DETAILED TECHNICAL SPECIFICATION FOR HIGH MAST LIGHTING

Sl.No.	Description for BHEL Requirement	Offered	Deviation
	Scope of supply, erection and commissioning:		
1.0	The scope of this specification covers the manufacture, transport, installation, testing and commissioning of the complete lighting system, using Raising and Lowering type of High mast Towers, including the Civil Foundation Works . BHEL will only provide the supply point and the feeder cable of the required size, up to the bottom of the high mast. However, all items required for the safe and efficient operation and maintenance of the lighting system, including the high mast, whether explicitly stated below or not, shall be included by the Vendor.		
2.0	Supply of 20 Meters High Mast system with all accessories including but not restricted to the following. a) Mast shaft in two section, hot dip galvanised and suitable for wind velocity as per IS 875 part 3. b) Head frame,steel wire rope of min. 6 mm dia., double drum winch. c) Galvanised Lantern carriage arrangement suitable for 12 nos. luminaires & its control gear boxes and Lightning finial. d) Integral power tool installed inside base compartment for its operation.		
3.0	Supply of foundation bolts manufactured from special steel along with nuts, washers, anchor plate and templates		
4.0	Design, supply and casting of suitable shallow foundation with M-15 concrete for the High mast considering safe soil bearing capacity at the site.		
5.0	Supply of **12 nos**. non - integral 2x400watts High Pressure Sodium vapour floodlight lumininaire with two nos 400 W HPSV lamps in each luminaire and required control gear boxes suitable for operation on 230V, 50HZ, a.c. supply.		
6.0	Supply of twin dome avaition obstruction light with 2 nos LED lamps.		
7.0	Supply of 4 nos. G.I pipe earthing station for High Mast (2 Nos for Mast and 1 for Lightining and 1 for power switch)		
8.0	Supply of control panel housing suitable control circuit for the operation of the mast, precision timer for automatic On/Off control and required controls for the power tool motor.		
9.0	Erection/ installation and commissioning of the High Mast system comprising of foundation, mast and its accessories, aviation warning lamps, earthing, luminaires, control panel etc. with the help of suitable equipments.		
10.0	3 sets of wiring/ connection diagram, O&M manual to be supplied along with the high mast.		

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11.0	The type and make of the luminaire and lamp to be furnished in the offer. Technical leaflet giving the dimensions, features to be attached with the offer. The fitting and control gear boxes offered should be suitable for outdoor application and properly sealed to prevent rain water entry.		
11.1	The luminaire and lamp should be of Philips, Bajaj make only.		
11.2	Make and details about the aviation obstruction light to be furnished with the offer.		
11.3	The electrical works should be carried out by a licenced electrical contractor.		
12.0	**Reference List/ Qualifying Condition:**		
12.1	Only those vendors who have supplied and commissioned similar or higher capacity/ size high mast and working satisfactorily for at least one year after commissioning should quote.		
12.2	Information about the companies where similar equipments have been supplied, certificate about satisfactory performance are to be submitted for qualification of the offer.		
13.0	**General Features:**		
13.1	**Winch**		
	The winch shall be of completely self sustaining type, without the need for brake shoe, springs or clutches. Each driving spindle of the winch shall be positively locked when not in use. Individual drum also should be operated for fine adjustment of lantern carriage. The capacity, operating speed, safe working load, recommended lubrication and serial number of the winch shall be clearly marked on each winch. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay, with no chances of rope slippage. The rope termination in the winch shall be such that distortion or twisting is eliminated and at least 5 to 6 turns of rope remains on the drum even when the lantern carraiage is fully lowered and rested on the rest pads. It should be possible to operate the winch manually by a suitable handle by an integral power tool.		
13.2	**Head Frame**		

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	The head frame, which is to be designed as a capping unit of the mast, shall be of welded steel construction, galvanised both internally and externally after assembly. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire ropes and the multi-core electric cable. The pulley block shall be made of non-corrodable material, and shall be of die cast Aluminium Alloy. Pulleys made of synthetic materials such as Plastic or PVC are not acceptable. Self-lubricating bearings and stainless steel shaft shall be provided to faciliitate smooth and maintenance free operation for a long period. The pulley assembly shall be fully protected by a canopy galvanised internally and externally. Close fittings guides and sleeves shall be provided to ensure that the ropes and cables do not get dislodged from their respective positions in the grooves. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage.		
13.3	**Sainless Steel Wire Ropes :**		
	The suspension system shall essentially be without any intermediate joint and shall consist of only non-corrodable stainless steel of AISI 316 or better grade. The stainless steel wire ropes shall be of suitable size, the central core being of the same material. The overall diameter of the rope shall not be less than 6 mm. The thimbles shall be secured on ropes by compression splices. Two continuous lengths of stainless steel wire ropes shall be used in the system and no intermediate joints are acceptable in view of the required safety. No intermediate joints / terminations, either bolted or else, shall be provided on the wire ropes between winch and lantern carriage.		
13.4	**Electrical System, Cable and Cable Connections.**		
	A suitable terminal box shall be provided as part of the contract at the base compartment of the high mast for terminating the incoming cable. The electrical connections from the bottom to the top shall be made by special trailing cable. Size of the cable shall be minimum 5 core 2.5 sq.mm. copper. At the top there shall be weather proof junction box to terminate the trailing cable. Connections from the top junction box to the individual luminaries shall be made by using 3 core 1.5 sq.mm. copper flexible PVC cables of reputed make. The system shall have in-built facilities for testing the luminaries while in lowered position. Also suitable provision shall be made at the base compartment of the mast to faciliiitate the operation of internally mounted, electrically operated power tool for raising and lowering of the lantern carriage assembly. The trailing cables of the lantern carriage rings shall be terminated by means of metal clad, multipin plug and socket provided in the base compartment to enable easy disconnection when required.		
13.5	**Power Tool for the Winch:**		

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	A suitable, high-powered, electrically driven, internally mounted power tool, with manual over ride shall be supplied for the raising and lowering of the lantern carraige for maintenance purposes. The speed of the power tool shall be to suit the system. The power tool shall be single speed, provided with a motor of the required rating. The power tool shall be supplied complete with suitable control. The capacity and speed of the elelctric motor used in the power tool shall be suitable for the lifting of the design load installed on the lantern carraige. The power tool mounting shall be so designed that it will be not only self supporting but also aligns the power tool perfectly with respect to the winch spindle during the operations. Also, a handle for the manual operation of the winches in case of problems with the electrically operated tool shall be provided.		
13.6	**Lightning Finial:**		
	One number heavy duty hot dip galvanised lighting finial shall be provided for each mast. The lightning finial shall be minimum 1.2 M in length and shall be provided at the centre of the head frame. It shall be bolted solidly to the head frame to get a direct conducting path to the earth through the mast.		
13.7	**Aviation Obstruction Lights :**		
	Suitable Aviation Obstruction Lights of reliable design and reputed manufacturer shall be provided on top of each mast.		
13.8	**Earthing Terminals :**		
	Suitable earth terminal shall be provided at a convenient location on the base of the Mast, for lightning and electrical earthing of the mast.		
13.9	**Feeder Pillar:**		
	Each mast shall be provided with a feeder pillar fabricated out of 14 SWG CRCA sheet and finished with two coats of red oxide primer and grey enamel paint. The feeder pillar shall comprise of incoming TPN Switch Fuse Unit with HRC fuses or MCCB of suitable current rating, incoming / outgoing terminals and control for the power motor. Feeder pillar shall be mounted near to the mast. Suitable digital timer of reputed make, with necessary contactors, wiring etc. for ON/OFF control of the lamps should be provided and connected in the circuit.		
13.10	**Power Cable:**		

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	A cable of size 4 x 10 sq.mm. Aluminium conductor, Armoured cables for power supply and 4 x 1.5 sq.mm. Copper conductor Armoured cable for motor supply shall be provided from feeder pillar to the base compartment of the highmast. Cable shall be taken to the base compartment of the highmast through the provision made in the foundation. Power cable of suitable size up to the feeder pillar from supply point shall be provided by BHEL.		