) Deposit linked insurance on the death in harness of the worker.
  - (iii) Payment of P.F. accumulation on retirement/death etc.
- d) Maternity Benefit Act 1951: -The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- e) Contract Labour (Regulation & Abolition) Act 1970: - The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Client by Law. The Principal Client is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Client if they employ 20 or more contract labour.
- f) The Code on Wages, 2019: This code consolidates the Laws relating to Wages and Bonus and matters connected therewith or incidental thereto.
- g) Industrial Disputes Act 1947: - The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- h) Industrial Employment (Standing Orders) Act 1946: - It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Client on matters provided in the Act and get the same certified by the designated Authority.
- i) Trade Unions Act 1926: - The Act lays down the procedure for registration of trade unions of workmen and Clients. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- j) Child Labour (Prohibition & Regulation) Act 1986: - The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

- k) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: - The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter- State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.
  
- l) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996: - All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Client of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Client to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.
  
- m) Factories Act 1948: -The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

## SPECIAL CONDITIONS

1.It must be understood that the work has to be completed as per the time provided in the contract and as such time is the essence of the contract.

2.The quantities furnished in the bills of quantities are only probable quantities liable to alternation by omission, deduction or addition, and it would be clearly understood that the contract is not a lump sum contract and the SWOSTI PREMIUM LTD do not, in any way, assure the tenderer or guarantee that the said probable quantities are correct or that the work would correspond thereto. Payments will be regulated on the actual quantities of work authorizedly done and measured at the accepted rates. No claims due to change in quantities (+ or -) will be entertained. The drawings, forming parts of complementary installations work specifications and the bills of quantities, of the contract, are explanatory of and are to one another, representing together the works / to be carried out. If neither the drawings nor the specifications nor the accepted bills of quantities include any part/parts the intention to include which is nevertheless clearly inferred and which are obviously necessary for the proper completion of the works/ installations, all such parts shall be supplied and executed by the contractor at no extra charge. Anything contained in one or another of (a) the drawings, (b) the specifications and (c) the accepted bills of quantities and not found in the others will be equally binding as if it were contained in each of them.

3.No alterations, that might have been made by the tenderer in the drawings, specifications, conditions or probable quantities accompanying this notice will be recognized and if any such alterations are made the tender, will be invalid. Conditional tenders will however be liable for rejection.

4.The tenderer must obtain for himself on his own responsibility and at his own expense all the information necessary, including risks, contingencies and other circumstances to enable him to make a proper tender and to enter into a contract with the SWOSTI PREMIUM LTD . He must examine the drawings, specifications, conditions and so on and must inspect the site of work, examine the nature of the ground and the subsoil (so far as is practicable) and acquaint himself with local conditions, means of access to the work, storage facilities or areas for staff colony, the nature of the work, in fact all matters pertaining thereto before he submits his tender.

5.The tender accepted shall not be entitled to make any claim for increase in the rates quoted and accepted excepting in pursuance of any specific provision in the contract.

6.Only approved agencies/ skilled workers shall be deployed to carry out requisite specialized items of work. The Officer/ Engineer in charge's decision in consultation with Architect's/ in this regard shall be binding to all the parties concerned.

7. The rates shall be firm and not be subject to any variations in exchange rates, in taxes, duties etc. in railway freight and the like including labour conditions, etc. The rates are not subject to escalation.

8.It will be the sole responsibility of the contractor to procure all the equipments/ materials and other materials required for the work.

9.The SWOSTI PREMIUM LTD further reserves the right to delete or reduce at any time, any section of the bills of quantities with out assigning any reasons whatsoever there for and no claim will be entertained in this regard.

10.The tenderer whose tender is accepted is bound to execute formal agreement with the SWOSTI PREMIUM LTD within one week of the date of intimation of award of work in

accordance with the draft agreement which will include conditions of tender, form of tender (general conditions of contract & Special Condition of Contract), Articles of Agreement, Bills of quantities, Conditions of contract, Special conditions if any, the drawings and specifications, but his liability under the contract shall commence from the date of written order to commence work whether the formal agreement is drawn or not.

The Contractor shall bear all expenses in connection with the execution of the said agreement including fees for stamping and registration of documents as required.

11. The Security Deposit will bear no interest whatsoever until the date of release.

12.

(a) The contractor, upon award of work, shall submit a memorandum of procedure giving the outline of his general scheme, programme and time table, in the form of a chart that shall be scrutinized and approved (with modifications as necessary), which shall become the approved programme for execution. The approved programme shall be the basis for assessment of comparative progress under the relevant conditions of contract.

(b). Over and above, the contractor has to supply programme chalked out showing important milestones to be achieved and the progress actually achieved compared with, the target of the same in the programme and shortfall, if any planned for being made up in the programme for next month.

13. The work in general shall conform to the Specifications provided.

(a) In case items not covered by the general specifications referred above, reference shall be made to the appropriate I.S. Code.

(b) Should there be any difference in the particular specifications of individual item of work and the description of item as given in the Schedule of quantity, the latter shall prevail, which will be as per the relevant drawing.

(c) In case of any work for which there is no specification in I.S. specifications or in the specifications forming part of tender documents or in case there is any variation, such work shall be carried out in all respects in accordance with the instructions to be issued by the Engineer in charge.

14. The work of any part of it shall not be transferred, assigned or sublet without the written consent of the SWOSTI PREMIUM LTD .

15. The Contractor shall be required to co-operate and work in co-ordination with and afford reasonable facilities for such other agencies / specialists / interior designers/ consultants as may be employed by the Architects / Project Management Consultant/ Officer in Charge on other works / sub-works in connection with the project/scheme of which this work forms a part.

16. The Contractor shall get the necessary insurance done for their personal employed/ Swosti Premium Ltd third party insurance in name of G.M(B D), Swosti Premium Ltd and for all other risk insurance or any other insurance as required.

17. The Contractor shall make arrangements of carrying water and electricity .

18. The Contractor is required to comply with all Acts of Government relating to labour, safety, environment and other Rules and Regulations made there under from time to time

and to submit at the proper times all particulars and statements required to be furnished to the appropriate Authorities.

19. Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the Work. When the Work shall be completed or as soon thereafter as convenient the Architect shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within a period of 14 days after receipt thereof by him, Owner shall sell the same, and shall give credit to the Contractor for the amount realized. The Architect shall thereafter ascertain and certify in writing what (if anything) shall be due or payable to or by the Owner for the value of the said plant and materials so taken possession of by the Owner and the expense or loss which the Owner shall have been put to in procuring the works to be completed, and the amount, if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Owner to the Contractor or by the Contractor to the Owner, as the case may be, and the certificate of the Architect shall be final and conclusive between the parties.

20. If at any time after the commencement of the work the Owner shall for any reason whatsoever not require the whole thereof, as specified in the tender, to be carried out, but need to abridge the Contract, the Owner shall give notice in writing of the fact to the Contractor who shall have no claim to any payment or compensation which he might have derived from the execution of the work in full, but which he did not derive in consequence of the whole amount of the work not having been carried out. The Contractor shall in this case, however, be entitled to payment for the work already executed by him in accordance with the agreed rates. The Owner shall also take over all building materials as might have been ordered for the work, but orders for which cannot be canceled, if delivered within a reasonable time, and shall pay for them at cost price. The Contractor shall also be allowed to remove his tools and plants from the site.

## Contractor Responsibility Matrix

Work Element / Activity	Contractor	Client (Swosti)	PMC (You)	Architect / Consultants
1. Mobilisation & Site Establishment	R	A	C	-
2. Setting Out and Site Survey	R	C	C	C
3. Site Safety & Housekeeping	R	C	C	-
4. Approvals from Local Authorities (as applicable)	C	A	R	C
5. Scaffolding, Centering, and Shuttering	R	I	C	-
6. Quality Control & Testing	R	I	C	C
7. Coordination with MEP teams	C	I	C	C
8. Materials Procurement (Cement, Steel, Bricks, etc.)	R	I	C	-
9. Submission of Progress Reports & MIS	R	I	A	-
10. Adherence to Timeline / Work Schedule	R	I	C	-
11. Rectification of Defects During DLP	R	A	C	-
11. Final Handover & Completion Report	R	A	C	-

### Legend:

- **R = Responsible** – Main executor.
- **A = Accountable** – Final decision-maker or owner.
- **C = Consultative** – Provides input and coordination.
- **I = Informed** – Kept in the loop, but not involved in execution.

### Management Meetings

- Either the Engineer or the Contractor may call for a management meeting.
- These meetings are held to review progress plans and handle issues flagged under the early warning system.
- The Engineer shall record meeting proceedings and circulate to attendees and the Client.
- Action items shall be assigned and communicated in writing.

### Quality Control

- The Engineer shall regularly inspect the Contractor's work and identify any defects. Instructions may be issued to uncover or test work suspected to be defective.
- **Tests** If the Engineer instructs tests not specified in the specifications, and the work is found defective, the Contractor shall bear the cost of tests. If no defect is found, it will be treated as a Compensation Event.

### Payments & Liquidated Damages Payments

- Payments shall be adjusted for deductions for retention, other recoveries in terms of the contract and taxes at source, as applicable under the law.
- The Engineer shall pay the Contractor the amounts as per the payment schedule attached to the contract.

### Retention

- The performance security obtained at the time of signing of contract shall be retained till successful conclusion of project completion and issue of completion certificate.
- The Client shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the works or settlement of final payment.
- On completion of the whole of the works half the total amount retained is repaid to the contractor and half when the Defects Liability Period has passed, and the Engineer has certified that all defects notified by the Engineer to the contractor before the end of the period have been corrected.

### Milestone

Milestone No.	To be Achieved	Timeline
Milestone 1-	<b>60 % of value of contract</b>	<b>Upto 120 Days</b>
Milestone 2-	<b>100 % of value of contract</b>	<b>Upto 180 Days</b>

### Liquidated Damages

- The Contractor shall pay liquidated damages to the Client at the rate 0.2%/day on the value of balance work beyond stipulated date of completion as per following milestones of execution subject to a maximum of 10% of contract value.
  - a) Up to end of 120 days of signing of contract – 60 % of value of contract
  - b) Up to end of 180 days of signing of contract –100 % of value of contract