ANNEXURE – A

QUALIFICATION CRITERIA:

The Bidder must satisfy the following Qualification Criteria for Supply, installation & maintenance of CCTV system for a period of 5 years on Financial Lease (Rental and Guarantee) basis.

1) The average financial turnover of the company during the last 3 years, ending 31st of March 2014, should be at least Rs:30 Lakhs and the bidder should submit audited balance sheet and profit & loss account for the last three years (2013-2014,2012-2013 and 2011-2012) duly certified by charted accountant /auditor.

2) Experience of having successfully completed **similar works** during last 7 years ending last day of month previous to the one in which tenders are invited should be either of the following: The bidder has to submit proof of executing similar works.

a) Three similar completed works costing not less than the amount equal to Rs: 40 Lakhs

(Or)

b.) Two similar completed works costing not less than the amount equal to Rs:50 Lakhs

(Or)

c.) One similar completed works costing not less than the amount equal to Rs: 80 Lakhs.

3) The bidder has to submit performance certificate at least from one customer for having successfully completion of the similar works along with technical offer.

Definition of Similar work: SUPPLY, INSTALLATION AND COMMISSIONING OF CCTV NETWORK SYSTEM ON FINANCIAL LEASE(R&G) BASIS or AMC or OUT RIGHT SALES.

4. The bidders to note that possession of provident Fund (PF) code is not a pre-condition for participation in the tender. However, the successful bidder should ensure to get the PF code for the employees engaged for this work.

SCOPE OF WORK

1. Design, supply, Installation, testing, commissioning and operation & Maintenance (for 5 years period) of CCTV surveillance system as per BOM and the technical specifications of the respective equipment on rental guarantee basis.

2. Complete wired/Wireless integration of 36 cameras through Wired/Wireless technology. Complete design, development, installation, commissioning of the networking components involved in the total system, bandwidth calculation, all statuary requirements for setting up the wireless networking is under vendor's scope.

3. Integration of the cameras with the application server and the storage server and proving out the capacity of the storage server for one month continuous recording.

4. All the IP PTZ Speed dome cameras are mounted on the top of GI poles/Towers. Light will be available during night time.

5. All the IP Fixed box type cameras are mounted on the pole or wall of gates with suitable fixtures to monitor vehicle movements and Person movements.

6. Details for Poles for the cameras & towers for CPE and BTS are enclosed. All the related civil works is under vendor's scope.

7. The vendor has to assess the site thoroughly and quote. Soil test has to be taken up by the vendor and the lay-out drawings has to be approved by BHEL.

8. 3-Phase 415V (± 10%), 50 Hz, (± 10%) and Single Phase 230V (± 3%), 50 Hz (± 3%) power for equipment supply will be provided by BHEL at the nearest place for each location mentioned in the annexure-I. Vendor has to distribute the power wherever needed for the devices.

9. Supply and laying of all the Cables on the wall/pole/Tower/ground (Power, Data and Video) will be under the Supplier’s Scope. The cable shall be laid underground at a depth of 0.8metre, in 1.5” diameter HDPE (High density polyethylene) pipe where ever required. Each run of cable shall be run through separate HDPE pipe. Cable route markers shall be used at intervals of 50 meters and at turning points. Underground cable laying involves laying in soft soil, hard soil, road and along cable trenches. Road cutting should be refilled and finished by cementing.

10. Supply and Erecting of GI poles, with surge protection to mount the cameras

11. Supplier should submit the catalogues and technical details for all the items for pre-evaluation.

12. Erection of entire system should be carried out with the guidance of Area Maintenance Executives.

13. Supply and installation of required capacity of UPS (with minimum 3 hrs backup) are under supplier’s scope.

14. Type of Alert and options should be mentioned by the vendor. BHEL requires e-mail alert for video loss and motion detection.
15. The 'Maintenance Manual' to be supplied by the Vendor (3 sets of Hard & Soft copies) shall

16. All relevant software upgrades should be provided during the period of contract at free of cost and source code of all software packages shall be handed over to BHEL for future maintenance.

17. Any other items required/statutory requirements for wireless networking to complete the system in full are under vendor's scope.

18. Freight, handling and packing charges, transit insurance, is in the scope of supplier.

19. Comprehensive maintenance shall include the following :
    a. Replacement of faulty component /equipment during the contract period.
    b. Wages to Maintenance staff employed by the contractor.
    c. Financial Lease (Rental and Guarantee) tax/right to use tax / any other statutory levies including service tax.

20. On-site Comprehensive insurance covering total scope of supply and man power during the currency of the contract.

21. Financial Lease (Rental and Guarantee) contract will commence only after successful testing and commissioning of the entire equipment in all respects to the satisfaction of BHEL Engineers as per the scope of the contract.

22. The entire system shall be supplied, installed and commissioned within 5 (five) months from the date of placement of PO.

23. BHEL reserves the right to retain the cameras, wired and wireless networking components, hardware, software and other items supplied in this procurement at the end of the lease period on payment of Re. 1/- (Rupee one only). On payment of terminal charges, the ownership of entire System including all the equipment, spares & software will get transferred to BHEL without any other payments.

24. The Annual Maintenance Charges subsequent to completion of 5 years Financial Lease (Rental and Guarantee) contract period shall be quoted as a percentage of outright purchase value of each item separately. The scope of AMC after Financial Lease (Rental and Guarantee) contract period shall be comprehensive including spares & Services and shall be applicable for a period of 2 years and will be binding on the Bidder.

25. All equipment supplied and installed at the stipulated locations shall be new and conforming to the contract technical specifications. Relevant test certificates, certificate of newness of equipment and any other statutory documents should be furnished.

26. Uptime of 95% shall be guaranteed for the system on monthly basis. Any down time greater than equal to 2% will result in the reduction of Financial Lease(Rental and Guarantee) contract rentals on Pro rata basis.

27. Bidder should arrange a system for registration, monitoring and redress of all complaints during the contract period.

28. Hardware upgrades during rental contract period shall provide upward compatibility at mutually agreed prices.

29. The Bidder shall submit the proposed plan of execution and the methodology along with bar chart to execute the plan at the time of bid submission.

30. The offers shall be evaluated based on the total Financial Lease (Rental and Guarantee) contract for 5 years for the entire scope of the work.

31. AMC charges quoted after Financial Lease (Rental and Guarantee) period will not be considered for evaluation tender.

32. At least two qualified Engineers (preferably one software cum Networking and one hardware) and two technicians shall be stationed at BHEL site.(Totally Four manpower to be arranged)

33. Maintenance service shall cover services, repairs and replacements necessary to keep the equipment in good working condition during the Financial Lease (Rental and Guarantee) period. However in case of any defect or sabotage or damage due to any reason whatsoever, the same equipment should be rectified/replaced by the vendor within 24 hrs (24x7 manner) of reporting of such incident. Vendor shall maintain sufficient equipment inventory onsite to rectify/replace the damaged/defective/non-functioning equipment. Vendor has to submit the monthly inventory status to BHEL in a prescribed format. Periodic maintenance check should be carried out to keep the equipment in good working conditions. Maintenance will include all components, back up batteries, lens, DSP processors etc.

34. During installation at BHEL, the associated BHEL coordinators shall be guided on the system usage. Exhaustive and detailed maintenance training shall be provided to BHEL personnel to enable BHEL to carry out maintenance after the expiry of the Financial Lease (Rental and Guarantee) period.

35. Camera make preference will be SONY/ HONEYWELL / PELCO/BOSCH / INFINOVA / AXIS / ACTI / PANASONIC and Preferable makes for Switches/Server/Wireless: Cisco / Juniper / HP/Ruggedcom/Allied Telesis

36. Wireless networking components: Cisco /Aruba /Ruckus /Motorola Cambium /HP/MRO-TEK.

37. Vendors are advised to visit the site before quoting for the proposed system.

38. Wherever applicable, proper lightning arrestors, surge protection devices and proper earthing to be provided to ensure the safety of the devices.

39. Vendor shall be responsible for the continuous and smooth operation of the wired, wireless network components, CCTV cameras and related hardware, software of the entire system for the lease rental period.

40. Vendor shall have back up support with Original Equipment Manufacturer (OEM) during contract period for wired , wireless network components , CCTV cameras and related hardware , software of the entire system to ensure availability of spares and services.

41. Vendor shall arrange to have a service facility in BHEL/Ranipet. They have to post their Maintenance engineers during day time. Any failure in this system shall be attended immediately and the system availability shall be more than 95 %.

42. Vendor needs to maintain critical spares for immediate replacement pertaining to this system.

43. Vendor shall have adequate tools and test equipment for regular work shall arrange Movement pass for men and materials to attend work outside the campus of all the installation

44. Daily checking of the status of all the CCTV cameras, Check for Healthiness of Networking, date, time, and the performance status of the entire system should be completed before 8.00 AM.

45. Daily log for monitoring of complaints of all field equipment, software, networking and Immediate action taken for rectification should be maintained.

46. Regular Monthly checking of software of PCs, server system and storage devices to ensure smooth recovery and business continuity in case of system failure.

47. Monthly battery checkup for UPS to ensure backup time.

48. All the cameras should be cleaned every month.

49. Monthly and Quarterly Preventive maintenance schedule shall be given to have a complete checking of all the CCTV System components and Battery backup, Power check, networking, connectivity and Wired/wireless communication systems.

50. 1 Month data have to be maintained for verification.

51. It is the responsibility of the vendor to take back the used batteries every month. It should not be stored in BHEL complex.

52. Backup, operating system of PCs, server, storage device and battery for real time clock shall be checked at least every six month.

53. Weekly Virus checks should be done and it should be cleaned on the PC's, servers and storage devices. Antivirus support should be ensured every month.

SPECIFICATION FOR IP FIXED BOX TYPE BULLET OUTDOOR TYPE IR CAMERA(20 nos)

1.	Image Sensor	:	Progressive scan CMOS
2.	Lens	:	f5.2-62.4mm / F1.8-3.0, DC iris, Auto focus
3.	Zoom Ratio	:	12X Optical
4.	Day and night mode	:	Yes
5.	IR LED	:	Yes, Adaptive IR (Object & Zoom Adaptive IR)
6.	IR Working Distance	:	40m IR
7.	Luminance / light sensitivity (lux)	:	Color: 0.1 lux, B/W: 0 lux (IR LED on) at F1.8
8.	Video compression	:	H.264 (Baseline/ Main/ High profile), MJPEG
9.	Max Video resolution (Pixels)	:	2048 x 1536 (3MP)
10.	Frames per second	:	15/30 (configurable)
11.	Audio	:	2-way (Line-in, Line-out)
12	Wide Dynamic Range	:	WDR (110 dB)
13.	Network	:	IPv4/v6, QoS
14.	Power	:	Through PoE port
15.	Local Storage	:	MicroSDHC/MicroSDXC memory card slot
16.	SD Card	:	1 no of 32 GB SD card per Camera
17.	Other Features	:	RJ-45 Network Connector
18.	Approvals	:	CE, FCC, IP67, NEMA 4X, IK10
19.	Operating Temperature	:	0°C to 50°C
20.	Humidity	:	up to 70 %
21.	Video Recording	:	Day and night for all days
22.	Mounting	:	as specified in location list.
23.	Other standard features	:	As per OEM standards.

SPECIFICATION FOR IP PTZ HIGH SPEED OUT DOOR DOME CAMERA (16 nos)

1.	Image sensor	**:** Progressive Scan CMOS or Ex View HAD Progressive scan CCD ¼"
2.	Lens	**:** Varifocal. f4.3-129mm / F1.6-5.0, DC iris, Auto focus,
3.	Zoom Ratio	: 30x optical, 16x digital
4.	Day and night mode	**:** Yes
5.	Mechanical IR Cut Filter	: Yes
6.	luminance /light sensitivity (lux)	**:** Color: 0.1 lux, B/W: 0.05 lux at F1.6
7.	Video compression	**:** H.264 (Baseline/ Main/ High profile), MJPEG
8.	Maximum Frame Rate vs. Resolution	: 30 fps at 1920 x 1080 30 fps at 1280 x 720 30 fps at 800 x 600 30 fps at 640 x 480 15 fps at 320 x 240
9.	Frames per second(50/60Hz)	**:** Min.25/30 (Extended D1)
10.	Multi-Streaming	: Dual streams
11.	Wide Dynamic Range	: WDR (145 dB)
12.	Digital Noise Reduction	: 2D+3D DNR
13.	Defogging	: Defogging
14.	S/N Ratio	: 56 dB
15.	Pan /Tilt	**:**,Pan 360°endless, tilt 220° (presettable),
16.	Intelligent video	**:** Motion detection, Auto tracking
17.	Heater and Fan	**:** Yes
18.	Network	**:** IPv4/v6,QoS
19.	Power	**:** AC 24V; High PoE
20.	Local Storage	**:** MicroSDHC/MicroSDXC memory card slot
21.	Other Features	**:** Continuous motion 24/7, RJ-45 Network Connector Visca, Pelco-D, Pelco-P for PTZ protocol
22.	Approvals	**:** CE, FCC, IP66, IK09, NEMA 4X
23.	Other standard features	: As per OEM standards.

High end application Server(1no)

1. The client Work Station shall have the necessary hardware and software to integrate all the cameras of CCTV system with all required features and view real time pictures from all cameras at a time.

2. **Technical Specification For Client High end work station for Client application :** VNMS-Client shall operate with no performance degradation using the following minimum hardware and operating system configuration:

1. PROCESSOR	**:** INTEL XEON E3-1225v2 3.2 8M GT2 4C CPU OR HIGHER END
2. RAM	**:** 4GB –DDR 3-1600 ECC (2x2GB)
3. Hard Disc Drive	**:** 500GB, 7200 RPM SATA
4. Optical Drive	**:** SATA Super multi DVD RW or equivalent
5. OS	**:** Windows 8 professional 64 or WIN 7 pro 64
6. Graphics card	**:** NVIDIA Quadro K600 (1GB X 2) with HDMI out port
7. Input devices	**:** Wireless Keyboard and wireless optical mouse
8. Networking	**:** Network interface should beIntegrated Intel 82579LM.
9. Ports	**:** The following min.ports facility should be available 4 USB 3.0; 6 USB 2.0; 1 serial; 1 microphone; 1 headphone; 1 audio line in; 1 audio Line out; 1 RJ-45; 2 PS/2 Including 1 VGA and 1 Display Port output From Intel HD graphics,,
10.Other standard features:	: As per OEM standards.

1. The application High end work station for Core CCTV software application (1no)contains a Network Video Data management centre which includes user management, facility management system logs etc. and event & control service which receives and controls events and commands of various formats via different communication modes and shall able to support either 36 or more cameras. However the system should be capable to expand virtually up to unlimited number of cameras by incorporating multiple High end work station for Core CCTV software applications to make a complete Video Management System. The application High end work station for Core CCTV software applications shall be used for BHEL and each High end work station for Core CCTV software application shall be capable to handle 36 or more channel data. Clustering of application High end work station for Core CCTV software application shall be done for redundancy.

TECHNICAL SPECIFICATION FOR CLIENT WORK STATION (4 nos)

1.	PROCESSOR	**:** Intel Xeon E5-1607 3.00Ghz 10MB 1066 4C CPU.
2.	RAM	**:** 8GB DDR3-1600 ECC (4x2GB) RAM.
3.	Hard DISK Drive	**:** 1TB 7200 RPM SATA 1st Hard Drive.
4.	Optical Drive	**:** 16X Super Multi DVDRW SATA .
5.	OS	**:** Windows 8 Professional 64
6.	Graphics	**:** NVIDIA Quadro K2000 2GB .
7.	Audio	**:** Integrated High Definition Realtek ALC262 Audio.
8.	Expansion slots	**:** 2 PCIe Gen3 x16; 1 PCIe Gen3 x8; 1 PCIe Gen2 x8 (x4); 1 PCIe Gen2 x4 (x1); 1 PCI; 114-in-1 media card reader (optional).
9.	Input devices	**:** Wireless Keyboard and wireless optical mouse.
10.	Networking	**:** Network interface should be Integrated Intel 82579LAN.
11.	Ports	**:** The following min. ports facility should be available 4 USB 3.0; 5 USB 2.
12.	Storage Management	**:** Hot swappable Module, Easy for cluster expansion, Multi-tiered.
13.	Power Input	**:** 100 ~ 280 VAC.
14.	Other standard features:	: As per OEM standards.

NAS Server Technical Specification(1no)

1. CPU	:	Quad Core Intel® Xeon® E3-1225 v2 Processor 3.2 GHz
2. Memory	:	System memory: 4 GB DDR3 ECC RAM; 4 GB x1.
3. Total memory slots	:	4 X8GB with pre-installed 1X4 GB.
4. Flash Memory	:	512MB DOM.
5. Hard Drive	:	16 x 3.5" or 2.5" SATA 6Gb/s, SATA 3Gb/s hard drive or SSD.
6. Hard Drive Tray	:	16 x hot-swappable and lockable tray.
7. LAN Port	:	4 x Gigabit RJ-45 Ethernet port.
8. USB	:	2x USB 3.0 port (rear) 4x USB 2.0 port (rear) Support USB printer, pen drive, USB hub, and USB UPS etc.
9. e SATA	:	2 (rear).
10. Alarm Buzzer	:	System warning.
11. Form Factor	:	3U, Rack mount.
12. VGA	:	Reserved for maintenance.
13. HDMI	:	Reserved for maintenance.
14. Humidity	:	80% non-condensing

BACKUP Device:

Tape: The Backup device should come with LT 05 Ultrium drive with 5nos of 1.6TB Tape and necessary backup software to be provided to connect with server and Cleaning cartridges' -2 sets to be provided.

HDD BACK UP: Supply of backup HDD 20 nos of video HD / SATA, 4 TB capacities has to be Configured as per BHEL RAID requirement.

Point to Multipoint(PTM) RF equipmentTechnical Specification (BASE STATION – 04 NO)

01 Type	:	5.8 GHZ OFDM AP with 90 degree sectoral coverage and counting fixtures.
02 CHANNEL SPACING	:	Configurable on 5 MHz increments.
03 FREQUENCY RANGE	:	5725 - 5875 MHz.
04 CHANNEL WIDTH	:	20 Mhz or 40 Mhz.
05 PHYSICAL LAYER	:	2x2 MIMO OFDM.
06 ETHERNET INTERFACE	:	10/100/1000 BaseT, auto negotiated (802.3af compliant).
07 PROTOCOLS USED	:	IPv4, UDP, TCP, IP, ICMP, SNMPv2c, HTTP, FTP.
08 NETWORK MANAGEMENT	:	HTTPs, FTP, SNMP v2c, SSH.
09 VLAN	:	802.1Q with 802.1p priority.
10 SUBSCRIBERS PER SECTOR	:	Up to 120.
11 ARQ	:	Yes.
12 MAXIMUM DEPLOYMENT RANGE	:	Up to 20 miles.
13 MODULATION LEVELS (ADAPTIVE):		QPSK 1/2, 64-QAM 5/6.
14 GPS SYNCHRONIZATION	:	Yes.
15 ANTENNA BEAM WIDTH	:	90° sector.
16 TRANSMIT POWER OFDM	:	-20 to +23 Dbm (1 dB interval).
17 ANTENNA GAIN	:	17 dBi.
18 ANTENNA CONNECTION	:	50 ohm, Reverse Polority SMA.

POINT TO POINT TRANSMITTER Technical Specification – 13 NO

1.	CHANNEL SPACING	:	Configurable on 5 MHz increments.
2.	FREQUENCY RANGE	:	5725 MHz - 5875 MHz.
3.	CHANNEL WIDTH	:	20 MHz or 40 MHz.
4.	PHYSICAL LAYER	:	2x2 MIMO OFDM.
5.	ETHERNET INTERFACE	:	10/100BaseT, half/full duplex, rate auto negotiated.
6.	PROTOCOLS USED	:	IPv4, UDP, TCP, IP, ICMP, SNMPv2c, HTTP, FTP.
7.	NETWORK MANAGEMENT	:	HTTPs, FTP, SNMP v2c.
8.	VLAN	:	802.1Q with 802.1p priority.
9.	ARQ	:	Required.
10.	MODULATION LEVELS (ADAPTIVE)	:	QPSK 1/2, 64-QAM 5/6.
11.	MAXIMUM DEPLOYMENT RANGE	:	Up to 20 miles.
12.	GPS SYNCHRONIZATION	:	Required.
13.	ANTENNA BEAM WIDTH	:	24° azimuth, 12° elevation.
14.	TRANSMIT POWER region) (1 dB interval).	:	-20 to +23 dBm maximum (combined, to EIRP limit by
15.	ANTENNA GAIN	:	15 dBi H+V, integrated patch.
16.	ANTENNA CONNECTION	:	Integrated patch antenna.
17.	ENVIRONMENTAL	:	IP54.

POE (POWER OVER EATHERNET)SWITCH TECHNICAL SPECIFICATION

(POE PLUS -16NO & POE -20NO)

1.Port	:	Shall have the following min. specifications 8 RJ-45 auto-negotiating 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE, IEEE 802.3at) 1 SFP 1000 Mbps port, and should be Support maximum of 8 autosensing 10/100/1000 ports plus 1 1000BASE-X SFP ports, or a combination
2. Memory and processor	:	Shall have the following specification min. ARM @333 MHz, 128 MB flash, 128 MB RAM; packet buffer size: 512 KB
3. Environment	:	Shall Operating temperature, 32°F to 113°F (0°C to 45°C), and Operating relative humidity shall be 10% to 90%, noncondensing, Nonoperation Storage Temperature, -40°F to 158°F (-40°C to 70°C) Non-operating/Storage relative humidity, 10% to 95%, noncondensing
4. Operating power	:	Shall be Voltage100-240 VAC, Frequency 50/60Hz
5. Safety		Should follow the following standards UL 60950; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1-03
6. Management	:	Should be IMC - Intelligent Management Centre; limited command-line interface; Web browser; SNMP Manager; IEEE 802.3 Ethernet MIB
7. Ports	:	SFP port and copper ports should work Simultaneously and should independent of each Other to give a total of 9 Gigabit-capable ports.

Technical Specifications for Media converter(32NO)

01. Should be Single channel stand-alone media converter

02. Media Conversion from 1000BASE-T to 1000BASE-X

03. Auto MDI-I/MDI-X copper Ethernet port

04. RJ-45 connector for 1000BASE-T port

05. SC connector for 1000BASE-X port

06. Link & Activity, FEF, LFP LED indications

07. Far End Fault indication for both remote side fibre and copper

08. Link Fault Pass-through from copper to fiber and vice versa

09. Supports multi-mode or single mode fiber

10. Internal auto-ranging AC or DC power supply

11. Configuration using DIP Switches

12. Standards Compliance:		IEEE 802.3ab, 1000BASE-T, 100BASE-X
13.1000BASE-T port	:	Shielded RJ-45, Half/Full Duplex support, Auto MDI-I / MDI-X
14.1000BASE-X port		SC Connector, LED Indicators: PWR (green): Power status,LNK (green): Link Status for Ethernet ports, ACT (green):Activity status for Ethernet ports, LFP (green):Link Fault Propagation Indication for Ethernet ports, FEF (yellow): Far End Fault Indication for Ethernet ports
15. Dip Switch		SW1: Link Fault Enable/Disable, SW2-SW4: Reserved
16. Power		100 to 250VAC
17. Operating Temperature		0°– 50°C / 32°– 122°F
18. Humidity		10% to 90%, non-condensing

SOFTWARE SPECIFICATIONS & FEATURES

1. The licensed Network Video management software with Video Analytics and the required client software for servers and work stations should be supplied with its product key. The software should support & compatible of multi branded cameras for viewing, recording, controlling and analyzing the entire IP based wireless CCTV system. Also the software should support future versions of Windows Operating Systems. Internet option should be provided for future requirements. The necessary antivirus packages for all the hardware are under the scope of the vendor. The anti-virus package should support for 5 years.

2. The software shall be capable to integrate/operate all the Servers, 36 cameras and the entire IP based wireless CCTV system.

3. SOFTWARE FEATURES: Vendor has to specify the features Video analytic of available in the Video analytic software with trigger an alert .The following Video analytic are preferred.

    i. Missing object detection

    ii. Left object detection

    iii. Virtual fence detection

    iv. Secure zone detection

    v. Behavioral analysis like detection on fall, running , loitering etc.

    vi. Trailing of intruder detection.

4. The NVMS client shall consist of administrator Tool application, a monitoring application, an Archive player application, a web monitoring access, a web Archive player access and a mobile monitor application.

5. The NVMS client shall perform the following applications simultaneously without interfering with any of the application and storage servers operations.

    i. Live display of cameras
    ii. Live display of camera sequences
    iii. Control of PTZ cameras
    iv. Playback of archived video
    v. Retrieval of archived video
    vi. Instant replay of live video
    vii. Use of replay of live video
    viii. Use of graphical controls (maps)
    ix. Use of procedures (macros)
    x. Configuration of system setting.

NVMS client monitor application (For Client application)

1) The client monitor application shall allow for live monitoring of video.
2) The monitor shall enable view of 1 to 16 video tiles simultaneously on a single SVGA/VGA (monitor at 25fps per camera.).
3) The NVMS monitor application shall allow operators to view an instant replay of any camera.
4) The operator shall be able to define the amount of time he wishes to go back from a predefine list or through a custom setup period.
5) The operator shall be able to control the playback with play, pause, forward, and speed buttons.
6) The NVMS monitor application shall allow operators to add bookmarks or to switch their instant replay view into the Archive player application, for advanced operations, by clicking on a single button in the instant replay tab.
7) The operator shall be able to choose and trigger an action from a list of available actions included but are not limited to:
   i. View camera in a video file ii. Starting/ stopping PTZ pre-set pattern
   iii. Sending alert messages & E-mails.
8) The VNMS monitor application shall provide management and control over the system using a standard PC mouse, keyboard and Suitable joystick to be provided for each client, as necessary.
9) The VNMS monitor application shall support Graphical site representation (maps) functionality, where digital maps are used to represent the physical location of cameras and other devices.

Network and Video Management System (NVMS)

1. SCALABILITY & REDUNANCY: The System shall be scalable to enterprise level system so that increase in the number of cameras; number of servers & number of Clients to the network shall not affect the currently running system operations & functionality and this procedure does not require any system down time. The server components of the system shall be fully redundant with no single point of failure. The system shall be able to perform an automatic switch over to a backup server if the primary server fails.

2. Open Standard Support: VNMS Software shall be ONVIF compliant so that it can integrate with multiple digital IP cameras, multiple digital and network video recording devices, multiple video matrix switchers and matrix keyboards.

3. The NVMS software should be capable to display & manage the entire surveillance system. It should be capable to support ONVIF compliant devices such as multi branded cameras, media-convertor, PTZ controller, storage and backup devices etc. The Network management software should be capable to display & manage the entire network system. It should support SNMP compliant devices such as switches, routers, wireless access points, modems etc.

4. Network video recording and Network video management system with video analytic software shall support 36-network camera & should be expandable to minimum up to 75 cameras in future if required.

5. Network video recording and Network video management system shall support time stamped comment during recording monitoring and these comments shall be linked with camera for easy logging. It shall support recording of H.264, MPEG-4, and JPEG (selectable).

6. The NVMS software shall support dual streaming function (User selectable)

7. The NVMS software shall provide Mail Setting tab for SMTP setting and Alarm Mail Default Setting and shall preferably be able to send Email/SMS notification with image data as a attachment on one or more than one email address when alarm occurs.

8. NVMS software shall support application programming interface for further customized application development.

9. NVMS software shall support customized viewing layouts to create customized site layout all allow to insert backgrounds, icons and logos.

10. NVMS software shall support customized logging reports.

11. NVMS software shall support multiple user accounts with various security privileges/ access such as access to only specific camera groups

12. NVMS software shall support dynamic masking function to prevent to viewing on prohibited or unwanted area.

13. Network video management system shall support play/back during recording without any interruption.

14. Network video management system shall support AVI file export function. NVMS software shall support automatic layout function to automatic switch between multiple network cameras. It shall operate on open architecture.

15. The NVMS software should have in-built facility to store configuration of cameras.

16. The software should support spilt screen display mode, scroll mode on the work station monitor and LED monitor as per our requirement.

17. Network video management system shall able to control all cameras ie.mouse controllable PTZ controls, presets, Selection of Video tour, Iris control auto/manual focus, color balance of camera & also having capacity for recording, pre alarm/ alarm etc.

18. The NVMS software should be able to display camera current status and relevant information including camera name, time/date, network status, recording, storage, video loss and event and fault alarm status.

19. The software shall provide the display viewer with capability to display the camera name, record status, sub-camera frame, date, time stamp, time slider interface and alarm blinking frame indication on the display viewer. It also provide optional color setting for selected name and time stamp on the display viewer

20. The Network video management system should generate reports of stored device configuration, to provide alarm & alarm log and take regular backup.

21. The NVMS software should have user access authority configurable on par device or per device group basis.

22. It should have facility to request the access of any camera and also control the camera for a specific period.

23. The administrator only should be able to add, edit & delete user with rights. 2 level security protections should be provided to add/modify/delete the videos. Reset provision for the 2 level security passwords should be provided.

24. Users should be possible to view the cameras and control them as per the permission assigned by the administrator.

25. It should have recording modes for continuous, manual or programmed on dates, time and camera wise.

26. It should provide on screen controls for remote operation of all cameras, it should have the facility for scheduled recording.

27. Programmable recording for motion detection to be provided.

28. System must be able to support video motion detection algorithms to detect and track object.

29. The software shall provide specific alarm mode display with relevant alarm function included. It includes alarm event list, alarm video play, alarm event searching function, missing object and foreign object function. The permission of alarm setting including alarm acknowledges and alarm search should be provided.

30. The missing object search function and foreign object search function shall provide optional relevant parameter including object area define frame, camera selection, video sampling interval, consecutive time hits. It shall provide start /stop searching and stop when found function. When the search is complete, the search results are shown in the list or video clip and available to drag to spooler area for video export

31. The software shall support synchronized audio/voice received by microphone during the real-time video display. It shall provide audio on/off option on the display window for user to select according to individual need.

32. Network video management system software shall provide system self-diagnostic mechanism and provide the hard disk and relevant hardware status information including CPU operating temperature, fan speed, hard disk operating temperature and power supply information.

33. The software shall provide multiple and flexible recording mode. The user is able to set the full time schedule recording or event trigger recording.

34. The CCTV Network video management system application software should allow retrieval of data instantaneously at any date/time interval chosen through search functionality of the application software. The data's should be automatically overwritten once the data storage for 30 days is over.

35. Preferable makes for Switches/Server/Wireless: Cisco / Juniper / HP/Ruggedcom/Allied Telesis
Wireless networking components: Cisco / Aruba / Ruckus /Motorola Cambium/HP.

UPS

1. **UPS**: Minimum 3 hours backup for the connecting loads. Vendor to specify design calculation along with connected load to meet the power requirement of the system. **The UPS units at all**
2. **the locations shall be the part of bidder's scope.**

3. Power input: 230 V AC/50 Hz. Vendor to specify for locations of UPS, capacity, numbers, Housing etc.

   230 V Single Phase Ac power supply up to UPS point is BHEL scope.

4. All the cameras should have a power backup of 3 hours.

5. Vendor to provide the UPS for the Servers, Storage device & Client workstations. Vendor to specify the capacity.

CABLE ,CONDUITS & ACCESSORIES

1. OFC single mode outdoor cable for long distance and PVCSTP CAT – 6 cable to provide for short distance (wherever required). Vendor to specify for Model, make, size, single core/Multi core, suitable conduit, accessories for wiring at the underground, wall & Post

2. Multicore fibre optic cable, suitable for outdoor deployment in Ethernet (up to 10Gbps) data network. The fibres shall be in a central tube filled with water-blocking compound and with standard colour code index. The cable shall have steel armour to provide rodent and lightning protection. The outer sheath shall be water-resistant, UV-resistant and Fungus-resistant and shall provide maximum environmental protection. The cable shall conform to TIA / EIA-568B standard. The minimum bending radius of the cable shall be 20 x cable diameter under load.

3. Power Cable (Copper Flexible): Vendor has to specify type required size & length for whole

   system

4. Single line diagram of proposed system : Vendor to provide

5. Cabling between cameras to Control: Supplier has to measure the cabling length that is required and quote.

General System Overview

a. All cameras should be of same make. All the networking components involved should be of same make.

b. System should operate in both Day & Night in Auto and manual mode. Recording and viewing should be done simultaneously

c. In case of power failure, system in central monitoring station and control room should work on its power backup mode for minimum 3 Hrs.

d. All equipment should be capable of operation for 24 X 7 hours unmonitored surveillance recording with remote viewing and control

e. Video records search function by camera, date, event type and time segments including advanced motion search, missing and left object search etc. shall be provided.

f. Backup facility shall be provided for video recordings and snapshots (stills), manually or by schedule directly to CD/DVD. It should be able to export the selected images and videos to external storage device according to user needs.

g. The system shall have joystick, keyboard and mouse to operate monitor selection, viewer selection; IP camera video stream selection, stored display pattern selection, start/stop tour, video playback, manual recording, PTZ camera PTZ function control and PTZ save and recall functions.

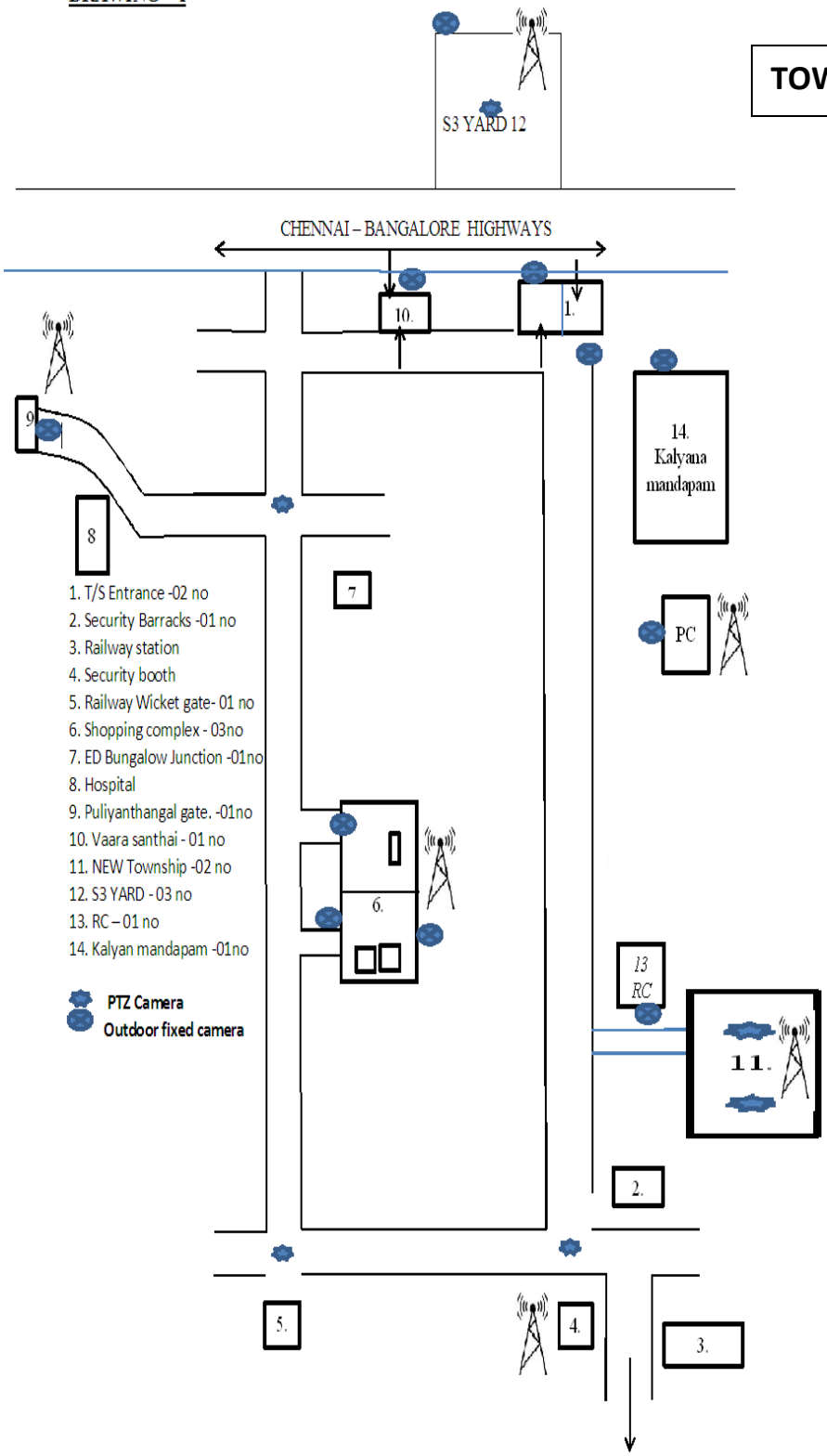
h. The system should provide network health monitor with alarm for any link failure, camera fault, light fault, extra delay, delay loss, power loss signal loss etc. It shall facilitate on screen display to log ath day, date and time.

BILL OF MATERIALS

Sl no.	Item Description	Unit	Item Qty
1	Fixed outdoor IR bullet IP camera with accessories as per the specification enclosed	No	20
2	Hi-speed Out door PTZ IP dome day/night camera with accessories as per the specification enclosed	No	16
3	Point to multipoint base wireless Radio station at control room end as per the specification enclosed	Set	4
4	Point to point base wireless station Configurable on 5 MHz increments - At camera end as per the specification enclosed	No	13
5	Application & display server as per the specification enclosed	No	1
6	Network attached Storage(NAS) serveras per the specification enclosed	No	1
7	Client work station with 22" LED monitor as per the specification enclosed	No	4
8	Video management and analytics software as per the specification enclosed	No	1
9	46" LED video display unit (Samsong MD46B or Equv)	No	4
10	4 TB smart video HDD storage device with accessories as per the specification enclosed	No	20
11	UPS with suitable capacity batteries(min 3 hrs back-up) for powering the cameras as per the specification enclosed	No	36
12	Suitable capacity online UPS with batteries(min 1 hr.back-up) for control room equipment(NAS server, monitors, application server).	No	1
13	GI poles of different sizes as per the drawing Sl.No: III to V enclosed.	No	25
14	Tower structure of different sizes with proper surge protection as per the drawing Sl.No: VI to XI enclosed	No	14
15	CAT-6 cables as per the specification enclosed	Mtr	2000
16	Fibre optic cables as per the specification enclosed	Mtr	5000
17	Patch cables	Lot	1 lot
18	Required PVC pipes (HDPE pipe)with accessories	Mtr	4000
19	Network active and passive material with required accessories for camera end and control room.(Including POE-20 nos, POE + -16nos switches and Media converter-32nos as per the specification enclosed)	Lot	1 lot
20	All Trenching & Civil works	Lot	1 lot
21	Other related required accessories	Lot	1 lot

DRAWING - I

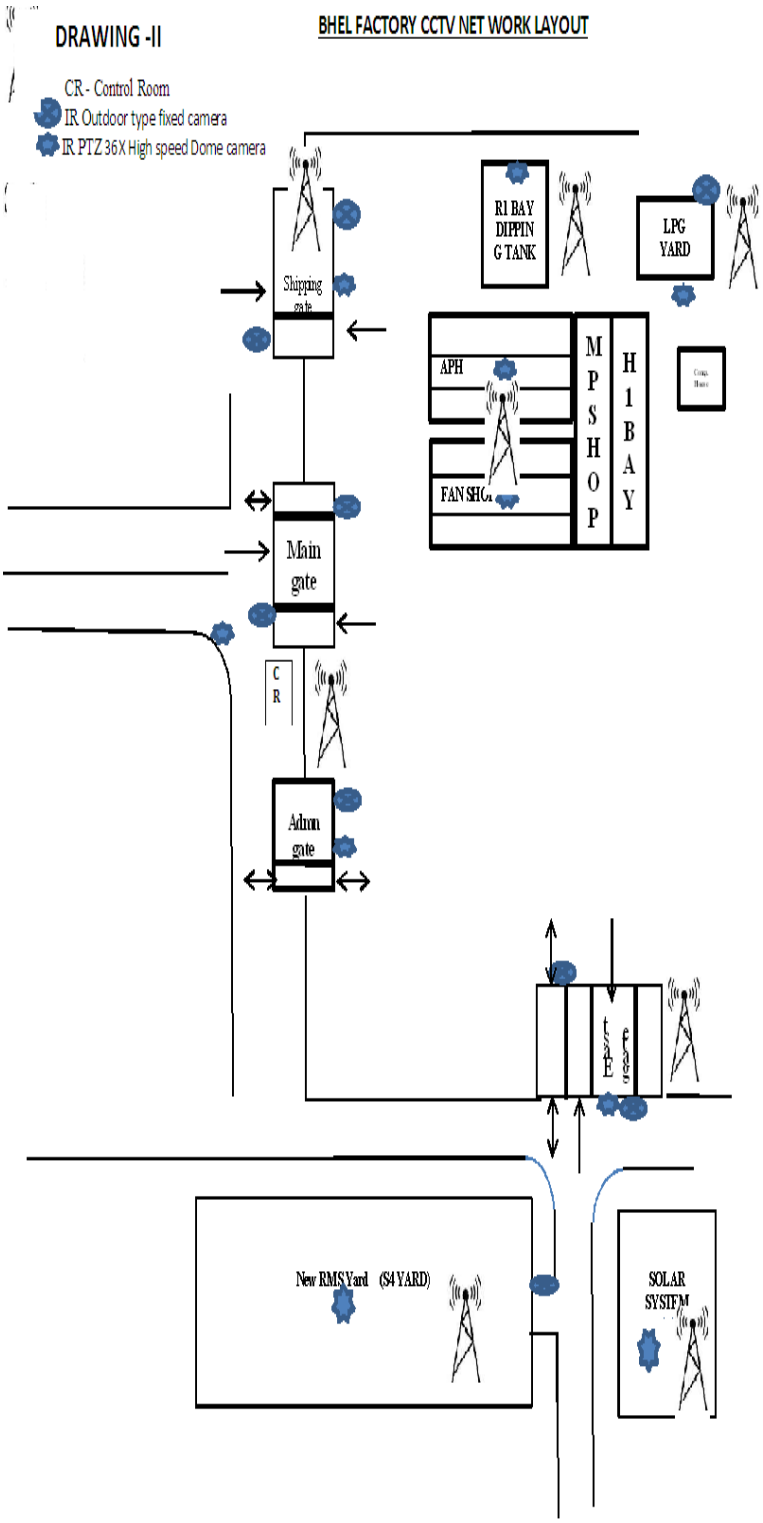
TOWNSHIP LOCATION LAYOUT



DRAWING -II

BHEL FACTORY CCTV NET WORK LAYOUT

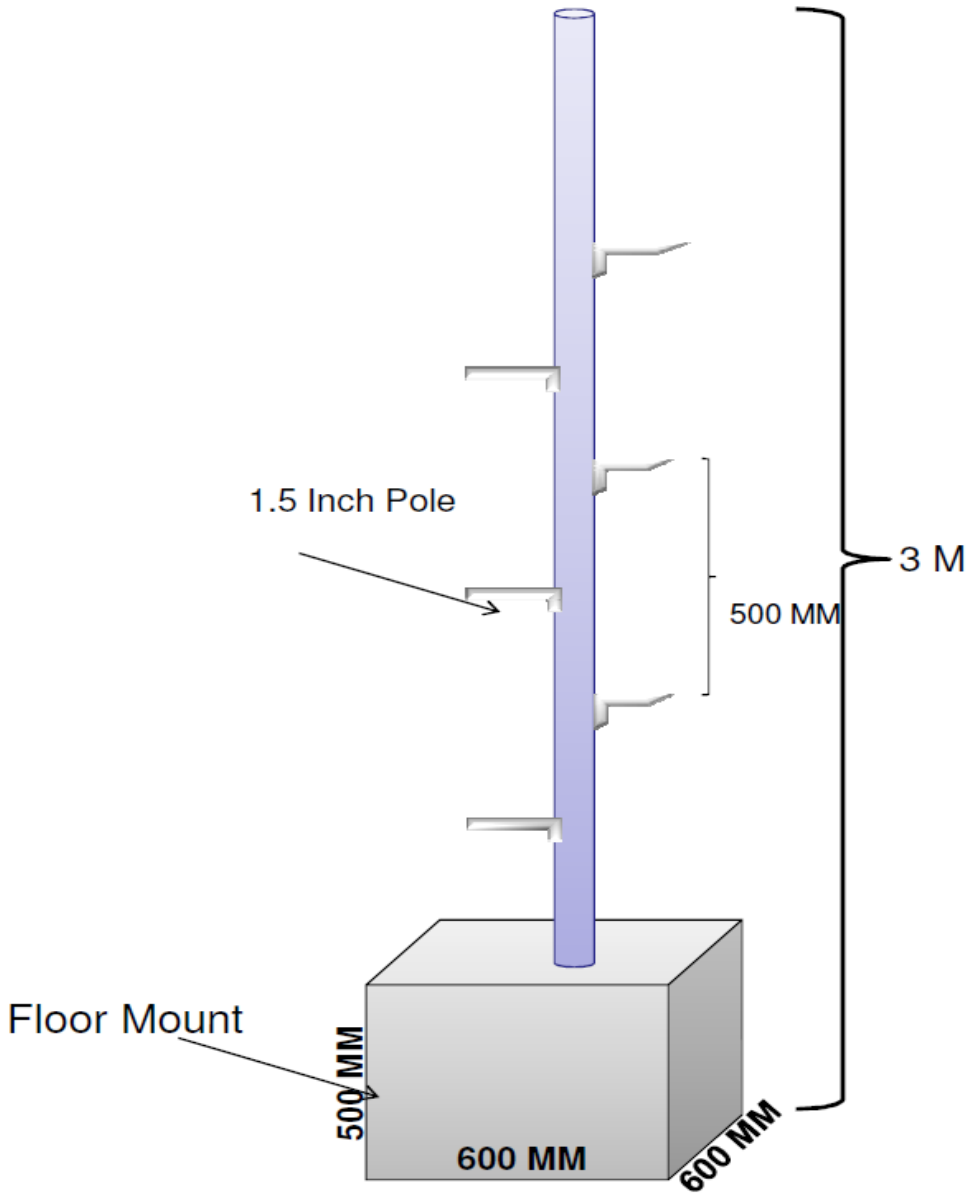
CR - Control Room
IR Outdoor type fixed camera
IR PTZ 36X High speed Dome camera



FACTORY LOCATION LAYOUT

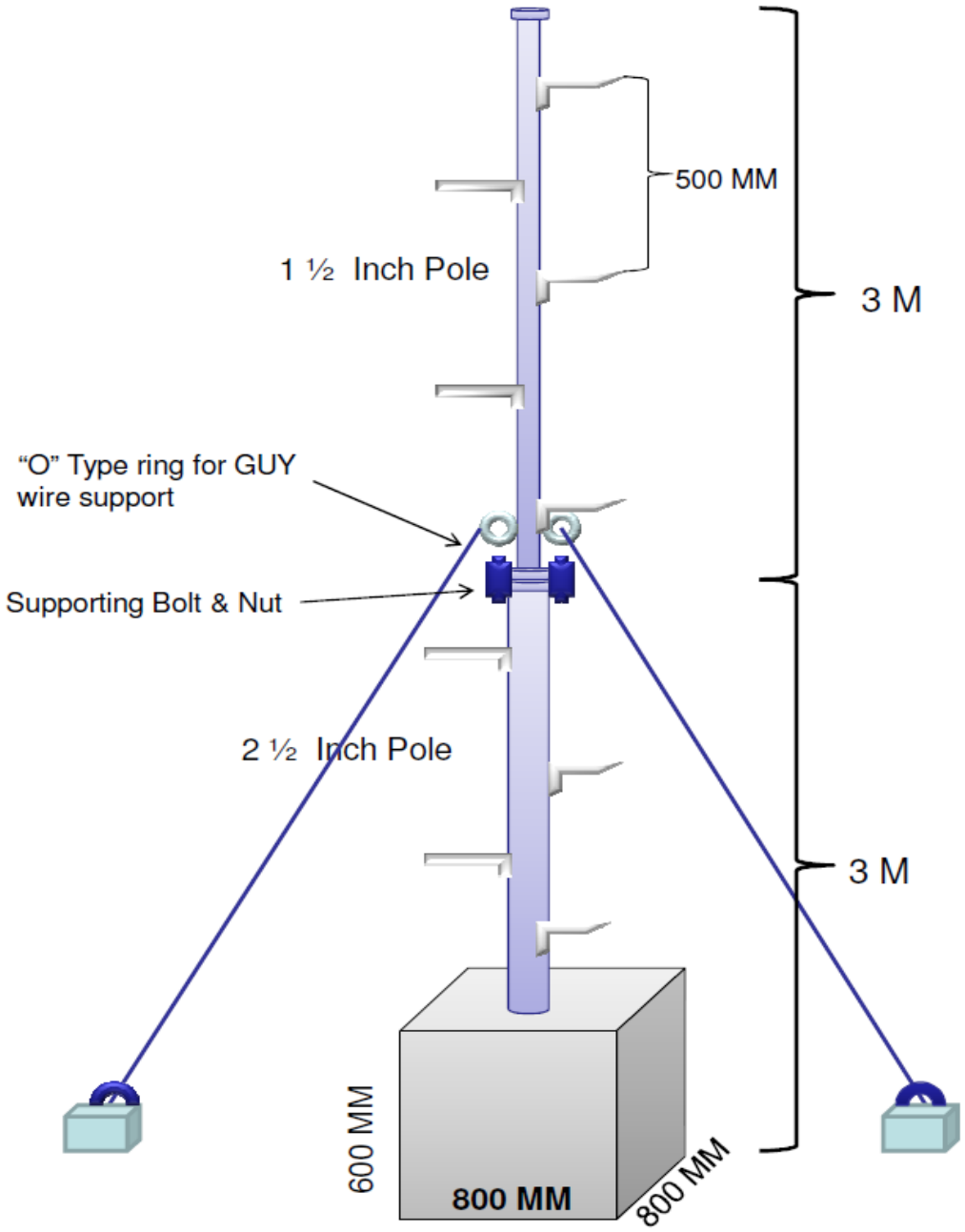
BHEL BAP RANIPET M&S

DRAWING – III : 3 M POLE DESIGN:



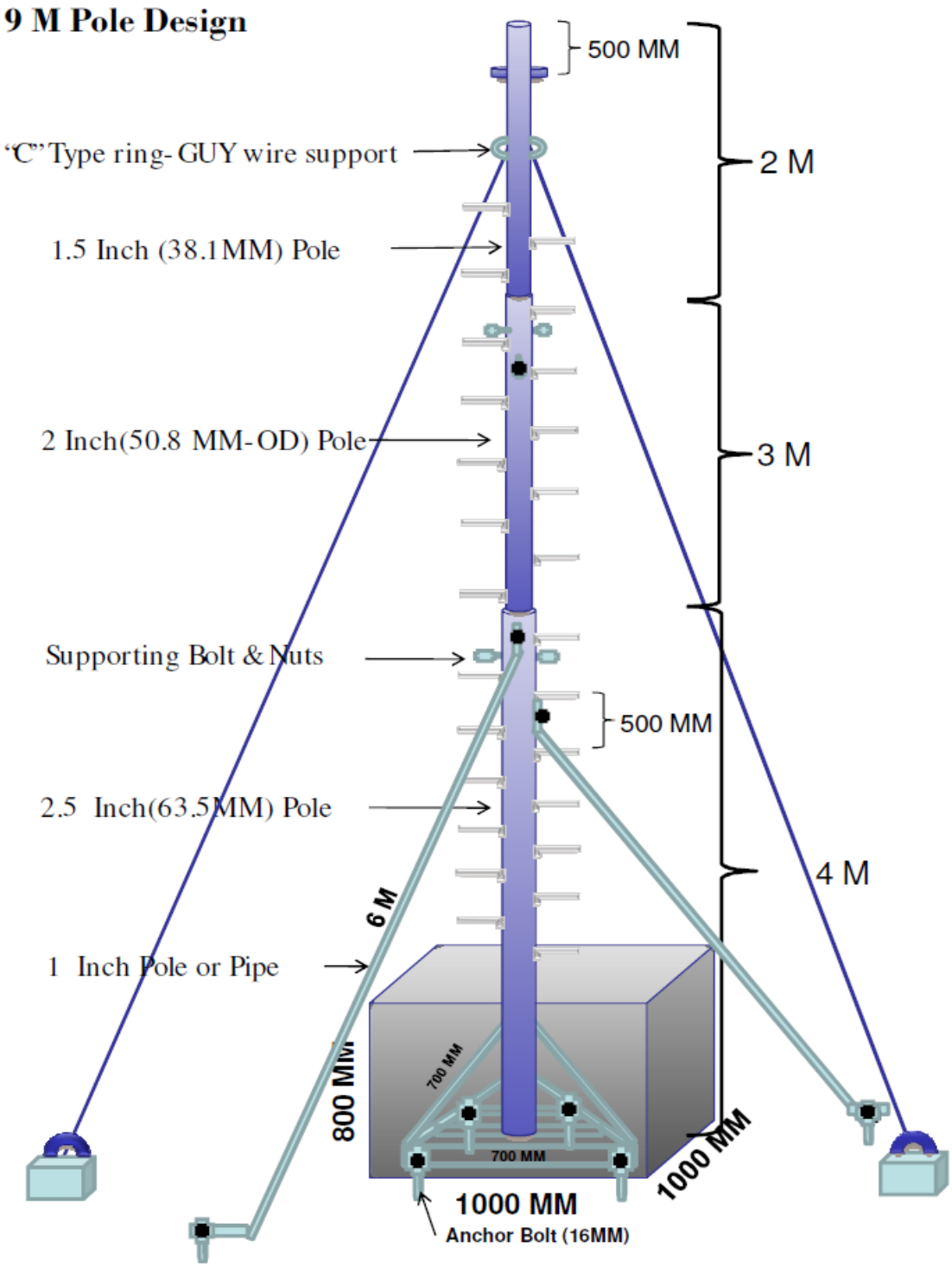
BHEL BAP RANIPET M&S

DRAWING – IV : 6 M POLE DESIGN:



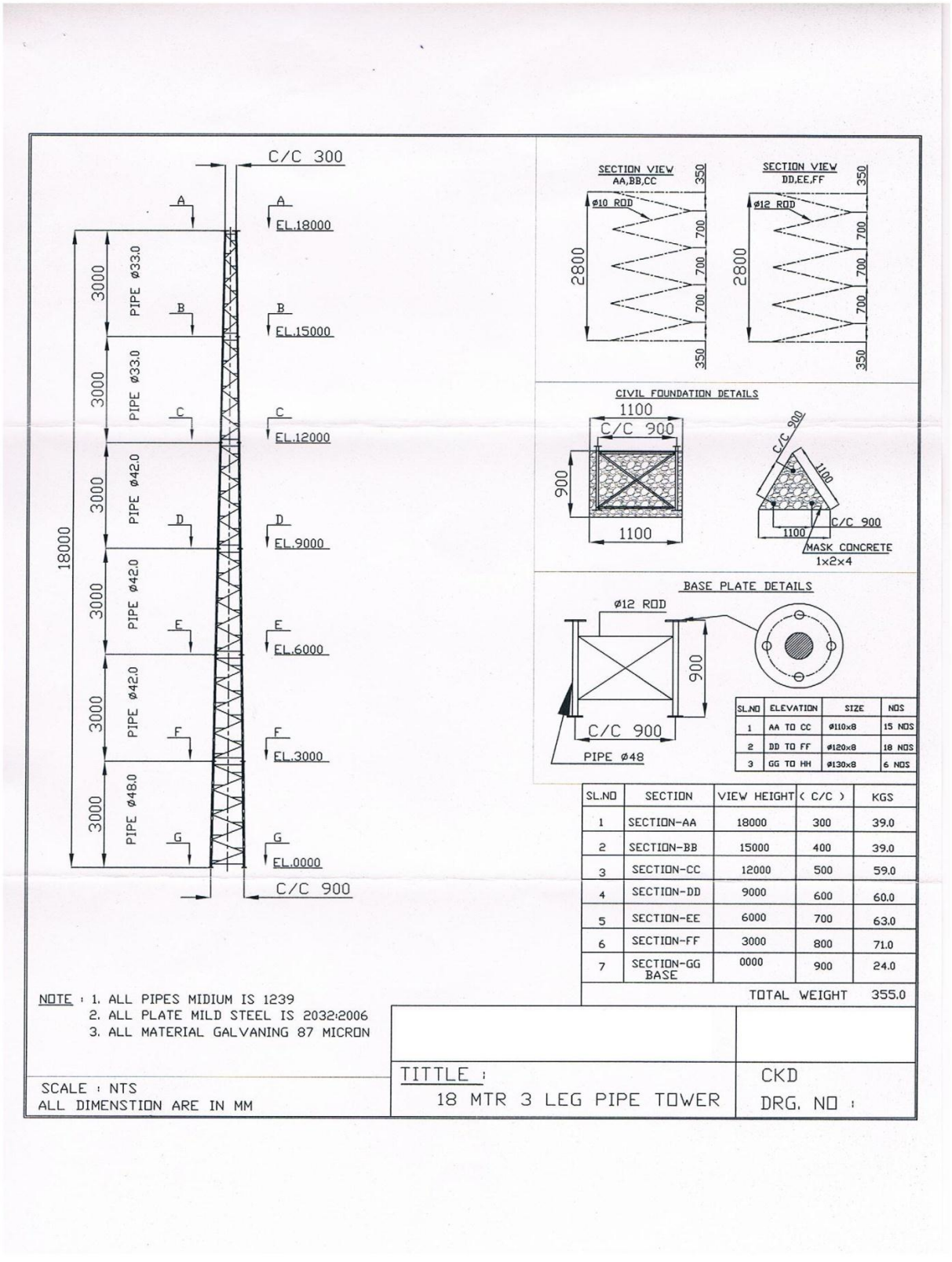
BHEL BAP RANIPET M&S

DRAWING: V **9 M POLE DESIGN**



BHEL BAP RANIPET M&S

DRAWING : VI **18 M 3 LEG PIPE TOWER**



SL.NO	ELEVATION	SIZE	NOS
1	AA TO CC	ø110x8	15 NOS
2	DD TO FF	ø120x8	18 NOS
3	GG TO HH	ø130x8	6 NOS

SL.NO	SECTION	VIEW HEIGHT	(C/C)	KGS
1	SECTION-AA	18000	300	39.0
2	SECTION-BB	15000	400	39.0
3	SECTION-CC	12000	500	59.0
4	SECTION-DD	9000	600	60.0
5	SECTION-EE	6000	700	63.0
6	SECTION-FF	3000	800	71.0
7	SECTION-GG BASE	0000	900	24.0
			TOTAL WEIGHT	355.0

NOTE : 1. ALL PIPES MIDIUM IS 1239
2. ALL PLATE MILD STEEL IS 2032:2006
3. ALL MATERIAL GALVANING 87 MICRON

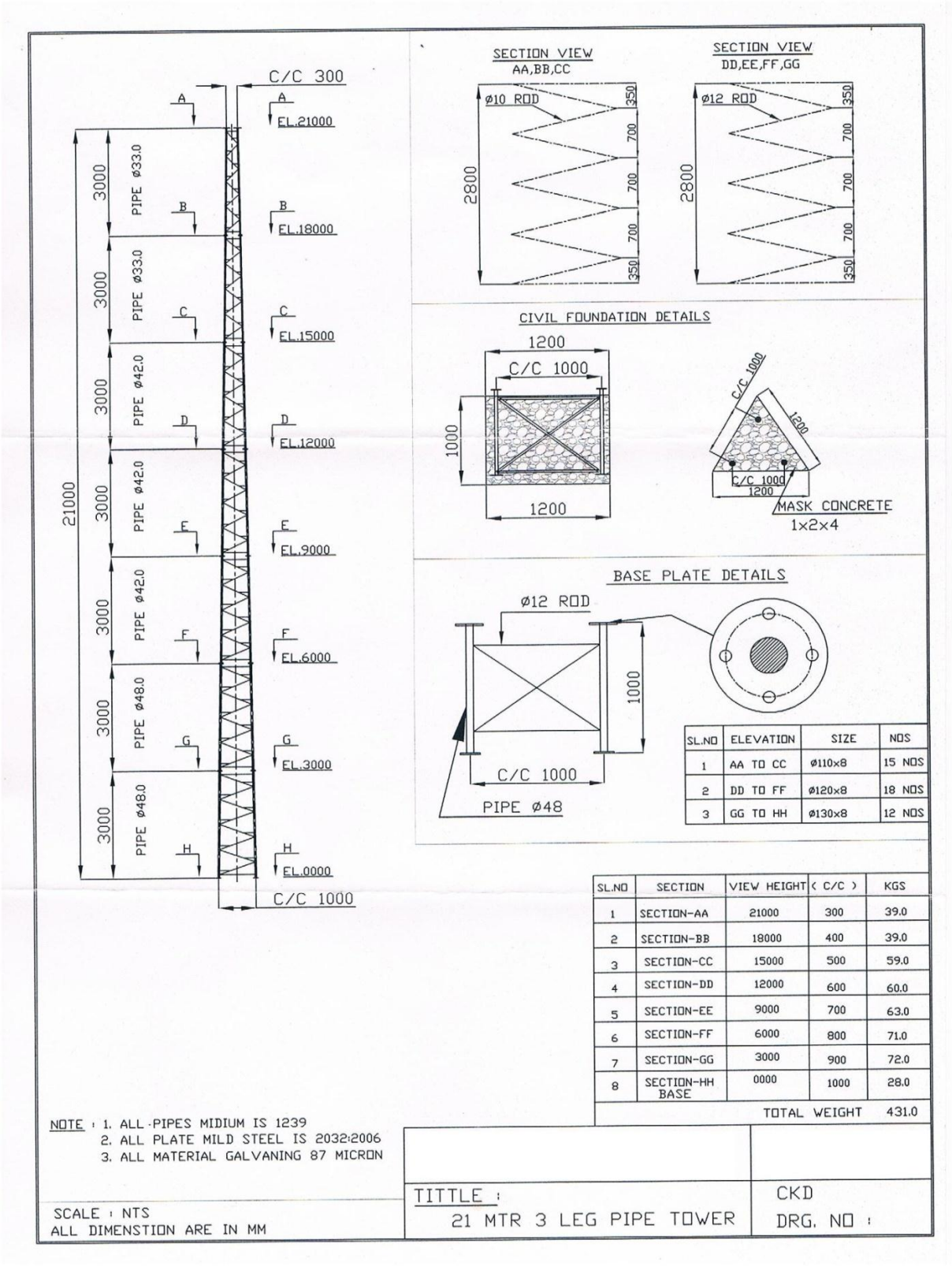
SCALE : NTS
ALL DIMENSTION ARE IN MM

TITTLE :
18 MTR 3 LEG PIPE TOWER

CKD
DRG. NO :

BHEL BAP RANIPET M&S

DRAWING: VII **21 M 3 LEG PIPE TOWER**



SL.NO	ELEVATION	SIZE	NOS
1	AA TO CC	ø110x8	15 NOS
2	DD TO FF	ø120x8	18 NOS
3	GG TO HH	ø130x8	12 NOS

SL.NO	SECTION	VIEW HEIGHT	(C/C)	KGS
1	SECTION-AA	21000	300	39.0
2	SECTION-BB	18000	400	39.0
3	SECTION-CC	15000	500	59.0
4	SECTION-DD	12000	600	60.0
5	SECTION-EE	9000	700	63.0
6	SECTION-FF	6000	800	71.0
7	SECTION-GG	3000	900	72.0
8	SECTION-HH BASE	0000	1000	28.0
			TOTAL WEIGHT	431.0

NOTE : 1. ALL PIPES MIDIUM IS 1239
2. ALL PLATE MILD STEEL IS 2032:2006
3. ALL MATERIAL GALVANING 87 MICRON

SCALE : NTS
ALL DIMENSTION ARE IN MM

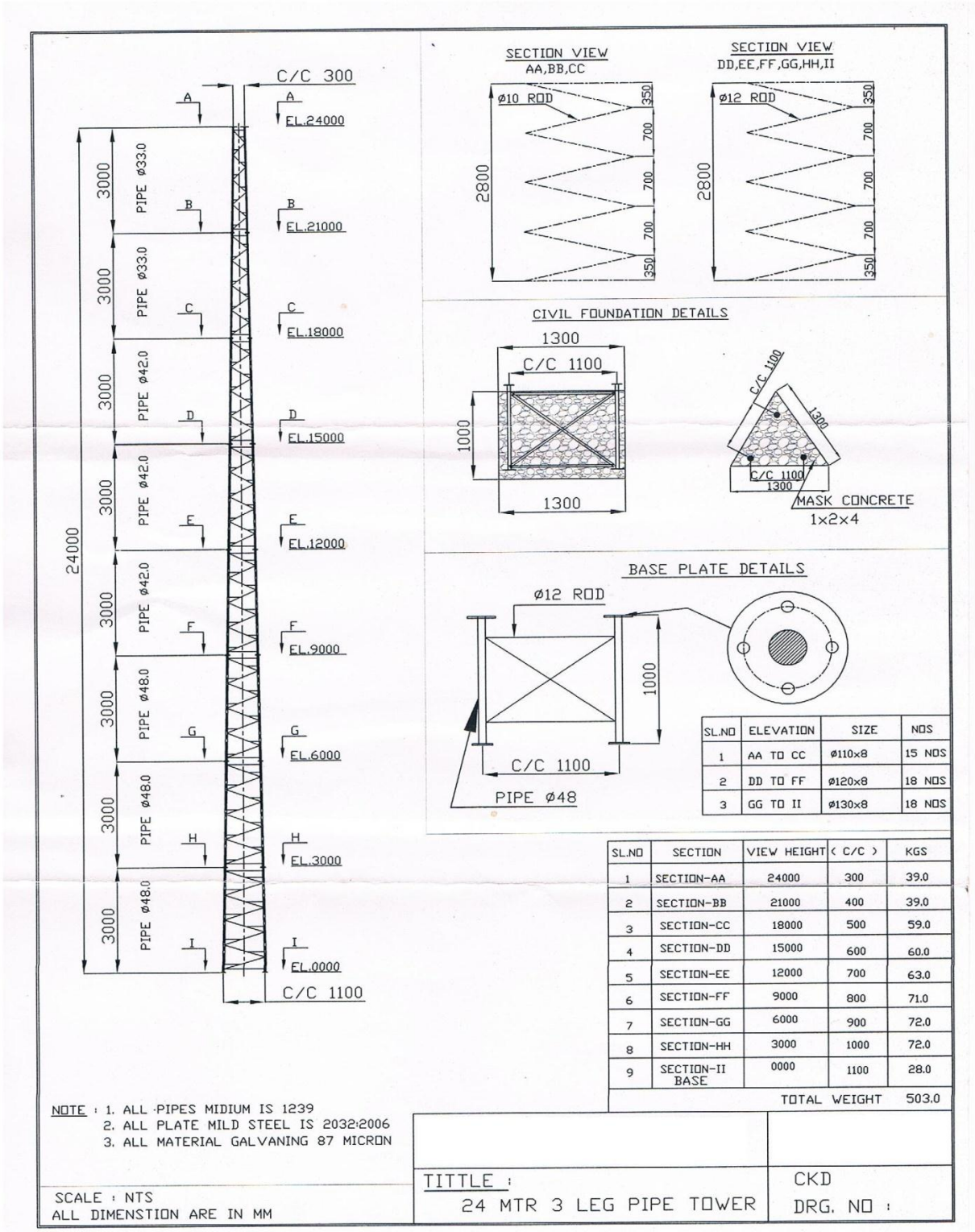
TITTLE : 21 MTR 3 LEG PIPE TOWER

CKD

DRG. NO :

BHEL BAP RANIPET M&S

DRAWING: VIII **24 M 3 LEG PIPE TOWER**



SL.NO	ELEVATION	SIZE	NOS
1	AA TO CC	Ø110x8	15 NOS
2	DD TO FF	Ø120x8	18 NOS
3	GG TO II	Ø130x8	18 NOS

SL.NO	SECTION	VIEW HEIGHT	(C/C)	KGS
1	SECTION-AA	24000	300	39.0
2	SECTION-BB	21000	400	39.0
3	SECTION-CC	18000	500	59.0
4	SECTION-DD	15000	600	60.0
5	SECTION-EE	12000	700	63.0
6	SECTION-FF	9000	800	71.0
7	SECTION-GG	6000	900	72.0
8	SECTION-HH	3000	1000	72.0
9	SECTION-II BASE	0000	1100	28.0
			TOTAL WEIGHT	503.0

NOTE : 1. ALL PIPES MIDIUM IS 1239
2. ALL PLATE MILD STEEL IS 2032:2006
3. ALL MATERIAL GALVANING 87 MICRON

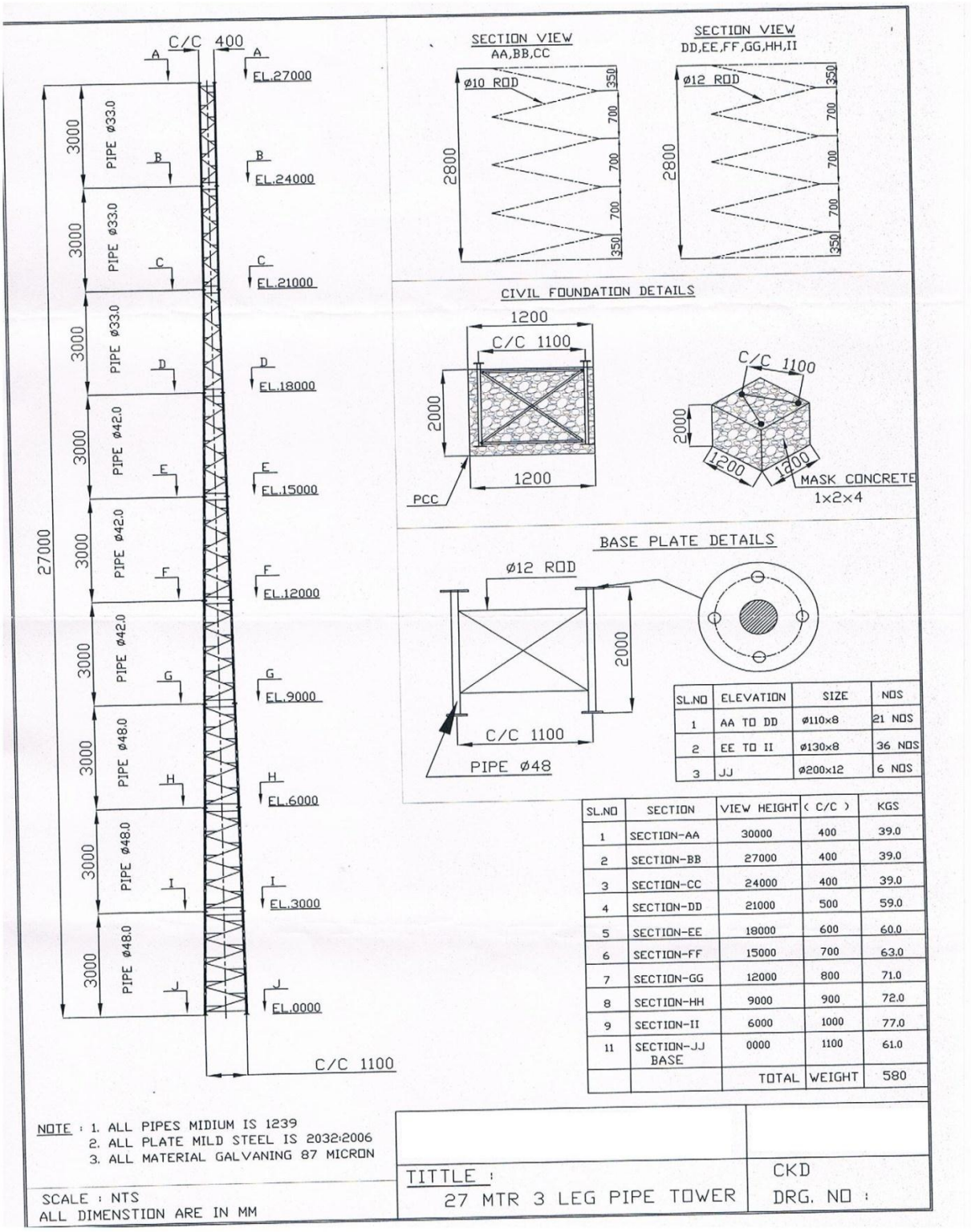
SCALE : NTS
ALL DIMENSTION ARE IN MM

TITTLE :
24 MTR 3 LEG PIPE TOWER

CKD
DRG. NO :

BHEL BAP RANIPET M&S

DRAWING: IX **27 M 3 LEG PIPE TOWER**



SL.NO	ELEVATION	SIZE	NOS
1	AA TO DD	ø110x8	21 NOS
2	EE TO II	ø130x8	36 NOS
3	JJ	ø200x12	6 NOS

SL.NO	SECTION	VIEW HEIGHT	(C/C)	KGS
1	SECTION-AA	30000	400	39.0
2	SECTION-BB	27000	400	39.0
3	SECTION-CC	24000	400	39.0
4	SECTION-DD	21000	500	59.0
5	SECTION-EE	18000	600	60.0
6	SECTION-FF	15000	700	63.0
7	SECTION-GG	12000	800	71.0
8	SECTION-HH	9000	900	72.0
9	SECTION-II	6000	1000	77.0
11	SECTION-JJ BASE	0000	1100	61.0
		TOTAL	WEIGHT	580

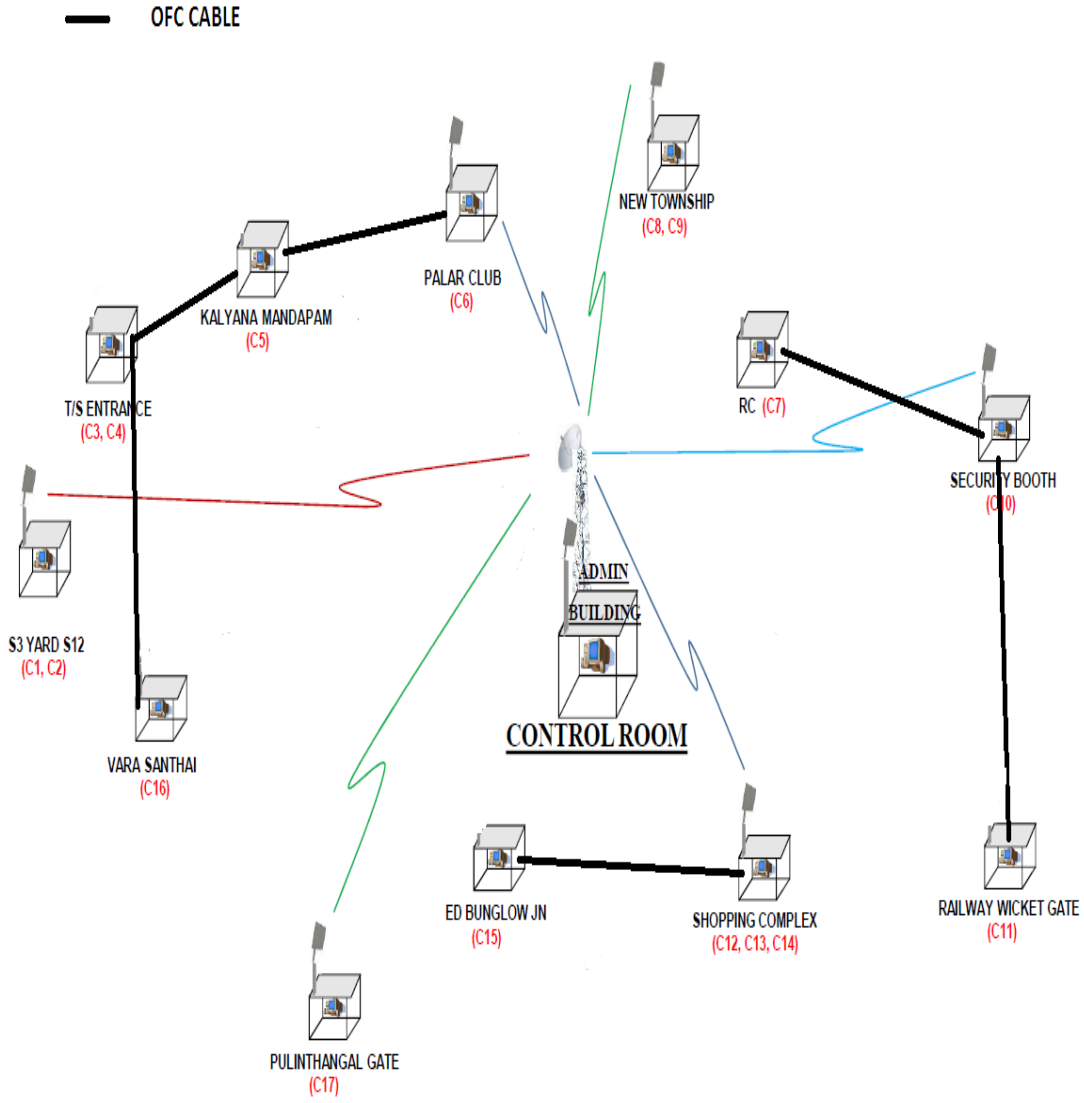
NOTE : 1. ALL PIPES MIDIUM IS 1239
2. ALL PLATE MILD STEEL IS 2032:2006
3. ALL MATERIAL GALVANING 87 MICRON

SCALE : NTS
ALL DIMENSTION ARE IN MM

TITTLE :
27 MTR 3 LEG PIPE TOWER

CKD
DRG. NO :

TOWNSHIP-CCTV FLOW CHART



FACTORY-CCTV FLOW CHART