



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
NEW DELHI

DOCUMENT No.	TB-393-316-011	Rev	00		Prepared	Checked	Approved
CUSTOMER Doc. No.				NAME	MVK	MVK	SKS
TYPE OF DOC.	TECHNICAL SPECIFICATION			SIGN			
TITLE Visual Monitoring System for Watch and Ward of Substation Premises				DATE	10.07.17	10.07.17	10.07.17
				GROUP	TBEM		
				W.O. No			
CUSTOMER	POWER GRID CORPORATION OF INDIA LIMITED						
PROJECT	Substation Package for Extension of 400kV Tumkur Pooling station (Pavagada) (including transformer & Reactor), Extension of 400/220kV Mysore Substation and Extension of 400/220kV Tumkur (Vasantnarsapur) (including Transformer) under Transmission System for Ultra Mega Solar Power Part at Tumkur (Pavagada), Karnataka-Phase-II						
NOA Ref:							

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Enclosed Drawings: -

1. TB-0-393-316-001 - Layout Plan for 400/220kV Tukmur (Pavagada) S/s Extn. (Sh.1/2)
2. TB-0-393-316-001 - Section Elevation for 400/220kV Tukmur (Pavagada) S/s Extn. (Sh.2/2)
3. TB-0-393-316-003 - Cable Trench Layout for 400/220kV Tukmur (Pavagada) S/s Extn.

00					First Issue		
Rev.	Date	Altered	Checked	Approved	REVISION DETAILS		
Distribution				CUSTOMER	TBMM	O/C	
				-	1	1	

SECTION - 1

1.1 SCOPE

This technical specification covers the requirements of design, packing at works, supply, unloading at site, storage at site, erection/installation, testing and commissioning of the complete visual monitoring system including cameras, digital video recorder system, mounting arrangement for cameras, cables, LAN switches, UPS and any other items/accessories for augmentation of Visual Monitoring System at Site. It shall also be bidder's responsibility to provide all necessary licenses to Owner i.e. Powergrid to run the system successfully.

The Visual Monitoring System is required for the following Project:

Name of the Customer : POWER GRID CORPORATION OF INDIA LTD. (PGCIL)
Name of the Project : Substation Package for Extension of 400kV Tumkur Pooling station (Pavagada) (including transformer & Reactor), Extension of 400/220kV Mysore Substation and Extension of 400/220kV Tumkur (Vasantnarsapur) (including Transformer) under Transmission System for Ultra Mega Solar Power Part at Tumkur (Pavagada), Karnataka-Phase-II

The specification comprise of following sections:

Section-1: Scope, Specific Technical Requirements & Bill of Quantities

Section-2: BLANK

Section-3: Project Details & General Technical Requirements

Section-4: Schedule of Technical Deviation

In case of any conflict between various sections, order of precedence shall be in the same order as listed above.

1.2 SPECIFIC TECHNICAL REQUIREMENT

Please refer Annexure-IV "Technical specification for Visual Monitoring System". In addition to the same bidder to comply the followings: -

1. Bidder shall submit the drawings with Bill of Quantity indicating quantities of

each items required for completion of Visual monitoring system (VMS) at the tender stage as informative submission. The detailed drawings with documents including detailed BOQ need to be submitted by bidder at contract stage for onward submission to Powergrid for approval. It shall be bidder's responsibility to get the drawings / documents/ BOQ approved from POWERGRID. Bidder shall also be required to visit BHEL/POWERGRID office for technical discussion.

2. It will be bidder's responsibility to assess the number of cameras and its location, in line with the fulfilment of complete scope.
3. The cameras may be mounted on (1.) existing structures, (2.) existing buildings or (3.) any other mounting arrangement to be supplied by bidder.
4. Bidder is advised to refer BOQ & following drawings enclosed with the specification for detailed scope involved.
 - A. Layout Plan for 400/220kV Tumkur (Pavagada) S/s Extn.
 - B. Section Elevation for 400/220kV Tumkur (Pavagada) S/s Extn.
 - C. Cable Trench Layout for 400/220kV Tumkur (Pavagada) S/s Extn.
5. If bidder feels that at any one or more locations it is not possible to cover the requisite area by placing cameras on existing structure or building than bidder can suggest alternative mounting arrangement and such alternative arrangement should be supplied by bidder without any extra cost implication to BHEL. Further alternative mounting arrangement should be proposed to BHEL/POWERGRID for acceptance.
6. The scope of supplies & services shall be as per commercial terms and conditions enclosed separately with the enquiry.

1.3 Test Requirement

The vendor shall submit a FAT (factory acceptance test) & SAT (site acceptance test) plan complying the specification for POWERGRID / BHEL approval that will be used during inspection at works & and site respectively.

- i) Complete operating and maintenance manuals and training of O&M personnel.
- ii) System commissioning and acceptance tests as specified in site acceptance test (SAT) plan.

1.4 Documents to be provided by bidder

- Detailed BOQ to meet the requirement of specification with make, model & quantity of each item
- Technical datasheet/Catalogues/brochures of the item
- Test certificates as per relevant standards
- Reference list of the Projects where similar equipment for similar application is being used for at least 2 years.

1.5 BILL OF QUANTITY: For 400/220kV Tumkur(Pavagada) S/s Extn.

The scope of the bidder shall include providing all items, accessories etc including Color IP camera, with PAN, TILT and ZOOM facilities, along with all required Items, Accessories, Line Interface units, Fiber patch cords, Power supply units, Junction Boxes, Cables, Fiber Optic Cables, etc., and **including integration in existing Hardware and Software for Augmentation of Visual Monitoring System** as per Technical Specification.

Sno	Description	UOM	Qty
1	Augmentation of VMS: Supply of Visual Monitoring System with all accessories as per Technical Specification	Lot	1
2	Augmentation of VMS: Erection, Testing and commissioning of the complete visual monitoring system as per Technical Specification	Lot	1
3	Training (1 day training at Site)	Lot	1

Note:-

1. Please refer "Annexure-I" for details of Visual Monitoring System for existing 400/220kV Tumkur (Pavagada) S/s. Supply & ETC of VMS for Switchyard area under present scope including integration in existing Hardware and Software for Augmentation of Visual Monitoring System is in scope of Bidder.
2. Bidder to submit break-up of LOT quantity in the bid.
3. Training at Site shall include familiarization of the Powergrid personnel with operation, maintenance and troubleshooting of the VMS System. Travel, lodging & boarding expenses of the bidders personnel for imparting training shall be borne by the bidder.

4. Storage - Open & Closed store area shall be provided by BHEL within the project premise. Material handling is under scope of contractor.
5. Height of the equipment - Please refer section Elevation drawings, standard height of 400kV equipment's is 8.3 meter and 245kV equipment is 6.2 meter above FGL.
6. Power supply - 220V DC and 415V AC supply (Non UPS based) shall be provided at Control Room Building. Further distribution under contractor's scope.
7. Conduit for Cable laying - GI pipe (light grade) of suitable size (minimum 25 mm) along with required bends, joints etc. shall be used for **special cables** (i.e. FO cable, high frequency signal cable etc) for visual monitoring system (VMS). Further, single pipe can be used for laying multiple cables. Supply of GI Pipe (light grade) is under scope of bidder.
8. Wind zone & earthquake zone of Tumkur (Pavagada) site shall be as per relevant IS code.
9. Other items / Accessories - need to be supplied as per Powergrid approved Make. Please refer "Annexure-A-1", "Annexure-B-1" & "Annexure-C-1" as reference for list of other accessories previously approved by Powergrid for typical projects. Bidder may offer equivalent item during detailed engineering stage and the same is subject to approval of Powergrid. Further Technical specification mentioned in Annexure-IV shall supersede these documents in case of conflict.

1.6 CLARIFICATION ON COVERAGE AREA - Please refer page 1 of Annexure-IV for scope of system / equipment to be monitored. Followings are the clarification on this regards

- ISOLATOR, CIRCUIT BREAKER, CURRENT TRANSFORMER, CVT, SURGE ARRESTOR, TRANSFORMERS & REACTOR e.t.c - Qty has been tabulated in PLAN Layout drawing along with respective locations.
- Switchyard Panel Room - Total qty 3 numbers, 2 numbers in 400kV yard & 1 numbers in 220kV Yard are in present scope. Please refer cable trench layout where as these are marked as SPR alongside the trench.

---XXX---

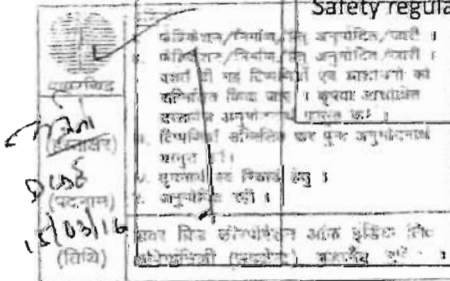
CLIENT	POWER GRID CORPORATION OF INDIA LTD (A Government of India Enterprise)
CONTRACTOR	EMC Limited
SUB-CONTRACTOR	DELCOM TELESYSTEMS PVT. LTD.
PROJECT	765/400kV VEMAGIRI(NEW) GIS SUBSTATION
DRAWING TITLE	GTP – FIXED CAMERA
DRAWING No:	DEL-EMCVMS-VMG-003
Revision	0

GUARANTEED TECHNICAL PARTICULARS FOR IP BASED FIXED CAMERA

Sl. No.	Item	Description																																										
1	Manufacturer	Sony Corporation, Japan																																										
2	Product Description	Network Camera																																										
3	Model Name	Sony SNC-EB 632R																																										
4	Features in the cameras	<table border="1"> <thead> <tr> <th>Specs</th><th>TS Requirement</th><th>Camera Specs</th></tr> </thead> <tbody> <tr> <td>Image Sensor</td><td>2-megapixel Progressive, 1 / 3" CMOS/CCD sensor, Minimum illumination 0.1 Lux</td><td>Better 2.14 Megapixel, 1/2.9" EXMOR image sensor</td></tr> <tr> <td>Min Luminous</td><td>0.5LUX(Color) 0.05Lux(Black)</td><td>Better 0.06 lx (Colour) and 0 lux in B/W</td></tr> <tr> <td>Camera Enclosure Type</td><td>IP66 Grade</td><td>Yes</td></tr> <tr> <td>Iris/Focus</td><td>Auto/Manual</td><td>Yes</td></tr> <tr> <td>Video Compression</td><td>Dual Stream H.264 and MPEG 4 user selectable</td><td>Better triple stream and H.264 and JPEG compression. H.264 has many profile (Base, Main and High profile)</td></tr> <tr> <td>Support Dual-stream</td><td>primary/secondary stream, H.264/MPEG 4 optional</td><td>H.264 and JPEG compression. H.264 has many profile (Base, Main and High profile)</td></tr> <tr> <td rowspan="2">Video Definition</td><td>Primary stream:1600x1200,1280x960,1280x720,</td><td>Better 1920x1080</td></tr> <tr> <td>Secondary stream:800x600,400x288, 192x144</td><td>Yes</td></tr> <tr> <td>Video Parameters</td><td>Brightness, hue, contrast, saturation and image quality</td><td>Yes</td></tr> <tr> <td rowspan="2">Video Frame Rate</td><td>PAL: 1-25frames/second</td><td rowspan="2">Yes</td></tr> <tr> <td>NTSC:1-30frames/second</td></tr> <tr> <td>Video Compression BR</td><td>32Kbit/S - 6Mbit/S</td><td>Yes</td></tr> <tr> <td>Video Output</td><td>One channel composite Streaming</td><td>Yes</td></tr> <tr> <td>Supported Protocols</td><td>TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, IPsec, UpnP, RTP, RTCP</td><td>Yes</td></tr> </tbody> </table>	Specs	TS Requirement	Camera Specs	Image Sensor	2-megapixel Progressive, 1 / 3" CMOS/CCD sensor, Minimum illumination 0.1 Lux	Better 2.14 Megapixel, 1/2.9" EXMOR image sensor	Min Luminous	0.5LUX(Color) 0.05Lux(Black)	Better 0.06 lx (Colour) and 0 lux in B/W	Camera Enclosure Type	IP66 Grade	Yes	Iris/Focus	Auto/Manual	Yes	Video Compression	Dual Stream H.264 and MPEG 4 user selectable	Better triple stream and H.264 and JPEG compression. H.264 has many profile (Base, Main and High profile)	Support Dual-stream	primary/secondary stream, H.264/MPEG 4 optional	H.264 and JPEG compression. H.264 has many profile (Base, Main and High profile)	Video Definition	Primary stream:1600x1200,1280x960,1280x720,	Better 1920x1080	Secondary stream:800x600,400x288, 192x144	Yes	Video Parameters	Brightness, hue, contrast, saturation and image quality	Yes	Video Frame Rate	PAL: 1-25frames/second	Yes	NTSC:1-30frames/second	Video Compression BR	32Kbit/S - 6Mbit/S	Yes	Video Output	One channel composite Streaming	Yes	Supported Protocols	TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, IPsec, UpnP, RTP, RTCP	Yes
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	Operating Temperature	-5 ~ +50°C	-30 ~ +50°C
	Operating Humidity	10 ~ 90%	Yes
5	Other Features :		
	IR Illuminator	Yes (Wave length: 850 nm [typical], IR LED: 20 pieces)	
	Day /Night	TRUE D/N	
	Wide-D	View-DR	
	Noise Reduction	XDNR	
	Image Stabilizer	Yes	
	Smartphone Viewer	Yes	
	Intelligent Motion Detection	Yes	
	Face Detection	Yes	
	Tamper Alarm	Yes	
	Multicast Steaming Support	Yes	
5	General :		
	Power Requirement	PoE (IEEE802.3at compliant)	
	Power consumption	Approx. 5W max	
	Operating temperature	-10 to +50 °C (23 to 122°F)	
	Safety regulation	UL2044, FCC 15B Class A, IC Class A, IEC60950-1, EN55022(A)+EN55024+EN50130-4, VCCI Class A, C-Tick Class A	

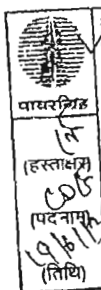
Cat 1



CLIENT	POWER GRID CORPORATION OF INDIA LTD (A Government of India Enterprise)
CONTRACTOR	LARSEN & TOUBRO LIMITED
SUB - CONTRACTOR	DELCOM TELESYSTEMS PVT. LTD.
PROJECT	SUBSTATION PACKAGE- P218-SS01 FOR CONSTRUCTION OF 765KV DHARMAJAYGARH SWITCHING STATION ASSOCIATED WITH TRANSMISSION SYSTEM ASSOCIATED WITH TRANSMISSION SYSTEM FOR PHASE-I GENERATION PROJECTS IN ORISSA (PART-9)
DRAWING TITLE	GTP – PTZ Camera
DRAWING No:	DEL-L&T-DGH-VMS-003
Revision	1 Dated: 09.05.13

GUARANTEED TECHNICAL PARTICULARS FOR IP BASED SURVEILLANCE & MONITORING CAMERA

Sl. No.	Item	Description
1	Manufacturer	Sony Corporation, Japan
2	Product Description	Network Camera
3	Model Name	Sony SNC-ER 550
4	Features in the cameras	
	a) Image Device	1/4-type Exmor CMOS – better CMOS Sensor
	b) Number of Effective Pixels	Approx. 1.43 Megapixel
	c) Electronic Shutter Speed	1/1 to 1/10,000 s
	d) Gain Control	Auto/Manual (-3 to 28 dB)
	e) Exposure Control	Full auto, Shutter priority, Iris priority, Manual
	f) White Balance mode	Auto, ATW, Indoor, Outdoor, One-push, Manual, Sodium vapour lamp
	g) Lens Type	Auto-focus Zoom Lens
	h) Zoom Ratio	Optical zoom 28x, Digital zoom 12x, Total zoom 336x
	i) Horizontal Viewing Angle	55.9 to 2.1 degrees
	j) Lens Size	f=3.5 to 98 mm(Better then



Handwritten signature and initials.

		asked)
k) F-number		F1.35 to F3.7 ✓
l) Pan-Angle		360 degrees endless rotation ✓
m) Pan Speed		Adjustable, 0.1 degrees / second ~ 300 degrees/s (max) ✓
n) Tilt Angle		210 degrees(with e-flip) ✓
o) Tilt Speed		Adjustable, 0.1 degrees / second ~ 300 degrees/s (max) ✓
p) Preset Positions		256 positions ✓
q) Day/Night		Yes ✓
r) WIDE-D		Yes ✓
s) Noise Reduction		Yes ✓
t) Video Compression Format		H.264, MPEG-4, JPEG ✓
u) Codec Streaming		Dual streaming ✓
v) Maximum Frame Rate		30 fps (H.264/MPEG-4/JPEG) ✓
w) Audio Compression		G.711/G.726 ✓
x) Intelligent Motion Detection		Yes ✓
y) Protocols		IPv4, IPv6, TCP, UDP, ARP, ICMP, IGMP, HTTP, HTTPS, FTP (client/server), SMTP, DHCP, DNS, NTP, RTP/RTCP, RTSP, SNMP(MIB-2) ✓
z) ONVIF Compliance		Yes ✓
aa) IP Class		IP 66 ✓
bb) PTZ Data Transfer Baud/Bit Rates Supported		Selectable 2400 bps / 4800 bps / 9600 bps(Not required in IP Cameras as all communication through TCP IP port) ✓

श्रेणियाँ

केंद्रीकरण / निर्माण / हेतु अनुमोदित / जारी :

II केंद्रीकरण / निर्माण / हेतु अनुमोदित / जारी :

वर्तत दी गई टिप्पणियाँ एवं आशोधनों को सम्मिलित किया जाए। कृपया आशोधित दस्तावेज अनुमोदनार्थ प्रस्तुत करें।

III टिप्पणियों सम्मिलित कर पुनः अनुमोदनाथ प्रस्तुत करें।

IV सुवन्त एवं विकसित हेतु।

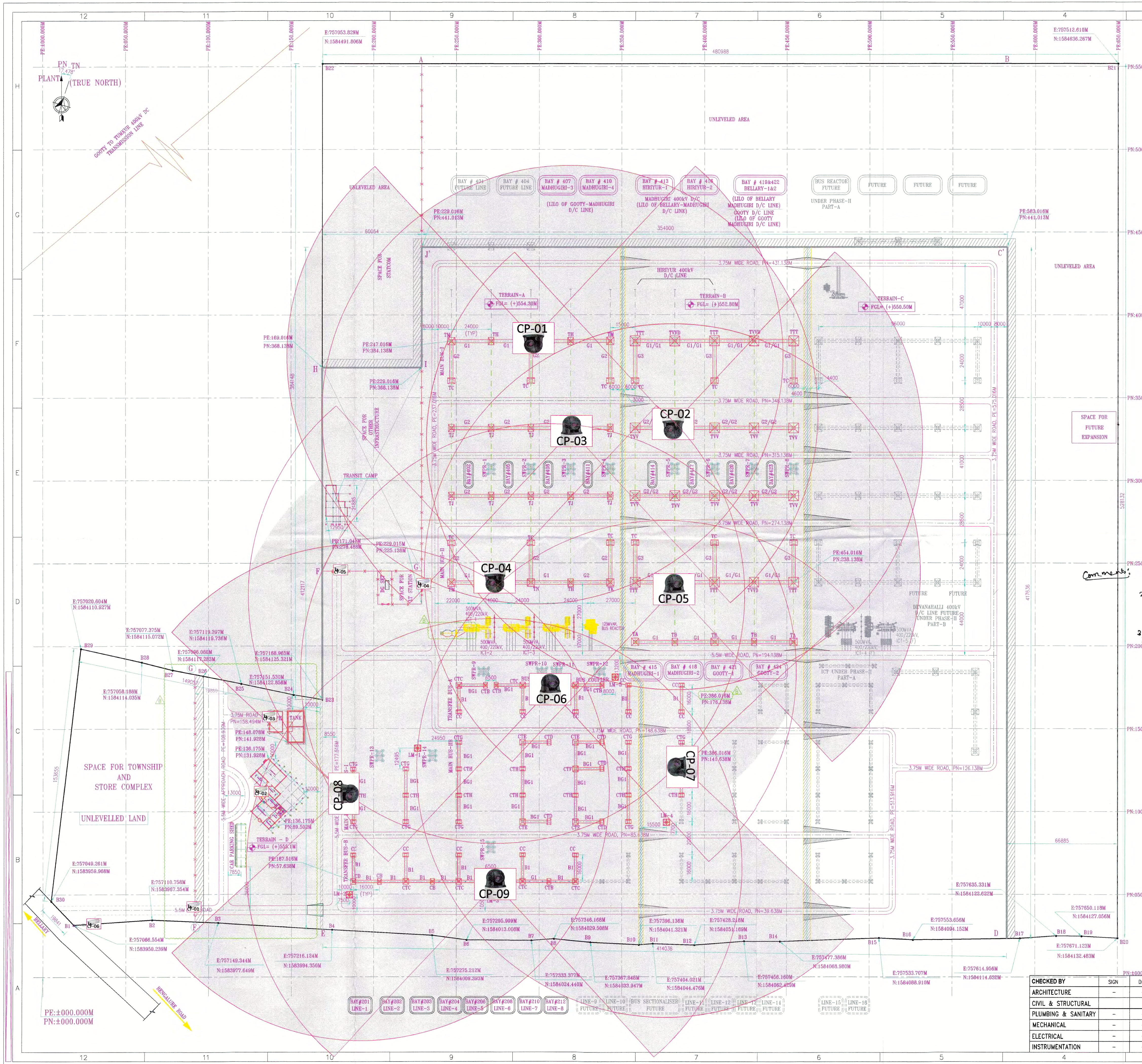
V अनुमोदित नहीं।

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लि०
अभियांत्रिकी (उपकेन्द्र) गुडगाँव, हरियाणा

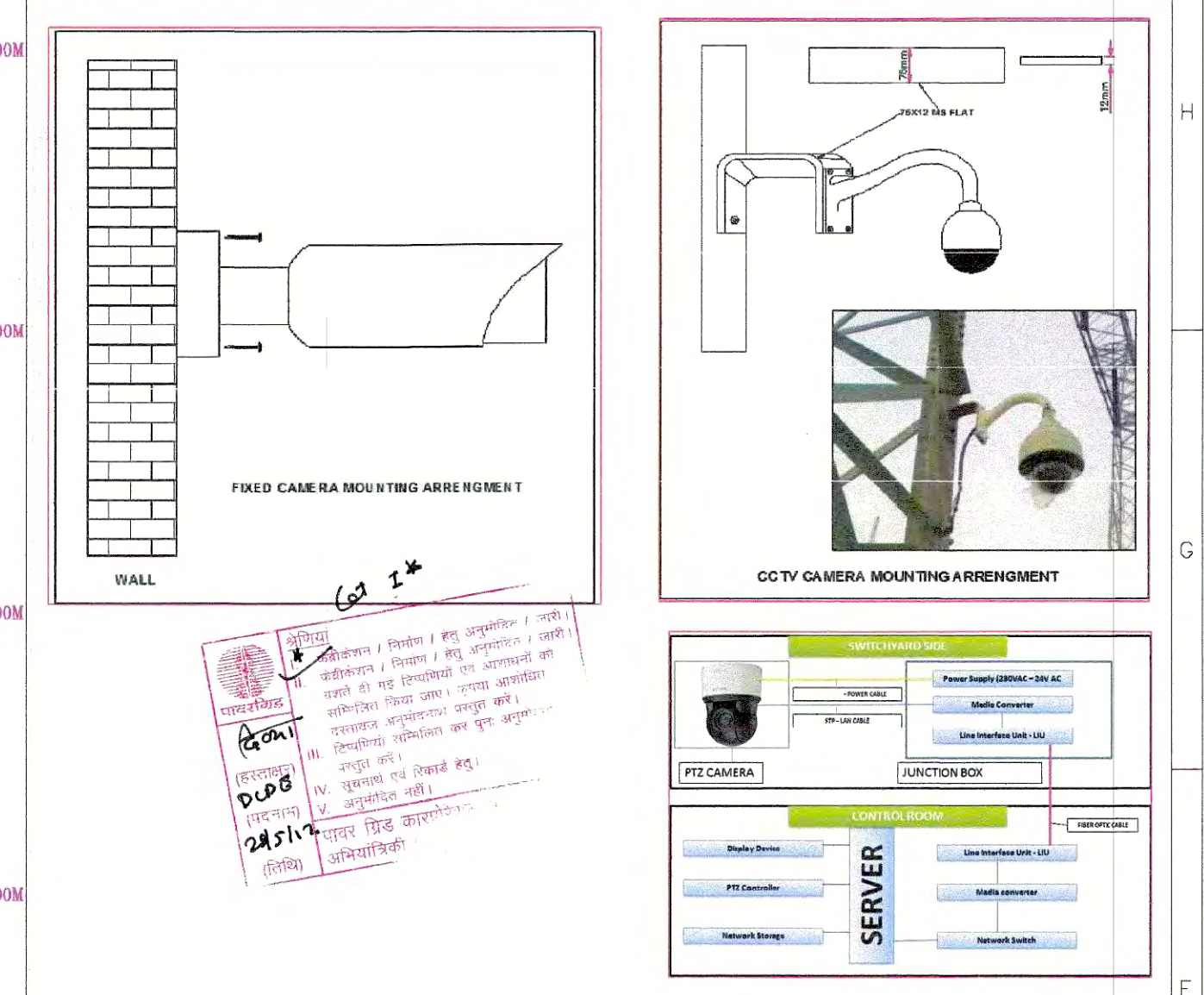
पावरग्रिड
(हस्ताक्षर)
(पदनाम)
(तिथि)

5	Interfaces: <table border="1"> <tr> <td>a) Ethernet</td><td>10Base-T/100Base-TX RJ Interface</td></tr> <tr> <td>b) Card Slots</td><td>SD memory card x 1 (Compatible with the SD/SDHC standards)</td></tr> <tr> <td>c) Sensor In/Out</td><td>(2in/1out)</td></tr> <tr> <td>d) External Microphone Input</td><td>Mini-jack (monaural)</td></tr> <tr> <td>e) Audio Line Output</td><td>Mini-jack (monaural), Max output level: 1 Vrms</td></tr> </table>	a) Ethernet	10Base-T/100Base-TX RJ Interface	b) Card Slots	SD memory card x 1 (Compatible with the SD/SDHC standards)	c) Sensor In/Out	(2in/1out)	d) External Microphone Input	Mini-jack (monaural)	e) Audio Line Output	Mini-jack (monaural), Max output level: 1 Vrms
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 पावर ग्रिड (हस्ताक्षर) 19/06/2019 (पदनाम) (लिपि)	श्रेणिया I फील्डिंग / निर्माण / हेतु अनुमोदित / जारी। II फील्डिंग / निर्माण / हेतु अनुमोदित / जारी। कर्तव्य दी गई दिनांकित एवं आशुधनो को सम्मिलित किया जाए। कृपया आशुधनो को दस्तावेज अनुमोदनाथ प्राप्तुत करें। III दिनांकित सम्मिलित कर पुनः अनुमोदनाथ प्रस्तुत करें। IV सुचनार्थ एवं रिमार्क हेतु। V अनुमोदित नहीं। पावर ग्रिड कॉरपोरेशन ऑफ इंडिया लि० अभियान्तरी (उपमोन्द) गुडगाँव, हरियाणा
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This drawing is the property of L&T Construction, Power Transmission & Distribution and must not be passed on to any person or body not authorised by us to receive it nor be copied or otherwise made use either in full or in part by such person or body without our prior permission in writing.



Sr. No.	Item Type	Description	Make	Qty
1.	BOQ Item	Camera Housing	Sony	0
2.	BOQ Item	Camera Housing	Sony	0
3.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
4.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
5.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
6.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
7.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
8.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
9.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
10.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
11.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
12.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
13.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
14.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
15.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
16.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
17.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
18.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
19.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1
20.	BOQ Item	Video Monitoring Software (VMS)	Milestone/Videometrics	1

Comments: 1) One no camera for site to be considered, location for each shall be as per actual site location at site. 2) Zonal reaches of camera shall be demonstrated at site & if all zones as shown in the Dg. are not covered by these cameras, then M/s L&T shall provide additional cameras to cover all zones w/o additional cost implication to POWERGRID. 3) The design of the system shall be such that, the cameras system shall be able to accommodate for all feeders and equipment for SLD (sub future).

DELCOM TELESYSTEMS PVT. LTD.
A-26, FIEE OKHLA PH-II
NEW DELHI - 110020

CLIENT :	POWER GRID CORPORATION OF INDIA LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)	CONSULTANT :	
PROJECT :	SUBSTATION PACKAGE SSDI FOR (I) ESTABLISHMENT OF NEW 400/220KV TUMKUR POOLING STATION INCLUDING 330KV/66KV AUTO TRANSFORMER AND 11/33KV/66KV BUS REACTOR (II) EXTENSION OF 400KV HIRAYUR SUBSTATION ASSOCIATED WITH TRANS. (III) EXTENSION OF 400KV TUMKUR SUBSTATION. SYSTEM FOR UMSP AT TUMKUR, KARNATAKA. IGA No: CC-CS/701-SR2/SS-3834/3/G6/NOA-I & II/5733 & 5744, DATED: 11.04.16 IGA No: CC-CS/701-SR2/TH-3834/3/G6/NOA-II/5808 & 5809, DATED: 02.06.16		
SUPPLIER / CONTRACTOR :	DELCOM TELESYSTEMS PVT. LTD.		
JOB No. :		TITLE :	400/220KV TUMKUR POOLING STATION VMS LAYOUT PLAN
NAME	SIGN	DATE	
DSGN			
DRWN			
APPD			
CHKD			
APPD			
DRG. No.	DEL-L&T-TUMKUR-VMS-001		
RELEASED FOR	☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☒ APPROVAL ☐ CONSTRUCTION		
CHECKED BY	SIGN	DATE	
ARCHITECTURE			
CIVIL & STRUCTURAL			
PLUMBING & SANITARY			
MECHANICAL			
ELECTRICAL			
INSTRUMENTATION			

SCALE
1:1100
PROJECTION
A1
REV. A