TE-IMS-PEMM P&E KDS-SPEC 686

Description: (**Specification for designing, selection, supply, installation, testing, commissioning of High Mast Lighting for Transnet Engineering Lydenburg**)				
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Local Business:	Locomotive			
Location:	Lydenburg			

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1. Scope of Work

This specification requirement covers all the requirements that will be needed to inform the supplier/vendor/manufacture to carry out what is expected from him/her: The contract will be awarded as a turnkey project and the contractor will be responsible for all the work specified.

This specification states the minimum requirements relating to the work and in no way absolves the contractor from responsibility for sound engineering practice. Any omissions or sub-standard requirements of this specification must be brought to the attention of Transnet Engineering KOEDOESPOORT at tender stage and optional prices for addressing such omissions must be provided.

The Supplier shall supply all the labour, tools, material, equipment, consumables, facilities, testing and supervision required for the supply of the specified equipment at site during erection, pre-commissioning and commissioning activities.

2. Information Required

Tenders shall be in duplicate and will not be considered if full particulars of all relevant equipment and works requested are not submitted at the tender stage, to ensure an objective assessment of the offer can be made. Tenderers shall confirm that the items that they are offering comply at a standard not less than the minimum required requirement asked for in the specifications. Tenderers must comply to these specifications, but alternative offers may, in addition, also be submitted. Such alternative offers must be fully motivated and substantiated.

3. Specific Requirements:

- Occupational Health & Safety Act (Act 85 of 1993) and its Regulations, as amended
- Compensation of Occupational Injuries and Diseases Act (Act 130 of 1993) as amended
- Transnet Contractor Management Procedure (TRN-IMS-GRP-PROC 014)
- Transnet Engineering IMS Compliance Policy Statement
- The contractor shall undergo Safety, Health and Environmental **(SHE) Induction**, and be issued with Induction certificate and valid permits authorising him/her to enter Transnet premises for the duration of the contract.
- The contractor is required to produce an approved **Compliance File or SHE File** and **Site Instruction Book** on site at all **times**.
- All measurements and amounts must be stipulated in quote.
- A supervisor will be on site at all times.
- Comply with Transnet Engineering Waste Management Standard.
- The correct PPE must be worn at all times. (Harnesses ropes, etc.)
- During and on completion of the project, there will be SHE inspections and Risk assessments done on the site that the supplier/vendor is working on, which will be reported to the project manager.
- Failure to comply will result in a stop certificate being issued and the supplier will be required to leave the site until the situation is rectified.
- Valid letter of good standing with Compensation commissioner.

4. Technical Requirements:

All equipment and installation whether detailed in this specification or not shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993 as amended. Sudden power losses will not have an adverse effect on equipment and shall not unduly delay return to operation after power is restored.

5. Codes of Practice, Regulations & Standards:

The tenderer shall specify which statutory or industry rules will be applied for the equipment to be working successfully and safely and shall indicate the designed life span.

6. Loads and Duty Cycles:

The tenderer shall describe all duty cycles that the equipment would be required to perform.
The duration and the number of cycles per day/week/month/year must also be stipulated.

7. Dimensional Parameters:

The tenderer shall describe the major physical dimensions that are required for ease of operation and installation.

8. Operational Parameters:

8.1 Environment:

The equipment will be required to operating in the climatic conditions of Pretoria:

8.2 Special Requirements:

The tenderer shall indicate any tooling, lifting attachments etc. which is not considered to be standard accessories for the equipment at hand and will be required to operate the equipment effectively and safely.

8.3 Controls:

The tenderer shall indicate the type of controls and layout to operate the equipment.

8.4 Markings:

The tenderer shall conspicuously mark the equipment with following info as a minimum: all PPE to be worn, technical data, dates of manufacture, manufacturer's details etc.

9. Specific Requirements:

	REQUIRED	DETAILS OF OFFER Comply (Yes) / Do not comply (No)
	Specification for designing, selection, supply, installation, testing, commissioning of High Mast Lighting for Transnet Engineering Lydenburg.	
1.	**Scope of work:**	
1.1	Do geotechnical investigation / report.	
1.2	Design foundations / structure by a competent, design, civil engineer. Approved drawings by the design / structural engineer to be submitted to TE PEMM for acceptance and approval. 1. **Foundations** 2. **Structure**	
1.3	Supply and install high mast structure with all accessories.	
1.4	Supply electrical power for lighting on high mast poles. Supply COC	
1.5	Test and commissioning of the lighting.	
1.6	The design and construction of the lighting masts shall be in accordance to SANS 10225.	
2.	**System and site particulars:**	
2.1	The lighting installation shall be suitable for a 400/250 volt 50 hertz supply of electricity.	
2.2	The site is located at Transnet Engineering Ladenburg The specific locations of the masts will be disclosed on the site clarification meeting and the client.	
3.	**System requirements:**	
3.1	The minimum illumination at a distance of 150 meters for a single mast shall be minimum 0.5 lux.	

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3.2	The complete system shall be designed, manufactured and finished to afford a maintenance free life span and materials shall be chosen to prevent wear, fatigue and corrosion.	
4.	**Foundations:**	
4.1	The contractor shall appoint a geo-technical consultant to report on the soil condition and the foundations shall be designed based on the data. A copy of the consultant's report and the foundation design calculations shall be submitted to the engineer and the project manager before site work is due to commence. Ready mixed concrete of the design strength shall be obtained locally for the foundations. The engineer shall inspect foundation steel immediately before concrete pouring. Concrete foundations shall protrude at least 300mm above ground level and shall be finished smooth.	
4.2	All mast shall be supplied with foundation bolts and templates. The bolts shall be hot dip galvanised over the entire length to SANS Specification No 763/1977. Two galvanised nuts, two washers and one spring washer shall be supplied for each bolt. The number of foundation bolts shall be determined according to the design above. Calculations shall be submitted upon request.	
4.3	One or two PVC, class B cable sleeves shall be provided from the centre of the top of the foundation plinth, through the concrete to a point 500mm below ground level on the side of the plinth	
4.4	After casting of the foundation, slab shall be covered by earth, property compacted. The area around the plinth shall be brought to the original level and be left neat and tidy.	
5.	**Masts:**	
5.1	**Construction:**	

	REQUIRED	DETAILS OF OFFER Comply (Yes) / Do not comply (No)
5.1.1	The mast shall be constructed from conical sections which, when assembled, will form a tapered column of circular cross section. There shall be no fillet welds of the overlaps. The sections shall be joined by friction fit only.	
5.1.2	The mast shall be of lightweight construction and a base plate shall be welded to the bottom end of the lowest section suitable drilled for foundation bolts.	
5.1.3	All welding shall be subject to SANS Specification 044 Part 3 Grade B and shall be carried out by SANS coded welders only. Proof that all welders have been tested by the SANS must be submitted on request. Inspection and acceptance certificates shall be furnished on request.	
5.1.4	The steel used in the manufacture of the mast shall have an ultimate tensile strength of between 450 and 620 Mpa and identical to SANS 1431 grade 300WA and Galvanised.	
5.1.5	Proof must be supplied that the manufacturer is ISO 9001 accredited.	
5.2	**Dimensions:**	
5.2.1	The masts offered shall give an overall flood light mounting height of 30 meters.	
5.2.2	The cross-section and wall thickness of the mast must be determined on the basis of the working loads.	
5.3	**Working loads:**	
5.3.1	The mast shall be designed in accordance with the SANS 02254 Code of Practice for the design and construction of lighting masts. The following site factors shall be considered. • Design wind speed: = 40m/s. • Class of structure: = B.	

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	• Category of terrain: = 2. • Altitude of site: = 1200m. The mast shall carry at its top 8 x 400 Watt metal Halide Flood lights evenly spread around its circumference. Data on wind induced oscillations and the dynamic behaviour of the mast shall be submitted.	
5.4	**Raising and Lowering Device:**	
5.4.1	Each mast shall be equipped with a three-point hoisting mechanism, consisting of three 6mm diameter stainless steel wire ropes, running over three pairs of aluminium pulleys on the head frame of the mast. The pulleys running on shafts manufactured from Stainless steel and bearings/housings are manufactured from Vesconite. All split points, bolts, nits and washers shall be stainless steel. Pulley shafts shall be positively prevented from rotating in their housing. 2 (two) – Rope system shall not be considered.	
5.4.2	The luminaire carriage shall be drawn against three inverted cones to ensure level positioning of the fittings in the operating position. The hoist ropes, which will remain under tension at all times, shall terminate inside the mast on a clevis plate, to which the rope of the hoisting unit can be connected or to which, when in the raised position, the locking device can be attached. The locking device shall be secured to a structurally sound member of the mast base. The other ends of the hoisting ropes shall be firmly secured to the luminaire carriage. Rope ends shall not be secured by Crosby clamps and only "Talurit" type ferrules of compatible material shall be used. In addition, a safety chain shall be provided between the clevis plate and a structurally sound member of the mast base.	
5.4.3	All fasteners connected with the raising and lowering device shall be secured by Nylock type nuts or stainless-steel split	

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	pins.	
5.5	**Hoisting Unit:**	
5.5.1	This shall be a single drum worm gear winch with a 50:1 ratio and suitable for manual or power operation. The winch shall run in a fully enclosed oil bath. It shall be possible for the winch to be removed, if so desired, thus not required a winch in each mast.	
5.6	**Access Opening:**	
5.6.1	An access door adequately protected against the weather shall be provided in the mast, with the bottom lintel 600mm above the base plate. The door shall be adequately protected against vandalism and security by three screws requiring a special opening tool.	
5.6.2	A door-frame shall reinforce the opening in the mast.	
5.6.3	The mounting strips welded opposite the door opening shall be drilled for the mounting of a control board. Earth terminals, as well as a support bar for the incoming supply cables, shall be provided below the door opening.	
5.7	**Corrosion Protection:**	
5.7.1	All parts of the mast and raising and lowering device, not specified as manufactured from stainless steel, shall be hot dip galvanised to SANS Specification No. 763/1977 and inspection certificates provided.	
5.8	**Electrical Connection to the Luminaires:**	
5.8.1	A flexible, heavy-duty 5-core trailing cable of the correct size, which runs over a separate set of Aluminium sheaves at the head frame, shall be provided. Sheaves shall be of Aluminium, running on Vesconite shafts. The shafts shall be positively secured from rotating in their housings. The	

	REQUIRED	DETAILS OF OFFER Comply (Yes) / Do not comply (No)
	Aluminium sheaves shall be adequately sized to prevent deformation of the cable.	
5.8.2	The trailing cable shall be firmly connected to the luminaire carriage at its one end and to the clevis plate at the other end. Suitable connectors of the CEE type of connectors meeting IP55 with DIN 40-050 shall be provided.	
5.8.3	A fully enclosed distribution board shall be provided for the mast containing: • 1 – 30 Amp 3 Phase overload protected circuit breaker as main switch. • 3 – 15 Amp single pole overload protected circuit breakers. (Lights). • 1 – 16 Amp single phase switch socket outlet for the use of a power tool. • 1 – 20 Amp Single pole overload protected circuit breaker for single phase socket outlet. • 1 – 30 Amp 30 mA Double pole earth leakage protecting unit for single phase socket outlet. • 1 – 5 Pin 25 Amp CEE switch socket outlet. (Male and female) • 1 – Adequately rated contactor. • 1 – 5 Amp Single pole overload protected circuit breaker for the use as by-pass switch. • 1 – 5 Amp Single pole overload protected circuit breaker as control circuit. • 1 – Day/Night switch. • 1 – 15 3 Phase overload protected circuit breaker for the 5 pin switch socket outlet. • 16mm cable 4 core swa minimum size to be installed • Lights to work independently on a 5 / 10 amp single circuit breaker	
5.8.4	All circuit breakers shall have a rupturing capacity of 5 kA and shall bear the mark of the SANS and shall be accessible through cut-outs in the cover without having to remove the cover.	
5.8.5	All equipment shall be permanently and clearly marked. (Labelled). The distribution board shall be fully wired and be ready for connection to the incoming supply cables.	

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5.9	**Earthing:**	
5.9.1	The earthing of the mast will be done according to the relevant SANS specifications and will be done in such a way that no copper conductors will be visible, once the job is completed.	
6.	**Luminaires:**	
6.1	Luminaires shall be designed and mounted to give a uniform circular light distribution on the ground. Luminaires shall be manufactured from materials which will not degrade from ultra-violet light corrosion. Reflectors shall be guaranteed not to lose reflectivity over the life span of the luminaire. All control gear shall be mounted in a compartment attached to the luminaire. The control gear and the compartment shall be adequately rated to operate in the high ambient temperatures in Gauteng area, without undue ageing. Plastic trays, brackets and retaining clips will not be accepted.	
6.2	The luminaire size shall be chosen to meet the specifications stated in clause 07689069 of this document.	
6.3	The luminaire shall bear the SANS 1279 mark and the SANS 1464 safety mark. The luminaire shall have a degree of protection that complies with SANS 1222: • Lamp compartment: IP 65. • Control gear compartment: IP 65. • The IP rating shall be certified by a SANS test report.	
7.	**Electrical cable supply for High mast Lighting:**	
7.1	All supply cables installed from point of supply to the point of control shall be SWA cables. SANS 1507/1000. Contractor shall be responsible for the overload protected circuit breaker at the point of supply. Supply cables shall be sufficient for 40Amps three phase per mast.	

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	All cable sizes shall be calculated according to the SANS 10142:2012 Edition 1.8.	
7.2	All supply cables shall be buried in the ground at a depth of minimum 500mm. A cable warning tape shall be buried 250mm above the cable in the trench.	
7.3	All cables installed inside buildings shall be installed and a suitable cable tray secured to the building.	
7.4	All cables installed under roads, concrete surfaces shall be installed in PVC sleeving or conduit pipe. Sleeving or conduit pipe shall be sufficient to remove/replace the cable with ease if needed.	
8.	**Documentation:**	
8.1	The following documentation shall be required at tender stage: • Contractor's registration with ECB or DOL as electrical contractor. • The accreditation as installation electrician and a copy of the persons ID. • Contractor's registration as an LME with the Dol. • The accreditations with ECSA as high mast lighting inspector (LMI) with the persons ID.	
8.2	Documentation required before work commence: • Design drawings of the masts. • Geo-technical report on soil. • Design drawings of foundations. • Design drawings of electrical reticulation. Before manufacturing is started, the tender shall submit his design calculations and detailed drawings, signed off by a competent professional person, to the Contract Manager for the Transnet Engineering Professional Engineer to check and sign off. This shall in no way absolve the contractor from professional responsibility.	
8.3	Documentation on day of commissioning: • All concrete test results. • COC for electrical installation. • Test certificates for all lifting equipment.	

	REQUIRED	DETAILS OF OFFER Comply (Yes) / Do not comply (No)
	3 sets off hard copies each with a disc containing documentation in PDF Format. • Operating Manual. • Maintenance Manual. • Mechanical Drawings. • Electrical drawings. • Parts List.	
9.	**Training:**	
9.1	The supplier shall indicate the minimum qualifications required to be able to operate and maintain the equipment.	
9.2	The supplier shall conduct a hand-over and familiarization training when delivering the equipment and shall indicate the period required.	
9.3	The supplier shall offer a formal training to Operators and maintenance artisans according to the training manuals of the equipment supplied. The supplier shall indicate if this training is accredited by SAQA.	
9.4	The supplier shall supply training manuals with the tender.	
10.	**Spares.**	
10.1	The supplier shall indicate detail spare parts list of the equipment.	
10.2	The supplier shall indicate the critical maintenance spares.	
10.3	The supplier shall indicate if consignment spares will be readily available in South Africa and the average lead time.	
10.4	The supplier shall describe in details the main components and how they operate in details.	
11.	**Maintenance**	
11.1	The supplier shall indicate the maintenance requirements and frequency of the equipment.	
11.2	Maintenance/servicing of the equipment during guarantee period shall be included in the price.	
12.	**Guarantee:**	
12.1	Equipment supplied shall have a minimum of 12 months	

	REQUIRED	DETAILS OF OFFER Comply (Yes) / Do not comply (No)
	preferable 24 months guarantee.	
12.2	Supplier shall be responsible for the maintenance/servicing of the equipment during guarantee period.	
13.	**General:**	
13.1	It shall be required that each individual bidder shall give a presentation regarding the equipment that will be supplied.	
13.2	Transnet engineering would also like to visit the company where these machines have been delivered previously, so to familiarise them with the equipment.	
13.3	All work delivered shall be of a high standard.	
13.4	All rubble shall be removed on a daily base.	
	Deviation	
	Note: Any deviation or non-compliance from the specification, the supplier must fix it at no additional cost.	

10. References:

Standard operating procedure for specification of contract work

11. Quality Control:

The contractor shall provide a quality control plan with the tender indicating how quality will be assured.