

Technical and Functional Specifications

Bidder shall ensure that the goods and services supplied under this project shall fully compliance to all the technical specifications as mentioned below.

1) Operator Console Table & Ergonomic Chair

S/N	Parameter	Minimum Specification
1.	Physical Structure	Ergonomically designed desk to ensure 24x7 deskings solution with sufficient knee space (min 450mm) and foot space (min 600 mm).
2.	Working Surface material	The Console Top / working surface should be made of minimum 25 mm thick MDF with High Pressure Laminate finish. The laminate shall be fire retardant, Insulated, Water Proof, Scratch resistant and high hardness. The Table Top should be as able to mount three 27 Inches Display monitors for each work station
3.	Console Design	Consoles must be of modular design, facilitating future equipment retrofits and full reconfigurations without requiring any major modification to the structure or exterior elements
4.	Equipment Mounting	The workstation shall be able to house computer equipment's, Ethernet Points, Power Distribution Unit. The CPUs shall be mounted on Slide out CPU trays (mounted on Heavy duty slides) for ease in maintenance, all of these equipment's should be concealed from direct human view
5.	Frame material	Made of heavy duty Aluminium. The Extrusions shall be duly powder coated with 40+ micron over all surfaces.
6.	Monitor Arms and Rear Walls	<ul style="list-style-type: none"> Die cast mounted Aluminium arm; fixed firmly on MS Pole with powder coating mounted on its rear wall also made of aluminium Monitor and Functional holder shall guarantee optimum viewing distance. All ergonomic aspects shall be taken in to account. It shall be capable for mounting all type of LCD/LED display with Dimensions between 17" to 27" using suitable brackets/additional base plate For configuration of working position, it shall allow the technical staff to rotate/ tilt/ raise/the monitors as well as fix their adjustment in a quick and easy manner
7.	Warranty/Guarantee	10 years replaceable
8.	Certifications	ISO 11064 latest revision, BIFMA
Chairs		
9.	General	Ergonomic Chair with Arm Rest and castor wheels designed for 24/7 usage
10.	Backrest support	Tilt adjustable, polystyrene support frame with 100% polyester fiber
11.	Seat Support	Height adjustable, Molded wood, 10 mm. thick with polyurethane foam, density minimum 70 kg/m3
12.	Seat Adjustment Mechanism	Self-adjustable synchronous mechanism with soft resort. Multi-locking with safe anti-return system.
13.	Armrests	Height adjustable via button, Front/back adjustable with PU pads (50 mm)

14.	Column	Class 3 built-in cartridge cylinder steel tube
15.	Base	Swivel on castor with 5 polyamide double-wheel castors (made of polyamide and fiber glass)
16.	Colour	Black
17.	Warranty	Minimum 5 replicable years

2) Office Cubical & Chairs for office staff

S/N	Parameter	Minimum Specification
Staff Cubicle/ Cabin Tables		
1.	Physical Structure	Workstation size of min. 18" (staff Cubicles) and 2" (for Cabin Table) depth made with 1.5mm thick laminate of standard make over 18mm thick commercial board complete with wooden beading including cutting holes & fixing of cable manager etc. complete with Long lasting polish.
2.	Accessories	The desk shall have the necessary drawers, keyboard trays, cabinets etc. along with sliding / opening as per approved design with quality drawer slides, hinges, locks etc.
3.	Storage	Storage unit with 18 mm thick MDF board along with 1.5 mm approved laminate colour outside and 2 coat of enamel paint inside the storage of size 1'6"x1'6"x2'4". The same should be provided with all the required accessories including the handle, lock, sliding channel and necessary hardware, etc. complete with Long lasting polish
4.	Chairs	Staff Chairs as Per the Chair Specs mentioned in Section 1.15 of this Document

3) Online UPS for CCC & DC

S/N	Parameter	Minimum Specification
1.	Output Power Capacity	Adequate capacity to cover all above IT Components at respective location
2.	Technology	True On-line High-Frequency Design UPS with Double Conversion technology, 3 Phase Rectifier & Inverter both to be IGBT based PWM
3.	Certifications	ISO 9001:2000 and 14001 Certified OEM (certificate to be submitted) UPS should meet CE and ROHS standards (Compliance to be submitted)
4.	Input Voltage Range	160-280 VAC @ 100% load, Single Phase
5.	Input Freq. Range	50Hz +/- 3 (auto sensing)
6.	Input Power Factor	0.99 (100% Load)
7.	Input Protection	Thermal Circuit Breaker
8.	Output Voltage	220/230/240 VAC +/- 1%
9.	Output Frequency	50Hz ± 0.5Hz
10.	Output Waveform	Pure Sinewave
11.	O/P Voltage Distortion	<3% for Linear, <6% for Non-Linear Load
12.	Output Connections	Output Connections: (1) Hard Wire 3-wire (H N + G), (2) IEC 320 C13
13.	Efficiency (Overall)	> 85%

14.	Efficiency (Inverter)	> 90%
15.	Battery Type	SMF-VRLA (Sealed maintenance free valve regulated lead acid)
16.	Battery Make	Exide, Quanta, Panasonic, CSB, Yuasa, Relicell or equivalent
17.	Battery Backup	120min backup on Full Load
18.	Communication	Full-Functional SNMP Card should be present; RS 232 & USB port with software for UPS status monitoring
19.	Protection	Inherent protection should be provided for Output Short-circuit and Overload, Input Fault, Cold Start, Low battery, Battery Over and Under charge, Battery Disconnect, Battery self-test feature, Over Temperature, OVCD, External Transient Voltage Surge Suppressor, etc.
20.	LCD Display	Input Voltage, Input Frequency, Output voltage, Output Current, Output Frequency, Battery Voltage, UPS Status, Load Level, Battery Level, Discharge Timer, Battery Disconnect and Fault Conditions
21.	By Pass	Manual and Automatic (Built-in) Bypass switch should be provided
22.	Environment	Noise Level – less than 60 dB at a distance of 1 meter
23.	Programmable Outlets	UPS should have programmable outlets for control of load segment
24.	Operating Temperature	0-45° C
25.	Relative Humidity	20-90%RH @0-400 C (Non-condensing)
26.	Miscellaneous	ECO Mode Operation with Enable/Disable function
		Cooling: Forces Air Cooling
		Emergency Power Off (EPO)
		BYPASS Mode Operation with Enable/Disable function
		Cables: With all necessary cables and plug and Battery links
		Rack: Suitable Metallic Rack for housing of SMF Batteries to be provided
27.	Battery Replacement	The successful bidder has to replace the UPS battery every 2 years for uninterrupted and smooth operations. OEM should confirm battery replacement in UPS at the end of 2nd year and 4th year respectively.

4) Building Management System

S/N	Minimum Required Specification
1.	Infrastructure Management System (IMS) - This should be a single Unified system capable of providing with a pre-integrated, centralized and consolidated platform for an end to end management of the infrastructure, which includes essential components like, UPS, Air-conditioning units, DG, CCTV, PDU, Electrical panel, Fire alarm system, Access control system, (WLD) Water leakage detection system, etc. irrespective of (Make / Model). The Proposed system should be highly fault tolerant to ensure high uptimes It could either be software based or appliance based solution.

2.	Solution should provide a pre-integrated, centralized and consolidated platform for end to end management of the building, which would include: Air-conditioning units, D.G. sets, HT Panel, LT panel, UPS Systems, Fire Alarm system, Surveillance System, Access Control, Water leakage detection, Rodent repellent, Temperature and Humidity, Fire, etc.
3.	The solution should be open to integrations with present and future disparate systems with minimal change in the existing system setup.
4.	The IMS supplier will have the entire responsibility of the hardware, operating system and the applications for the system supplied by them for this solution.
5.	The IMS system should be capable of enabling Notifications through Web Portal, SMS and email.
6.	The IMS solution must be highly secure and must support HTTPS, SSH protocols with SHA 512 encryption level
7.	Future Ready for Integration with IP / SNMP based systems at the remote infrastructure end.
8.	The IMS Tool should have following functionalities
A.	The Monitoring and Management of Energy parameters at different levels of the remote location.
B.	The Monitoring and Management of DG set and Fuel tank for Diesel Supply.
C.	Monitoring and Management of Surveillance and Access control system
D.	Monitoring and Management of Fire Alarm System
E.	Monitoring and Management of Environmental Cooling system and Environmental Monitoring
F.	Customized Fault, Performance and availability reporting Mechanism.
G.	Integration with ITIL based Helpdesk tools for SLA and Vendor Management
9.	Energy Supply and Distribution Monitoring and Fault Management
A.	The IMS system should be capable of integrating energy monitoring from the HT/LT section of the input supply to the data communication infrastructure.
B.	The IMS system should be able to do continuous monitoring of the quality of power supplied by the Electricity board and by the Generators.
C.	The IMS system should be capable to monitor the UPS.
D.	The IMS tool should have the feature to setup thresholds on each of the monitored energy parameter.
E.	The Polling interval of each and every monitored parameter should be configurable.
F.	The IMS tool should have the capacity to store monitored performance data of each and every parameter up to 1 year.
G.	The IMS tool should have the inbuilt feature to enable data backup of the performance data at customer definable time intervals.
H.	The IMS tool should be able to integrate with a Dashboard and Reporting tool to enable generation of different kinds of standard and customized reports.
I.	The IMS tool should be able to get alarm information of electrical systems and should be able to generate SMS to the designated team and also trigger generation of trouble tickets with defined SLAs.
10.	Surveillance and Access Control System
A.	The IMS tool should be capable of integrating with the access control and surveillance system of data communication infrastructure.

B.	The IMS tool should have the built-in feature to provide alarms generated by the access control systems on the centralized management console and also provide reports of access details to the users.
C.	The IMS tool should have the feature to monitor the services availability of the cameras installed for the surveillance .
D.	The IMS tool should also be able to monitor the health of the servers or encoders installed for the collection of video feed from the cameras installed in the building premises.
E.	The IMS tools should be open to integration with any make and model of cameras and access control system on standard interfaces irrespective of make or model
11.	Fire Alarm System Monitoring and Management
A.	The IMS tool should have the capability to integrate with the fire alarm system of the building and provide the alarms generated by the system on the centralized Dashboard of the Fire Alarm System
B.	The IMS tool should have the capability to be configured to setup control mechanism for the buildings incase of fire alarm is detected. Some of the actions which might have to be enabled by the IMS tool are referred below:
a.	Co-relation with the nearest camera to enable validation of the fire alarm.
b.	Activation of audio alarm at the centralized command centre.
c.	SMS notification to the concerned teams
C.	Any other actions like the shutdown of the main supply should also be possible through the system if required to be configured in future.
12.	Reporting Mechanism
A.	The IMS tool should have availability and performance reporting mechanism built-in for fault and trend analysis.
B.	The IMS tool should have its own Business Intelligence tool to help enable the customer get pre-defined business reports and should also be customizable for specific reports on request.
C.	Monthly device availability report for all sub-systems
D.	Monthly SLA report for the sub-systems
E.	Weekly report of CPH 'consumption per hour' of the Gensets in use.
F.	Weekly report on the CPU 'cost per unit' of electricity generated by the Gensets.
G.	Weekly and Monthly temperature and Humidity trend of the building.
13.	Integrated Helpdesk System for SLA and Vendor Management
A.	The IMS tool should be fully integratable with ITIL compliant Helpdesk tool
B.	Some of the alarms generated from the different systems in the IMS tool should generate trouble tickets and address it to the relevant teams with pre-defined SLAs.
C.	The integrated Helpdesk tool of the IMS should be able to handle change requests as per the workflow defined by the customer.
D.	The Helpdesk tool should be able to generate of different types of SLA reports to help the customer understand specific issues or calls handled by independent vendors and level of SLA adherence by the vendors etc.
14.	Special Features desired for the IMS Tool

A.	The centralized dashboard of the IMS tool should provide a monitoring and management window using the actual views of the data communication infrastructure where the different devices of IMS tool are placed. This will help immensely in the visual monitoring of the infrastructure health and quick identification of the fault area in case of alarm generation.
B.	The IMS tool should have the capability to integrate systems with following interfaces,
C.	NO/NC contacts
D.	Analog signals - 0-20 mA, 0-5 V DC, 0-10 V DC.
E.	Digital Outputs - Ref voltage 12 V DC
F.	Modbus RTU
G.	Modbus TCP
H.	IP SNMP V1/v2/v3 support

5) Fire Alarm system

S/N	Specification
1)	Shall be a microprocessor based single loop addressable fire detection and alarm system
2)	Must be implemented as per NFPA 72 guidelines
3)	Shall activate the system by automatic Heat and smoke detectors
4)	Shall have break glass units
5)	Shall be UL/EN54 Part 2 and UL/EN54 Part 4 compliant
6)	The system status shall be made available via panel mounted LEDs and a backlit 8 line x 40-character alphanumeric liquid crystal display
7)	All system controls and programming will be accessed via an alphanumeric keypad. The control panel will incorporate form fill menu driven fields for data entry and retrieval
8)	The system should have an option of manual over ride of the call, if required, after verification.
9)	The manual control should consist of: <ul style="list-style-type: none"> • Start sounders • Silence sounders • Reset system • Cancel fault buzzer • Display test • Delay sounder operation • Verify fire condition • Disable loop
10)	Smoke detector should be UL/EN54 part 7 compliant
11)	Heat detector should be UL/EN54 part 5 compliant
12)	Heat detector shall be of the fixed temperature (58° C) or rate of temperature rise type with a fixed temperature operating point.
13)	Control & Monitor module must be provided for integration with 3 rd party systems.

14)	<p>Alarms:</p> <ul style="list-style-type: none"> The sounders should be suitable for operation with a 24V DC supply Shall be providing a sound output of at least 100dBA at 1 meter and 75 dBA min, for a bed head or sounder base type device. The sounder frequency shall be in the range of 500Hz to 1000Hz.
-----	---

6) Junction Box, with adjustable mounting frames

S/N	Parameter	Specification
1.	Built	<ul style="list-style-type: none"> The Outdoor Utility Cabinet will be constructed with a front sheet steel door with 3 point Locking system to ensure the security of the cabinet. Side and Wall Panels shall be double wall constructed, with fixing bolts internal to the cabinet. The Cabinet should have the required frames to mount the required components like, network device, power, UPS, LPU, battery, etc.
2.	Utility & IP rating	Should be Made for 24/7/365 Outdoor Applications; The Utility Cabinet shall be IP 55 rated (Regulatory Standard Compliance) for ingress protection.
3.	Size	The cabinet has to be provided of size suitable for the mounting of the associated network devices, power, UPS, LPU/mini-server and Battery components securely and safely within the cabinet.
4.	Power Slot	3 x 5 way/15 Amp PDU's has to be provided to support the site equipment. PDU type should be as per actual requirement.
5.	Installation	Each Cabinet will be mounted on a raised height Plinth, 600 - 1000 mm high, as per site requirements. Cooling unit shall be inherent in the design.
6.	Cable	Proper cable management should be provided
7.	Management	Cable Routing: Power connection cable shall be provided from the nearest access point provided by Power utility company to the Outdoor Utility Cabinet through Power meter enclosure.

7) UPS

S/N	Parameter	Minimum Specifications
1.	Capacity	Adequate capacity to cover all IT Components at respective location
2.	Technology	IGBT based PWM Technology, True Online UPS
3.	Input Frequency Range	45 to 55 Hz
4.	Input Voltage Range	160-280 VAC @ 100% load, Single Phase

5.	Output Frequency Range	45 to 55 Hz
6.	Output Voltage	220VAC - 230VAC
7.	Voltage Regulation	+/-2% (or better) and with built-in Over Voltage Cut off facility in the Device
8.	Frequency	50 Hz +/- 0.1% (free Run Mode)
9.	Harmonic Distortion (THD)	< 3% (linear load)
10.	Output Waveform	Pure Sine wave
11.	Output Power Factor	0.8 or more
12.	Battery Backup	120min backup on Full Load
13.	Battery Type	Lead acid, Sealed Maintenance Free (SMF)
14.	General Operating Temperature	0 to 45 Degree Celsius
15.	Alarms & Indications	All necessary alarms & indications essential for performance monitoring of UPS like mains fail, low battery & fault detection
16.	Bypass	Automatic, Manual Bypass Switch
17.	Certifications	For Safety & EMC as per international standard
18.	Overall Protection	IP 55, Junction Box design should ensure to keep the temperature within suitable operating range for equipment's and should also avoid intentional water splash and dust intake

8) Poles including mounting/installation

S/N	Parameter	Minimum Required Specifications
1.	Pole type	Galvanized pole as per IS:2629 and Fabrication as per IS:2713
2.	Height	8 meter above ground surface Bottom section : 2.4 meter Middle Section : 2.4 meter Top Section : 3.2 meter
3.	Foundation	Minimum 1 meter so as to ensure that video feed quality is not impacted due to winds in different climatic conditions and from vibration caused due to heavy vehicles on road
4.	Pole Diameter (Outerside)	Bottom section : 139.7mm Middle Section : 114.3mm Top Section : 88.9mm
5.	Bottom Base Plate	300mm x 300mm x 6mm
6.	Protection	Lightening arrestor and Earthing
7.	Cantilevers	The pole should support 3 number of cantilever of varying length from 0.5 to 2.0 meters. The cantilever should be fitted such that the can be rotated to change the direction or adjust the angle, if at all required. The Cantilever should be strong enough so as to mount 2 CCTV camera's, if required.
8.	Mounting Facility	CCTV camera on pole or cantilever, Junction Box

9) Video Wall Solution- 55" LED in a 4 X4 and 4X2 arrangement

S/N	Parameter	Minimum Required Specifications
1.	Configuration	Full HD IPS LED Display, Direct LED Backlight, Display suitable for use in video wall with bezel to bezel distance not less than 4 mm
2.	Screen Size	55" or higher in 4x4 arrangement and 4X2 arrangement
3.	Resolution	Full High definition (1920 X 1080) 16:9 Widescreen
4.	Contrast Ratio	5000:1
5.	Brightness	1000 S
6.	Refresh Rate	>800 Hz

7.	Response Time	8 ms
8.	Viewing Angle	H : 178°, V : 178°
Interface		
9.	Standard Inputs	1x Digital DVI-I ; 1x Digital DVI-D, or Higher
10	Standard Outputs	1x Digital DVI-D ; 1x CVBS BNC, 2 X HDMI
11	Control	RS-232/RS-422/IR
Power		
12	Consumption	Not more than 5000 Watt
13	Power Supply	AC 100 -240 V~ (+/-10 %), 50/60 Hz
General		
14	Operating Temperature	0°C - 40°C
15	Humidity	10% - 90%, non-condensing
Accessories		
16	Cables	Dual Link DVI-D cable, power cable for daisy chain, AC cable, Remote Controller
17	Display Controller	Video Distributor, Display controller to control Video wall in a matrix as per requirement with necessary software: Processor specs: Quad core 64-bit, 3.4 GHz CPU or latest RAM: 8 GB DDR3 minimum HDD: Min 500 GB Hard Disk (Hard disk Capacity should be upgradable) Network support: Gigabit Ethernet Controller inbuilt, Support for Add on Network adapters. Videowall Display: Display multiple source windows in any size, anywhere on the wall Accessories: DVD-R,DVD+RW,, Keyboard, mouse OS Support: 64-bit Operating Systems Windows / Linux or equivalent industry standard
Video Wall Management Software		
18	Display & Scaling	Display multiple sources anywhere on display up to any size
19	Input Management	All input sources can be displayed on the video wall in freely resizable and movable windows
20	Scenarios Management	Save and Load desktop layouts from Local or remote machines
21	Layout Management	Support all Layout from Input Sources, Internet Explorer, Desktop and Remote Desktop Application
22	Multi View Option	Multiple view of portions or regions of Desktop, Multiple Application Can view from single desktop
23	Other features	<ul style="list-style-type: none"> • SMTP support • Remote Control over LAN

		<ul style="list-style-type: none"> • Alarm management • Remote management • Multiple concurrent client • KVM support
24	Cube Management	<ul style="list-style-type: none"> • Cube Health Monitoring • Pop-Up Alert Service • Graphical User Interface

10) Workstations

S/N	Parameter	Minimum Required Specifications
1.	Processor	Latest Quad Core i7 with 3 GHz or higher
2.	Motherboard & Chipset	OEM Motherboard & Compatible 64 bit Chipset
3.	Video	Integrated Graphic controller with 2 GB video memory (non- shared)
4.	System Memory	Minimum 8 GB DDR3 or higher expandable up to 32 GB or more
5.	Ports	6 Nos. or Higher USB (min 2 USB3.0), 1XHDMI port, 1 VGA Port.
6.	Storage	2 TB , SATA III HDD 7200 RPM with Flash Cache of 64GB SSD. Provision for installing more drives
7.	Monitor	27 Inches or Higher, Wide LED Touch Screen , Resolution- 1920x1080, Aspect Ratio-16:9 , refresh rate 5ms or better
8.	Keyboard	104 Keys or Higher Mechanical Keyboard
9.	Mouse	USB Optical Scroll Mouse
10.	OS Support	Pre Loaded Windows 10 with recovery disc
11.	Certification	ENERGY STAR/BEE
12.	Warranty Support	Minimum from 5 years from the date of Commissioning

11) Desktop

S/N	Parameter	Minimum Required Specifications
1.	Processor	Latest Intel Core i7 with 2.8 GHz with 6MB L3 cache or higher
2.	Motherboard & Chipset	OEM Motherboard & Compatible Chipset
3.	Video	Integrated Graphic controller : NVidia/Intel/AMD
4.	System Memory	Minimum 4 GB DDR3 or higher expandable up to 16 GB or more
5.	Ports	6 Nos. or Higher USB (min 2 USB3.0), 1XHDMI port, 1 VGA Port.
6.	Storage	1 TB , SATA II HDD 7200 RPM

7.	Monitor	27 Inches or Higher, Wide LED Screen , Resolution- 1920x1080, Aspect Ratio- 16:9
8.	Keyboard	104 Keys or Higher Mechanical Keyboard
9.	Mouse	USB Optical Scroll Mouse
10.	OS Support	Windows 10
11.	Certification	RoHS, ENERGY STAR/Gold rating
12.	Warranty Support	Minimum from 5 years from the date of Commissioning

12) Multi-function Printer

S/N	Parameter	Minimum Required Specifications
1.	Function	Printer, Scanner, Copier all-in-one
Printer		
2.	Printing Speed	Min. 30ppm or Higher
3.	Print Technology	Laser
4.	Print Quality	1200 x 1200 dpi
5.	Duty Cycle	Min 50000 pages/month
6.	2-Side Printing	Automatic
7.	Automatic Paper Sensor	Yes
Scanner		
8.	Scanner type	Flat Bed with ADF for Duplex documents
9.	Scan File Format	JPEG, PDF, PNG
10.	Resolution	1200 x 1200 dpi
11.	Scan speed	Min. 20 ppm
Copier		
12.	Copy Speed	Min. 20 ppm
Paper Feeder		
13.	Total No. of Trays	1
14.	Input paper Handling	Min. 150-sheet standard
15.	Output Paper Handling	Min. 150-sheet
16.	Media Size Support	A4, A5, Legal, Letter
Network Capabilities		
17.	Network support	Built-in Ethernet 10/100/1000 Base TX

18.	Operating System Support	Windows XP, Vista, 7, 8, 10 Linux/Unix
19.	Memory / Processor	256MB, 600MHz
20.	Cartridge Yield	10000 pages/cartridge

13) Indoor Fixed Dome Cameras with PoE

S/N	Specification
1.	Image sensor : 1/2.7" Progressive Scan CMOS
2.	Lens : 3 to 9 mm or better, DC-iris, motorized
3.	Field of View : 37.5°~103.7°(horizontal), 21.6° ~ 71.2° (vertical), 42.6°~111.21° (diagonal)
4.	Day and Night : Automatic/manual/scheduled
5.	Min. Illumination / Light Sensitivity : Color mode: F1.2 @ 0.5 lux Black and white mode: F1.2@ 0.05 lux
6.	Light sensor : Senses the level of ambient light to determine when to switch day/night mode.
7.	Video Compression : H.264 and Motion JPEG
8.	Audio Compression : G.711 A-Law, G.711 U-Law, G.726
9.	Resolutions and frame rates : 30 fps at 1920x1080 (1080p)
10.	Protocol Support : IPv4, IPv6, TCP/IP, HTTP, DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols/Should meet all functional requirement of the project
11.	PoE : 802.3af compliant
12.	Environmental Certification and Housing : IP66 and IK10 rated
13.	Camera Should remote Zoom and Auto focus
14.	Camera should support Micro SD/SDHC (up to 32GB) and other preceding standard SD cards
15.	Should be ONVIF compliant
16.	The camera should be automatically discovered and configured when connected to VMS or Network Switch, to set the right network parameters for the video stream on the network

14) 48 port L2 switch

S/N	Specification
1.	Layer 2 Switch with minimum 48 No's of 10/100/1000 Base-TX ports (Duplex: Full, Half)
2.	Should have minimum switching capacity of 32 Gbps. All ports on the switch should work on line rate.
3.	Should be IPv4 and IPv6 ready from day one
4.	Should support minimum 4000 MAC address entries
5.	Should support protocols like MSTP, STP, RSTP, dot1q VLAN-tagging, LACP, NTP
6.	Should have features like port-security, auto-negotiate, flow control, MAC filtering
7.	Should have a dedicated OOB Management port using CLI(SSH), WebUI(SSL), SNMP (V1, V2, V3), TFTP, etc.

8.	Switch should support AAA features using TACACS+, Radius, LDAP, etc
9.	Should be NDPP or EAL3 certified at the time of Bidding
10.	All necessary SFP's, interfaces, connectors, patch cords (if any) & licenses must be delivered along with the switch from day one.
11.	The Switch should be Rack mountable & the switch should be supplied with Indian standard AC (15Amp) power cord.

15) 24U Network Rack

S/N	Specification
1.	24 U: 750 x 1070 x 1185 mm
2.	Door Steel Full Prof 750W x 24U
3.	Castor with ft break (2+2)
4.	Sliding Tray
5.	Should have sufficient perforation for ventilation of air
6.	IPDU: 2 nos of 32 Ampere IP Switched PDU each having 21 nos C13 sockets, 3 nos of C19 sockets

16) Access Control System

S/N	Specification	
Biometric Finger Scan Reader		
1.	Transmission Frequency : 13.56 MHz	
2.	iClass Technology. Should be compliance with iClass 15693 & 14443B	
3.	The data flow between card & Reader should be encrypted using 64 bit authentication keys.	
4.	Should be configured as a Reader – Enroller, Enroller Only & Reader Only (All three are mandatory)	
5.	Optical Finger print sensor	
6.	Sensor resolution should be of atleast 500dpi	
7.	Finger print should be captured in less than 2 seconds and verified in less than 5 seconds.	
8.	Should have fingerprint enrollment software	
9.	Operating temperature : 0° to 50°C	
10.	Operating humidity : 10% to 90% relative humidity (Non-Condensing)	
Smart card Reader		
11.	Transmission Frequency : 13.56 MHz	
Controller		
12.	Reader Inputs	Two
13.	Universal Inputs	Two
14.	Tamper Input	One
15.	Digital Lock Inputs	Two
16.	Processor	50 MHz with 32 MB RAM

S/N	Specification	
17.	Processor For Reader Inputs	Yes (Dedicated Processor for each Reader)
18.	Communication	10/100 Ethernet Port
19.	Memory	Minimum 500 personnel Records
20.	Area Lockdown Support	Yes
21.	Real Time Clock	Yes
22.	Encryption	64 bit
23.	Visual Indicator	Yes
24.	Mounting	Wall / Ceiling Mount
25.	Battery Backup	5 hours or more
26.	Technology Compatibility	Wiegand
27.	Card Reader Power	5V DC
28.	Wiring Distance	150 meters (Wiegand)
29.	Indicator LED	Yes
30.	Push Button Switches	Yes (For clearing the memory & Resetting the IP Address)
31.	Enclosure	Yes
32.	Certifications	CE Approved
33.	Operating Temperature	0° to 45°C
34.	Operating Humidity	10% to 80% relative humidity (Non-Condensing)
Access Control Software		
35.	Compatibility with any Windows Operating System	
36.	Compatibility with MYSQL / SQL / ORACLE	
37.	Support for TCP/IP Communication	
38.	Provision for Alarm Monitoring for Battery, Mains Supply, Door Opened too Long, Door Forced Opened, Unauthorized Swipe & Controller Tampering	
39.	Support for unlimited number of Card Database & Transactions	
40.	Specify Card Activation & Expiry Date	
41.	Support for Biometric, Pin & Smart Card Applications	
42.	Management of Dual Access Levels to a single Card	
43.	Remote Locking & Unlocking of Doors	
44.	Remote management of Controllers	
45.	Customization of Door User time for every card Holder	

S/N	Specification
46.	One Client License
47.	Two Stages of Alarm Management (Acknowledgement on Receipt & Closure on Investigation)
48.	Access Privileges on the basis of Time & Date
49.	Creation of holiday schedules to cover maintenance & Vacations / Holidays
50.	Permission to activate any control output for a specific event such as alarm
51.	Programmable Shunt time to control the door opening time
52.	Area Control by using Hard Anti Pass back, Soft Anti Pass back, Timed Anti Pass back, Occupancy Limit, Multi man principle, Area Lock down, Threat level conditioning.
53.	Alarm Management
54.	Automatic User Log off
55.	Cardholder Management & Enrollment
56.	Creation & Maintenance of User Database
57.	Assignment of Access Privileges

17) Public Address System

S/N	Specification
1.	Should have the capability to control individual PAS i.e. to make an announcement at select location (1:1) or multiple locations (1: many). The PAS should also support both, Live and Recorded inputs
2.	Should have Minimum 2 Speaker, to be used in different directions with Minimum 200 Watts of amplification
3.	Should have IP Based connectivity
4.	Access control mechanism would be also required to establish so that the usage (including sound volume) is regulated.
5.	Should be integrated with Smart City Operations Center, Police Command Control Center, Traffic Control Center, CCC Software and other such command center established in Ahmedabad
6.	Internal Battery with different charging options (Solar/Mains)
7.	Should support Automatic on/off operation
8.	Should have IP-65 rated for housing
9.	Operating temperature: 0° to 50°C

18) Emergency Call Box

S/N	Specification
1.	Should have Cast Iron/Steel Foundation, Sturdy Body for equipment
2.	Call button should be Watertight Push Button, Feedback for button press
3.	Speaker & MicroPhone : VOIP Phone, Hands-free calling, Watertight and industrial grade equipment
4.	Should provide 3G/4G/Ethernet/Fibre connectivity

5.	Internal Battery with different charging options (Solar/Mains)
6.	Should support Automatic on/off operation
7.	Should have IP-65 rated for housing
8.	Operating temperature: 0° to 50°C

19) Cloud based Controller

S/N	Specification
1.	Cloud based Wireless controller (WLC) should support unlimited number of Access Point/Users without any additional Licensing cost.
2.	Should be based on Cloud platform for Wi-Fi Service Management, Control, configuration and Monitoring
3.	Should support supplied access point and Access Points of any make built on standard i.e. 802.11n/ac or newer
4.	Should support Industry-standard protocols such as SNMP/SSH /SOAP/TCP and HTTP/S to access devices
5.	Should be able to auto discover Access Points of any make which are made as per 802.11 n/ac or newer standards. Should be able auto assign IP to the end devices.
6.	Automatic wireless channel selection.
7.	Should have an ability to dynamically adjust channel and power settings based on the RF environment.
8.	should support IPv6 access control lists
9.	Should adhere and support to the security standards: WEP, WPA, WPA2, etc
10.	Controller should provide profiling based on protocols like HTTP, DHCP and more to identify the end devices on the network
11.	Should be able to set user bandwidth usage restriction on basis of time duration such as Daily, Monthly, Weekly, Hourly etc.
12.	Should be able to assign IP's to the Access Points and the end user Devices
13.	The solution should have an integrated firewall capabilities, content filtering, blocking of malicious attacks, etc. to provide security to the overall network infrastructure.
14.	Controller should have capability to manage traffic across the network to analyze information about applications usage, peak network usage times for all access points.
15.	In case the cloud based services need a platform upgrade, the Access Point infrastructure previously working with the controller should still work as normal with the same Access Points
16.	Cloud service should also provide OTP based authentication (Radius: AAA) mechanism, along with an integrated payment gateway for making payments through Card based/ Internet banking /Wallet medium The capacity of the above has to be planned as per the total quantity of the AP deployment

17.	The Controller should be able to support more than 5000 access point keeping in view the Future scalability without any limitation of licenses
18.	Should keep the logs of Wi-Fi Services used by the end users such as IP details, time stamp/time details, End User Authentication, Mobile No. etc. as per the regulatory requirement under laws/rules/Guidelines issued by Department of Telecom, Government of India or TRAI or any other competent authority as when notified by the Govt. of India
19.	The solution must have an integrated dashboard to view the health of the Access Points/ Status of Network

20) DC Core Router

S/N	Specification
1.	Router should have redundant controller cards and should support stateful switch over, Nonstop forwarding and Nonstop routing.
2.	In case of failure of any single route processor, none of the line card traffic should be impacted.
3.	Router should support capacity of minimum 250 Gbps.
4.	Router should support 4000 MAC addresses or more.
5.	Router should support Redundant Power Supply and should also support On line insertion and removal of the same from day one.
6.	Router must support TCP/IP, PPP, Frame Relay, HDLC
7.	Router should support IPv4 and IPv6 from day one
8.	Router should support all standard routing protocols like BGP, MBGP, OSPF v2/v3, IS-IS, RIP/RIPv2, static routes, MPLS (L2 & L3), PIM(v1, v2), IGMP(v1, v2, v3), VPN (GRE, IPsec, L2TP), Ipv6 tunneling (6to4, 4to6, 6to6), NAT, NTP, etc.
9.	Router should support High Availability (VRRP, or other proprietary protocol, etc.)
10.	Router should support QoS (DSCP, CoS), marking, classification and Policing
11.	Router should support encryption algorithm for routing protocols
12.	Router should support Traffic Engineering & MPLS-TE with FRR
13.	Router should have a dedicated OOB Management port using CLI(SSH), WebUI(SSL), SNMP (v1, v2, v3), TFTP, etc.
14.	Router should support AAA features using TACACS+, Radius, LDAP, etc.
15.	Router should be NDPP or EAL3 certified at the time of bidding
16.	Router should be supplied with at least 4x10G interface scalable to 8x10G and 2x40G interface scalable to 4x40G
17.	Router should have redundant, hot-swappable power supply support for a fully loaded chassis
18.	The Router should be supplied with Indian Standard 15A power cables.
19.	The Router should be supplied with all applicable Licenses from day one.

21) Internet Router

S/N	Specification
1.	Router should have redundant controller cards and should support stateful switch

	over, Nonstop forwarding and Nonstop routing.
2.	In case of failure of any single route processor, none of the line card traffic should be impacted.
3.	Router should support capacity of minimum 100 Gbps.
4.	Router should support 4000 MAC addresses or more.
5.	Router should support Redundant Power Supply and should also support On line insertion and removal of the same from day one.
6.	Router must support TCP/IP, PPP, Frame Relay, HDLC
7.	Router should support IPv4 and IPv6 from day one
8.	Router should support all standard routing protocols like BGP, MBGP, OSPF v2/v3, IS-IS, RIP/RIPv2, static routes, MPLS (L2 & L3), PIM(v1, v2), IGMP(v1, v2, v3), VPN (GRE, IPSec, L2TP), Ipv6 tunneling (6to4, 4to6, 6to6), NAT, NTP, etc.
9.	Router should support High Availability (VRRP, or other proprietary protocol, etc.)
10.	Router should support QoS (DSCP, CoS), marking, classification and Policing
11.	Router should support encryption algorithm for routing protocols
12.	Router should support Traffic Engineering & MPLS-TE with FRR
13.	Router should have a dedicated OOB Management port using CLI(SSH), WebUI(SSL), SNMP (v1, v2, v3), TFTP, etc.
14.	Router should support AAA features using TACACS+, Radius, LDAP, etc.
15.	Router should be NDPP or EAL3 certified at the time of bidding
16.	Router should be supplied with at least 4x10G interface with capability to add more interface cards for scalability
17.	Router should have redundant, hot-swappable power supply support for a fully loaded chassis
18.	The Router should be supplied with Indian Standard 15A power cables.
19.	The Router should be supplied with all applicable Licenses from day one.

22) DC Switch

S/N	Specification
1.	Layer 3 Switch with minimum 48 No's of 10/100/1000 Base-TX ports (Duplex: Full, Half) and 4 x 10GE Uplink port.
2.	Should have minimum switching capacity of 56 Gbps with packet forwarding rate of 70Mpps or more. All ports on the switch should work on line rate.
3.	Should be IPv4 and IPv6 ready from day one
4.	Should support minimum 8000 MAC address entries
5.	Should support protocols like MSTP, STP, RSTP, dot1q VLAN-tagging, LACP, NTP
6.	Should have features like port-security, auto-negotiate, flow control, MAC filtering
7.	Should support dynamic routing protocols like static route, OSPF, RIP, BGP, Multicast, PIM(v1, v2), IGMP(v1, v2, v3) from day one for both IPv4 and IPv6.
8.	Should have a dedicated OOB Management port using CLI(SSH), WebUI(SSL), SNMP (V1, V2, V3), TFTP, etc.
9.	Should support AAA features using TACACS+, Radius, LDAP, etc
10.	Should be NDPP or EAL3 certified at the time of Bidding
11.	All necessary SFP's, interfaces, connectors, patch cords (if any) & licenses must be

	delivered along with the switch from day one.
12.	The Switch should be Rack mountable & the switch should be supplied with Indian standard AC (15Amp) power cord.

23) Firewall

S/N	Specification
1.	It must allow administrators to create Firewall/IPS policy by application, active directory users/groups and content.
2.	It must support a minimum bandwidth of 10 Gbps (per interface) with no latency or performance impact with all protection capabilities enabled.
3.	Should support atleast 30,00,000 concurrent sessions
4.	Should Support atleast 100,000 new connections per second
5.	Should provide throughput of 100Gbps or more
6.	It must support multiple logical firewalls on the same hardware platform
7.	It must support site to site VPN using IPSEC, GRE, remote access VPN
8.	It must support client based VPN using SSL/TLS for remote users.
9.	It must support the authentication of users via Radius, TACACS+, etc
10.	It must be capable of identifying and controlling both UDP and TCP based traffic
11.	It must provide a configuration audit capability.
12.	The supplier must provide 7x24x365 technical support.
13.	It should perform all of the scanning and identification processes in a single pass
14.	The licensing model should be appliance based
15.	It should contain role/discretionary based administration function to provide for separation of duties for administrative access and control
16.	It should provide vertical and horizontal delegation of access control of virtual firewalls/systems and policies
17.	It should provide compliance reporting as per industry standards like ISO27001:2013, PCI, FIPPA, etc.
18.	It should provide IPv4, IPv6 support.
19.	It should support static and dynamic routing protocol, NAT, PAT, multicast support
20.	It should have redundant power supply, Fan
21.	It should have atleast 4x10G port scalable to 8 and 2x40G port scalable to 4
22.	It should have dedicated OOB Management port for managing the device using CLI(SSH), WebUI(SSL), SNMP, etc
23.	The device should be configurable in High Availability (Active-Active, Active-Passive mode)

24) Intrusion Prevention System

S/N	Specification
1.	The device should be transparent to the network
2.	The device should be configurable in High Availability mode (Active-Active, Active-Passive)
3.	The device should have dual support
4.	The device should provide throughput of 80Gbps
5.	It must support a minimum bandwidth of 10 Gbps (per interface) with no latency or

	performance impact with all protection capabilities enabled.
6.	Should Support atleast 100,000 new connections per second and 30,00,000 concurrent connections
7.	It should have dedicated OOB Management port for managing the device using CLI(SSH), WebUI(SSL), SNMP, etc
8.	Should be able to perform stateful inspection of traffic for: TCP Reassembly IP Defragmentation Bi-directional Inspection Forensic Data Collection Access Lists
9.	Should provide Real-time protection against: Backdoor and Trojans Brute Force Protection SQL Injection Worms and Viruses Cross Site Scripting SNMP Vulnerability Web Protection Mail Server Protection
10.	Should have provision for Real Time Updates of Signatures, Should support Automatic signature synchronization from database server on web Device Should have capability to define User Defined Signatures
11.	Proposed solution should have automatic bypass for IPS in case of performance suffer beyond defined administrative threshold or IPS function/engine fails

25) Server Load Balancer

Sr. No.	Specification
1.	should support load balancing algorithms based on Load, traffic, Users, Hits, Response Time, etc.
2.	Should support Client availability (Heartbeat) monitoring
3.	Should be support High Availability in Active-Active, Active-Passive mode.
4.	Should be Manageable using CLI(SSH), WebUI(SSL), SNMP (V1, V2, V3), etc.
5.	The management option should allow configuration, operation, firmware upgrade, traffic reporting, error logs, status logs
6.	Should support IPv6 from day one
7.	Should support static and dynamic routing
8.	Should support features like Server and Client process coexist, UDP Stateless, Service Failover , Backup/Overflow , Direct Server Return, Client NAT, Port Multiplexing-Virtual Ports to Real Ports Mapping, DNS Load Balancing
9.	Should support Global Server Load balancing, URL based Load balancing, HTTP, HTTP redirection, HTTP Layer 7 redirection, DNS redirection, DNS Fallback redirection,
10.	Should be able to creat and load http/ssl certificates

11.	Should be Rack mountable & should be supplied with Indian standard AC (15Amp) power cord.
-----	---

26) Enterprise Management System

S/N	Specification
1.	The System NMS/EMS system should deliver following functionalities: <ol style="list-style-type: none"> 1. Network & Server Fault Monitoring & Performance for IP/SNMP enabled devices like router, switches, CCTV devices, Sensors, PA System, Emergency Call Boxes, etc 2. Application Performance Management 3. IT Helpdesk – ITIL v3 Aligned 4. Business Services Dashboard 5. Service Level Management 6. Capacity Management 7. IT Asset Inventory Management & License Management 8. Configuration Automation.
2.	The Centralized EMS solution needs to have a standalone system and has to be technology / vendor agnostic that shall enable to introduce any additional technology / vendor in the network. Such a network as and when introduced should seamlessly integrate with the solution proposed and continue to provide the services right since the day one of its introduction.
3.	The EMS should also support single pane visibility across multiple areas of Monitoring
4.	The system must allow for push or pull methods to send/collect or receive the information to and from various 3rd party systems/devices/servers.
5.	The system should have the ability to provide performance/service data to external systems.
6.	The system shall be able to interface with fault management system via standard protocol.
7.	The solution should be able to monitor the performance, availability, utilization, memory, etc of all the devices in the network.
8.	It should have a WEB Based user Interface through which Administrator can access all administrative tasks and operational status monitoring for Network Devices, Servers, Sensors, etc.
9.	It should produce a WEB based interface to the users also for accessing the SLA reports
10.	Should be able integrate with Helpdesk System for automated incidents reporting with option for manual reporting followed by viewing, updating, tracking and closing.
11.	The Enterprise Management tools must have Service Level Management function to allow building various service levels and track the performance of Infrastructure and operational service levels in real time.
12.	The solution should have perpetual licenses to manage all the devices in the network and any other devices that may be added in future

27) Shared file System with Storage & LTO Tape Library

S/N	Parameter	Specification
1.	Primary	<ul style="list-style-type: none"> • Solution should be IP Based/iSCSI/FC/NFS/CIFS

S/N	Parameter	Specification
		<ul style="list-style-type: none"> Retention period of 15days 100% expandable Storage Capacity should be as per Overall Solution Requirement (80% usable) Disks should be preferably minimum of 3 TB capacity To store all types of data (Data, Voice, Images, Video, etc) Modular design to support controllers and disk drives expansion Should be Rack Mountable The controllers / Storage nodes should be upgradable seamlessly, without any disruptions / downtime to production workflow for performance, capacity enhancement and software / firmware upgrades. Licenses for the storage management software should include disc capacity/count of the complete solution and any additional disks to be plugged in in the future, upto max capacity of the existing controller/units. A single command console for entire storage system. Should also include storage performance monitoring and management software Should provide the functionality of proactive monitoring of Disk drive and Storage system for all possible disk failures Should be able to take "snapshots" of the stored data to another logical drive for backup purposes The storage array must have complete cache protection mechanism either by de-staging data to disk or providing complete cache data protection with battery backup for up to 4 hours
2.	Secondary Storage	<ul style="list-style-type: none"> Storage capacity of 3PB for Retention period of 30days It should support LTO-7 drive type with Minimum 6 drives It should support In-box capacity scaling of minimum 50 cartridge slots. It should have capability for multi-unit scalability It should drive interface support - 4 Gb Fibre Channel. It should support tape based data encryption with the longest and most secure keys - 256 bits. It should support web based remote manageability to allow monitoring and managing of the library Web based interface should give - Status information, health, configuration and operations, reporting, error and status logs, Library and drive firmware upgrade capabilities, Diagnostic tests and information, Cartridge movement for maintenance and management purposes, Security and access control.

S/N	Parameter	Specification
		<ul style="list-style-type: none"> It should support SNMP for device monitoring, HTTPS web console, IPv6. Device should have link path failover features, power and cooling fans redundancy. Should support industry leading backup software Offered Secondary Storage solution with LTO Tape by the bidder shall be Certified by the Quoted VMS solution.
3.	File Storage Management software	<ul style="list-style-type: none"> The Shared File System Software should support large file systems and in-Built data archiving to tape mechanism. Upon the File System functionality for the Secondary Storage should not be only responsible to allocate move / Archive the data to tape but it shall be in Native Format between Primary & Secondary Storage automatically without using third party Backup and Archive Software. Supported Inbuilt Archiving functionality shall also allow and Confirm the Archived Data access & Retrieval Directly from VMS without using any third party Backup & Archive extensive system to retrieve the Data from Tape Library. The Shared File System should provide low latency, high throughput concurrent data access to all the clients. The Shared File System should support automatic placement & movement of the files created by the user / applications into appropriate multi-vendor & Compatible Primary storage arrays and then copying / moving the data to Tape pools, based on the defined affinity policies with the fixed duration for primary storage & secondary storage (Tape Library) using in-built Data Mover Mechanism. The Shared File System should support heterogeneous clients on Network with shared data access for the same data set and same Data Storage. Heterogeneous clients support includes Microsoft Windows, Red Hat Enterprise Linux & SUSE Linux, MAC, AIX etc.. File system shall have the capability to allocate the Primary Storage space to recording server, monitors, analyst for read and write access accordingly. The Shared File System shall permit consolidation of Storage with different capacities, performance capabilities and make and model into a common single and Global storage pool. Addition, deletion or failure of any clients shall not have any effect on file system functionality. It shall support to help in reducing the cost of Secondary Tape Storage in case of Increasing the Retention for the

S/N	Parameter	Specification
		<p>installed Camera Count as a future requirement just by adding the Media Cartridges.</p> <ul style="list-style-type: none"> • The Shared file system should be open to support the different/ multiple make of Storage under the same existing Global name space view for all the users/ files in single file system view to all the Hetrogenous client at the time of Storage Expansions and volume expansion with Capacity. • The Shared File System should present the location of the file with the same file path and filename to all its clients. • The Shared File System should allow multiple clients to access the same file for concurrent read. • The Shared File System shall allow online expansion and retirement/removal of storage capacity without taking the file system off line. • Offered file system shall have the inbuilt Data Archiving functionality as a single software without using the LTFS mechanism, It shall be a single GUI to move the data from Primary Disk to Tape Library in the Native File Format and leave the Stubs on to Primary Storage. • Offered File System shall also have the in-built functionality of retrieving the data from Tape active slots in Native Format to Primary Storage through the VMS application as a normal Data access functionality from the VMS. Original Data can be accessed and read by the VMS application or User without using any data recovery console • Offered File System should have the provisioning of keeping a Duplicate / Second copy of the Primary storage's Online Video Data on Secondary Storage as well. Data Older than the Primary storage's retention will be kept only on Secondary LTO Tape Storage. • Shared File System should be capable of recovery in case of system crash or unplanned shutdown. • Offered Shared file system should be capable of recovering all the Backup & archived data in the Native Format from Tape without using the main server, in case of server is down or not in use. • In case of increasing the Retention, only LTO media cartridge to be added to Retain the Data. No other licenses required to increase the Retention to control the Cost. • Secondary Storage should have the in-built Retrieval process, under which it shall restore the data directly on the Same Primray Storage location under the same path from where it was moved to Tape Storage. • Retrieving data from Secondary Storage shall be accessed directly by the VMS application to view/ Monitoring

S/N	Parameter	Specification
		<p>purpos as per the active Tape slot capacity sizing & planning.</p> <ul style="list-style-type: none"> Shared file system shall support to restore all the Data and Data link of the primary Storage content to the same or higher capacity Storage provided, in case of Primary Storage is completely down and not accessible. It shall have the functionality to 'vault' the media and provide a means of notifying the operator to retrieve a 'vaulted' media when an 'oldest' file is requested, when the capacity is increased by increasing the Retention . Shall have administration capabilities through GUI and CLI Shall provide capabilities for user administration Bidder has to estimate licensing requirement for server, workstations for Connected Clients and storage equipment's. It is the bidder responsibility to make the solution operational as per RFP requirement.

28) Tape Library

Sr. No.	Specification
1.	It should support LTO-6 drive type with Minimum 6 drives
2.	It should support In-box capacity scaling of minimum 60 cartridge slots.
3.	It should have capability for multi-unit scalability
4.	It should drive interface support - 4 Gb Fibre Channel.
5.	It should support tape based data encryption with the longest and most secure keys - 256 bits.
6.	It should support web based remote manageability to allow monitoring and managing of the library
7.	Web based interface should give - Status information, health, configuration and operations, reporting, error and status logs, Library and drive firmware upgrade capabilities, Diagnostic tests and information, Cartridge movement for maintenance and management purposes, Security and access control.
8.	It should support SNMP for device monitoring, HTTPS web console, IPv6.
9.	Device should have link path failover features, power and cooling fans redundancy.
10.	Should support industry leading backup software

29) Server

S/N	Parameter	Specification
1.	Processor	Latest series/ generation x86 processor(s) with Twelve or higher cores

S/N	Parameter	Specification
		Processor speed should be minimum 2.4 GHz Minimum 2 processors per each physical server
2.	RAM	Minimum 256 GB Memory per physical server
3.	Internal Storage	2 x 900 GB SAS (10k rpm) hot swap disk with extensible bays
4.	Network interface	2 X 10GbE LAN ports for providing Ethernet connectivity 1 X Dual-port 16Gbps FC HBA for providing FC connectivity
5.	Power supply	Dual Redundant Power Supply
6.	RAID support	As per requirement/solution
7.	Operating System	Licensed latest version of Linux/ Unix/Microsoft® Windows based Operating system
8.	Form Factor	<ul style="list-style-type: none"> Rack server OR Blade server <p>Note : for Blade server, chassis specification should be as below</p>
9.	Virtualization	Shall support Industry standard virtualization hypervisor like Hyper-V, VMWARE, Citrix., etc
Blade chassis specification		
1.	Single blade chassis should accommodate 8 or higher hot pluggable blades and must support proposed server	
2.	Support heterogeneous environment: X86 CPU blades must be in same chassis with scope to run any Operating System	
3.	Blade Chassis shall accommodate hot swappable Interconnect Modules, Power supplies, Fans, Management Modules etc	
4.	Redundant 10Gbps L2/L3 Ethernet switching module to be provided to connect all the blades to the LAN and should be configured to minimize the no. of ports in the external switch as also to reduce the no. of cables coming out of the chassis. There should be minimum 2*10Gbps uplink ports using short range SFP+ modules & 4*1Gbps RJ-45 ports to be provided from each 10Gbps switch to external LAN connectivity.	
	Shall be capable of increasing the number of NICs per connection without adding extra Blade I/O modules, and reducing cabling uplinks to the data center network	
	Shall be capable of providing min 16 x 10Gbps downlinks to Blade server NICs	
	Shall be capable of providing flexibility in choosing between 10Gbps SR, LR, or LRM fiber and copper SFP+ uplinks	
	Shall be capable of providing 10 x 10Gbps uplinks to connect to other Ethernet switches of Data Centre	
	Shall be capable of supporting up to 4 Physical NICs per 10Gbps server communication port, within the server Blade.	
5.	SAN switches to be provided with 16 internal ports and 4 uplink ports (from each switch) to connect with external storage.	
6.	Shall have remotely manageable & redundant architecture without compromising with : <ul style="list-style-type: none"> Performance, Power Supply(N+N), 	

S/N	Parameter	Specification
	<ul style="list-style-type: none"> • Network interface, • Fiber Channel interface, • Management Module , • Cooling unit (fully populated with fans for cooling), • Entire enclosure & its components 	
7.		Should have dedicated network management port for remote administration.
8.		DVD Drive can be internal or external, which can be shared by all the blades allowing remote installation of S/W and OS
9.		Management Module which provides a single point of control for intelligent management of the entire console. It should provide setup & Control of Enclosure, report asset & inventory Information for all the devices in Enclosure.
10.		Systems management and deployment tools to aid in Blade Server configuration and OS deployment
11.		The blade chassis should have at least 4 I/O Modules or more
12.		The offered Blades chassis should support Ethernet/ FC/FCOE switches in blade chassis.
13.		The proposed blade chassis/enclosures/servers should support industry-leading virtualization Infrastructure.

30) Fire Proof Enclosure for Media Storage

S/N	Specification
1.	Capacity 3000 Litres
2.	Should with stand temperature of 1000°C for atleast 1 hour
3.	Internal Temperature should be 30° C after exposure to high temperature For 1 hour
4.	Locking system : 2 IO-lever high security cylindrical / Electronic lock

31) 42U Server Rack

S/N	Specification
1.	42 U : 600 x 1070 x 1991 mm
2.	Door Steel Ful Prf 600W x 42U
3.	Castor with ft break (2+2)
4.	Sliding Tray
5.	Should have sufficient perforation for ventilation of air
6.	IPDU : 2 nos of 32 Ampere IP Switched PDU each having 21 nos C13 sockets, 3 nos of C19 sockets

32) 42U Network Rack

S/N	Specification
1.	42 U : 750 x 1070 x 1991 mm
2.	Door Steel Ful Prf 7500W x 42U
3.	Castor with ft break (2+2)
4.	Sliding Tray

5.	Should have sufficient perforation for ventilation of air
6.	IPDU : 2 nos of 32 Ampere IP Switched PDU each having 21 nos C13 sockets, 3 nos of C19 sockets

33) Camera Type A

S/N	Parameter	Minimum Specification
1.	Image sensor and Effective Pixels (Resolution)	1/ 3 or better, CMOS Progressive Scan & Minimum 3 MP (based on the Type of Utility) or better
2.	Electronic Shutter	1 to 1 / 10,000 s or better
3.	Focus	Automatic / Manual
4.	Automatic Gain Control	Automatic / Manual
5.	Frame Rate	25 FPS for 1920 x 1080
6.	Codec	H.264 or better For future requirement, migration to h.265 should happen with a simple firmware upgrade
7.	Varifocal Lens	As per requirement of various application like Video Analytics/RLVD/ANPR/Speed Detection which suits to size of sensor
8.	Starlight	Required – 0.002 Lux@f1.2
9.	High Light Compensation	Required
10.	Motorized Focal Zoom (MFZ)	Required
Video		
11.	Day and Night functionality	Automatic, Color, Mono
12.	IR illuminator	External Illuminator with visibility should be at least 50m, Power requirement & connectivity should be part of the solution. Illumination (Colour & b/w) should be sufficient to capture Objects/Faces at night time when there is not sufficient illumination at site.
13.	Video Resolution	Minimum 2 MP (1920 x 1080) or Better as per the requirement of the application
14.	WDR	True WDR 100 dB or better
15.	Video Streams	Individually configurable 03 video streams (H.265, H.264, MJPEG)
16.	Intelligent Video	Motion detection, Tampering Alert
Network & Interface		
17.	Interface	RJ-45 for 10/100 base-T Ethernet
18.	Network Protocols support	IPv4, IPv6, TCP/IP, HTTP, DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols/Should meet all functional requirement of the project
19.	Alarm Event	Events / alerts send via FTP, HTTP, email, Pre-Post alarm video buffering.
20.	Compliance	ONVIF compliant latest version
Security		
21.	General	Password Protection, HTTPS encryption, IEEE 802.1X

S/N	Parameter	Minimum Specification
General Camera Features		
22.	Operational Temperature °C	0°C to 55 °C
23.	Casing	IP65 or above
24.	Power	PoE (802.3 af) OR AC 24V/ DC12V, 100- 230VAC
25.	Certifications	CE, FCC, EN/UL
26.	Local Storage (memory card included)	In the event of failure of connectivity to the central server the camera shall record video internally or on the SD card automatically. After the connectivity is restored these recordings shall be automatically merged or can be merged manually as & when required with the server recording such that no manual intervention is required to transfer recordings to server. Minimum 24 Hour capacity should be considered.

34) Camera Type B

S/N	Parameter	Minimum Specification
1.	Image sensor and Effective Pixels (Resolution)	1/ 3 or better, CCD/CMOS Progressive Scan & Minimum 2 MP or better
2.	Electronic Shutter	1 to 1 / 10,000 s or better
3.	Focus	Automatic / Manual
4.	Automatic Gain Control	Automatic / Manual
5.	Frame Rate	25 FPS for 1920 x 1080
6.	Codec	H.264 or better For future requirement, migration to h.265 should happen with a simple firmware upgrade
7.	Varifocal Lens	2.8 to 12mm or better
8.	Starlight	Required
9.	High Light Compensation	Required
10.	Motorized Focal Zoom (MFZ)	Required
Video		
11.	Day and Night functionality	Automatic, Color, Mono
12.	IR illuminator	Internal/External Illuminator with visibility should be at least 50m. Illumination (Color & b/w) should be sufficient to capture Objects/Faces at night time when there is not sufficient illumination at site.
13.	Video Resolution	Minimum 2 MP (1920 x 1080) or Better
14.	WDR	True WDR 100 dB or better
15.	Video Streams	Individually configurable 03 video streams (H.265,H.264, MJPEG)
16.	Intelligent Video	Motion detection, Tampering Alert
Network & Interface		

S/N	Parameter	Minimum Specification
17.	Interface	RJ-45 for 10/100 base-T Ethernet
18.	Network Protocols support	IPv4, IPv6, TCP/IP, HTTP, DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols/Should meet all functional requirement of the project
19.	Alarm Event	Events / alerts send via FTP, HTTP, email, Pre-Post alarm video buffering.
20.	Compliance	ONVIF compliant latest version
	Security	
21.	General	Password Protection, HTTPS encryption, IEEE 802.1X
	General Camera Features	
22.	Operational Temperature °C	0°C to 55 °C
23.	Casing	IP65 or above
24.	Power	PoE (802.3 af) OR AC24V/ DC12V, 100- 230VAC
25.	Certifications	CE, FCC, EN/UL
26.	Local Storage (memory card included)	In the event of failure of connectivity to the central server the camera shall record video internally or on the SD card automatically. After the connectivity is restored these recordings shall be automatically merged or can be merged manually as & when required with the server recording such that no manual intervention is required to transfer recordings to server. Minimum 24 Hour capacity should be considered.

35) Camera Type C: PTZ

S/N	Parameter	Specification
1.	Sensor	1/3" CCD/CMOS & Minimum 2 MP
2.	Min. Illumination	Color: 0.5 lux 0.01 lux with IR or better
3.	Scanning System	Progressive
4.	S / N Ratio	>55dB
5.	IR Distance	100 meters
6.	IR Intensity	Automatically Adjust
7.	IR on/Off Control	Auto
8.	WDR	True WDR 100 db or better
	Lens	
9.	Optical Zoom	30X or better
10.	Focal Length	4.3 to 129mm
11.	Focus Control	Auto/Manual
	Pan Tilt Zoom	
12.	Pan/Tilt Range	Pan: 0° ~ 360° endless; Tilt: -15° ~ 90°, auto flip 180°
13.	Manual Control Speed	Pan: 0.1° ~160° /s; Tilt: 0.1° ~120° /s
14.	Preset Speed	Pan: 240° /s; Tilt: 200° /s
15.	Presets	Minimum 50 Preset Points
	Video	
16.	Compression	H.265/H.264 / MJPEG
17.	Streaming Capability	3 Streams

S/N	Parameter	Specification
18.	Resolution	1080 P or Better
19.	Frame Rate	1080P (1 ~ 25/30fps)
20.	Codec	H.264 or better For future requirement, migration to h.265 should happen with a simple firmware upgrade
21.	Day and Night	Automatic, Color, Mono
22.	White Balance	Auto / Manual /ATW/Indoor/Outdoor/Daylight lamp/Sodium lamp
23.	Noise Reduction	Ultra DNR (2D/3D)
24.	Motion Detection	Required
25.	Region of Interest	Required
26.	Digital Zoom	16X or better
Network		
27.	Ethernet	RJ-45 (10/100Base-T)
28.	Protocols	IPv4/IPv6, HTTP, HTTPS, 802.1X, QoS, FTP, SMTP, UPnP, SNMP, DNS, DDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, ICMP, DHCP, PPPoE,
29.	Interoperability	ONVIF Profile S or higher
30.	Streaming Method	Unicast / Multicast
31.	Local Storage (memory card included)	In the event of failure of connectivity to the central server the camera shall record video locally on the SD card automatically. After the connectivity is restored these recordings shall be automatically merged or can be merged manually as & when required with the server recording such that no manual intervention is required to transfer the SD card based recordings to server. Minimum 24 Hour capacity should be considered.
32.	Certification	CE, FCC, EN/UL
33.	Power	PoE (802.3 af) OR AC 24V/ DC12V, 100- 230VAC
General		
34.	Working Temperature / Humidity	0°C to 55 °C, 80% RH non-condensing within enclosure
35.	Casing	IP65 or above
36.	Mounting Accessories	For pole and surface mount with L/C Brackets


36) Camera Type D : Fisheye

S/N	Parameter	Minimum Specification
1.	Image sensor and Effective Pixels (Resolution)	1/ 3 or better, CCD/CMOS Progressive Scan & Minimum 5 MP or better
2.	Focus	Automatic / Manual
3.	Automatic Gain Control	Automatic / Manual
4.	Frame Rate	30 FPS for 1080 Full HD

5.	Codec	H.264 or better For future requirement, migration to h.265 should happen with a simple firmware upgrade
6.	Lens	1.5mm Fisheye lens for 180 degree Panaromic view and 360 degree Surround view
7.	High Light Compensation	Required
8.	Motorized Focal Zoom (MFZ)	Required
Video		
9.	Day and Night functionality	Removable IR-cut Filter for Day & Night Function
10.	WDR	True WDR 100 dB or better
11.	Video Streams	H.265,H.264, MJPEG
Network & Interface		
12.	Interface	RJ-45 for 10/100 base-T Ethernet
13.	Network Protocols support	IPv6, TCP/IP, HTTP, DHCP, UDP, DNS, SMTP, RTP, RTSP, SNMP protocols/Should meet all functional requirement of the project
14.	Alarm Event	Events / alerts send via FTP, HTTP, email, Pre-Post alarm video buffering.
15.	Compliance	ONVIF Profile S compliant latest version
Security		
16.	General	Password Protection, HTTPS encryption, IEEE 802.1X
General Camera Features		
17.	Operational Temperature °C	0°C to 55 °C
18.	IP rating	Vandal Proof IK8 or above rated, NEMA 4x/IP65 rated Housing.
19.	Power	PoE (802.3 af) OR AC24V/ DC12V, 100- 230VAC
20.	Certifications	CE, FCC, EN/UL
21.	Local Storage (memory card included)	In the event of failure of connectivity to the central server the camera shall record video internally or on the SD card automatically. After the connectivity is restored these recordings shall be automatically merged or can be merged manually as & when required with the server recording such that no manual intervention is required to transfer recordings to server. Minimum 24 Hour capacity should be considered.

37) CCTV Sign boards

#	Item	Specifications
1	Size	Board Width = 12" / 12"
2	Plate Material	Corrosion resistant Aluminum Alloy as per IRC 67:2001 (Code of Practice for Road signs)
3	Plate Thickness	Minimum 1.5 mm

4	Retro-Reflective sheeting for sign-plate	Weather-resistant, having color fastness
5	Other Specifications	As per IRC 67:2001 (Code of Practice for Road signs)
6	Mounting	Can be mounted on wall or pole (appropriate mounting brackets to be provided)
7	Design	<p>As per following signage diagrams:</p> 

38) Display Boards

S/N	Parameter	Specification
1.	LED Type	DIP
2.	Best Viewing Distance(m)	> 10 Meter
3.	Pixel Pitch	10 mm
4.	Pixel Density	1000 Dots/m ²
5.	Brightness	$\geq 7200 \text{ cd/m}^2$ (Adjustable)
6.	Refresh Frequency	$\geq 1000 \text{ Hz}$ (Adjustable)
7.	MTBF	> 10,000 Hours
8.	Max Power Consumption	700 Watt/ m ²
9.	Average Power Consumption	250 Watt/ m ²
10.	Viewing Angle	120° Horizontally & Vertically
11.	Color	More than 16.7 million
12.	Color Temperature	R.G.B brightness 256 level adjustable
13.	IP Rating	IP 65 or above
14.	Life Span	> 100000 Hours (After that 50 % Illumination)
15.	Operating Temperature	0 ° C to 50° C
16.	Operating Humidity	10 % RH to 90% RH
17.	OS Platform	Windows 7/ 10

S/N	Parameter	Specification
18.	Display Resolution	1280*1024
19.	Communication Interface	RJ45 / Fiber port
20.	Software Display Controller	<ul style="list-style-type: none"> Should be able to remotely configure and manage at least 300 LED Screen from a Central location Should be able to play the selective contents at different LED Screens as per the requirement Should provide an easy-to-use playlist format for scheduling of content, images, videos, live feeds such as weather forecasts or the news, social media etc. Assign roles and permissions to allow multiple content creators and managers Should have an interface for content design with ready made/custom made templates Should have options for Importing video feeds, Images and contents from other sources such as inputs from Environmental Sensors, Social Media, Camera Feeds etc. The Hardware for the central Display Controller has to be provided along with the proposed solution From the scalability point of view, the software should be able to do so without any extra Licensing up to 500 LED Screens

39) Access Points

S/N	Specification
1.	Access Points proposed must include radios for both 2.4 GHz and 5 GHz with 802.11n/ac or newer. The same Access Point must also include 2 nos. (WAN+LAN) of 10/100/1000 Base-T auto sensing RJ45 based Ethernet ports.
2.	Should support Signal rejection for 3G/LTE/WiMAX in a co-Located environment.
3.	It should be compatible and be able to integrate with the Cloud based Controller. Must support SSH & SNMP protocol It should be Pre-configured with the necessary open source firmware such that it becomes a Plug and Play device and should be auto discoverable by controller
4.	Should support Proactive Key Caching or other methods for Fast and Secure Roaming.
5.	Each AP Should support 4 WLANs for SSID deployment flexibility.
6.	AP's Should support Minimum 70 Meters radial coverage & Minimum 50 concurrent users @ each radio channel
7.	AP's Should support "802.3 af/at" standards i.e. of Power over Ethernet (PoE+)
8.	Access point shall support Pole, Wall, and roof mounting options.
9.	The Access point shall be IP65 or above rated for dust and water Ingress protection.
10.	The Access point shall be rated for operation over an ambient temperature range of 0° to 55°C

11.	Should support interference detection and avoidance for both Wi-Fi and non-Wi-Fi interferers
-----	--

40) Sensors

S/N	Parameter	Specification
Environmental Sensor		
1.	General	They should be ruggedized enough to be deployed in open air areas such as Traffic Junctions, Streets, Parks, Parking Lots etc.
2.		The sensor should be able to communicate its data using wireless technology
3.		The data should be collected in a software platform that allows third party software applications to read that data.
4.		The sensor management platform should allow the configuration of the sensor to the network and also location details etc.
5.	Measurement Parameter	NOX, SO2, CO2, O2 Ambient Light, Sound
6.	Measurement range	Real Time measurement NOX : 0 to 50ppm , 5000ppm SO2 : 0 to 50ppm, 5000ppm CO : 0 to 50ppm, 5000ppm CO2 : 0 to 10% / 0 to 20% O2 : 0 to 10% / 0 to 25% (2 ranges each, maximum range ratio 1: 25 except O2) *Optionally, N2O and CH4 can be measured Temperature: 0 to 100° C Light: up to 10,000 Lux UV: up to 15 mW/ cm2 Sound/Noise: up to 120 dB (A)
7.	Repeatability Error	±0.5% FS
8.	Drift	Zero Drift: <ul style="list-style-type: none"> ±1.0% FS max per week ±2.0% FS max per week if range is less than 200ppm) ±2.0% FS max./month for O2 meter Span drift : <ul style="list-style-type: none"> ±2.0% FS max per week ±2.0% FS max per month for O2 meter
9.	Response Time	120 seconds max. for 90% response from the analyzer inlet
10.	Connectivity	USB / Ethernet /Wireless
11.	Operating Temperature	0 to 55 °C
12.	Data Interface	GPS ,GSM, Wi-Fi- 802.11 n/ac
Temperature, Humidity Sensor		
13.	Temperature Sensor	Real-time Temperature Range: Indoor -10°C ~ +70°C (+14°F ~ +122°F)

S/N	Parameter	Specification
14.	Humidity Sensor	Real-time in Air Humidity Level
Parking Information System-Sensors		
15.	Sensor Type	Infra Red Vehicle Detection Sensor (with Transmitter and receiver)
16.	Purpose	To uniquely detect a presence of a Vehicle Entering and Exiting the Parking Lot
17.		The IR beams should be suitably modulated to avoid environmental effects.
18.	Outer Casing	The Outer housing of the Sensor should be environment proof

41) Managed Outdoor L2 Switch with PoE - 8-port

S/N	Specification
1.	Minimum 8 No's of 10/100/1000 Base-Tx PoE+ ports (Duplex, Full, Half) and 2 x 1GE Uplink port.
2.	All ports should have features of auto- negotiate, flow control (802.3x), port based network access control (802.1x), port security, MAC filtering etc.
3.	Minimum Switching capacity of 8 Gbps or more
4.	Should be IPv4 and IPv6 ready from day one
5.	Should have IGMP snooping v1,2 & 3 supporting 1K multicast groups
6.	Features of DHCP (including option 82), DHCP Relay NTP or equivalent, SNMPv1, v2 & v3, TELNET/ SSH
7.	Should have console port for administration & management, CLI and web based GUI for easy management
8.	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)
9.	Port Security to secure the access to a port based on the MAC address of a user's device. The aging feature to remove the MAC address from the switch after a specific time to allow another device to connect to the same port.
10.	Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
11.	Port-based and 802.1Q tag-based VLANs, MAC-based VLAN, Guest VLAN, Private VLAN, also known as protected ports, with multiple uplinks
12.	Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, protocol-based VLANs

13.	Duplicate address detection (DAD)
14.	Should be Surge Protection certified
15.	Operating temperature 0 to 60 °C

42) Managed Outdoor L2 Switch with PoE - 16-port

S/N	Specification
1.	Minimum 16 No's of 10/100/1000 Base-Tx PoE+ ports (Duplex, Full, Half) and 2 x 1GE Uplink port.
2.	All ports should have features of auto- negotiate, flow control (802.3x), port based network access control (802.1x), port security, MAC filtering etc.
3.	Minimum Switching capacity of 16 Gbps or more
4.	Should be IPv4 and IPv6 ready from day one
5.	Should have IGMP snooping v1,2 & 3 supporting 1K multicast groups
6.	Features of DHCP (including option 82), DHCP Relay NTP or equivalent, SNMPv1, v2 & v3, TELNET/ SSH
7.	Should have console port for administration & management, CLI and web based GUI for easy management
8.	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)
9.	Port Security to secure the access to a port based on the MAC address of a user's device. The aging feature to remove the MAC address from the switch after a specific time to allow another device to connect to the same port.
10.	Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
11.	Port-based and 802.1Q tag-based VLANs, MAC-based VLAN, Guest VLAN, Private VLAN, also known as protected ports, with multiple uplinks
12.	Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, protocol-based VLANs
13.	Duplicate address detection (DAD)
14.	Should be Surge Protection certified

S/N	Specification
15.	Operating temperature 0 to 60 °C

43) Managed Outdoor L2 Switch with PoE - 24-port

S/N	Specification
1.	Minimum 24 No's of 10/100/1000 Base-Tx PoE+ ports (Duplex, Full, Half) and 2 x 1GE Uplink port.
2.	All ports should have features of auto- negotiate, flow control (802.3x), port based network access control (802.1x), port security, MAC filtering etc.
3.	Minimum Switching capacity of 32 Gbps or more
4.	Should be IPv4 and IPv6 ready from day one
5.	Should have IGMP snooping v1,2 & 3 supporting 1K multicast groups
6.	Features of DHCP (including option 82), DHCP Relay NTP or equivalent, SNMPv1, v2 & v3, TELNET/ SSH
7.	Should have console port for administration & management, CLI and web based GUI for easy management
8.	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)
9.	Port Security to secure the access to a port based on the MAC address of a user's device. The aging feature to remove the MAC address from the switch after a specific time to allow another device to connect to the same port.
10.	Multilevel security on console access to prevent unauthorized users from altering the switch configuration.
11.	Port-based and 802.1Q tag-based VLANs, MAC-based VLAN, Guest VLAN, Private VLAN, also known as protected ports, with multiple uplinks
12.	Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, protocol-based VLANs
13.	Duplicate address detection (DAD)
14.	Should be Surge Protection certified

S/N	Specification
15.	Operating temperature 0 to 60 °C

44) CCC Software (including implementation)

S/N	Parameters	Minimum Specifications
1.	Solution & Platform	Must have built-in fault tolerance, load balancing and high availability & must be certified by the OEM.
2.		Software (Application, Database and any other) must not be restricted by the license terms of the OEM from scaling out on unlimited number of cores and servers during future expansion.
3.		System must provide a comprehensive API (Application Program Interface) or SDK (Software Development's Kit) to allow interfacing and integration with existing systems, and future application and sensors which will be deployed on the field.
4.		The solution should be network and protocol agnostic and provide option to connect legacy system through API's with either read, write or both options. It should connect diverse on premise and/or cloud platform's and makes it easy to exchange data and services between them.
5.		The system shall allow seamless integration with all of the department's existing and future initiatives (e.g. open source intelligence, situation management war room, etc.)
6.		The platform should be able to integrate with any type of sensor platform being used for the urban services irrespective of the technology used.
7.		The platform should be able to normalize the data coming from different devices of same type (i.e. Different lighting sensor from different OEMs, different energy meters from different OEMs etc.) and provide secure access to that data using data API(s) to application developers
8.	Convergence of Multiple feeds / services	<p>System need to have provision that integrates various services and be able to monitor them and operate them. The solution should provide option to integrate existing deployed solution by City and also need to provide scalability option to implement new use cases.</p> <p>System should have capability to source data from various systems implemented in Ahmedabad City to create actionable intelligence</p>

S/N	Parameters	Minimum Specifications
9.	Industry Standards for the Command & Control Center	The solution should adhere to the Industry standards for interoperability, data representation & exchange, aggregation, virtualization and flexibility
10.		IT Infrastructure Library (ITIL) standards for Standard Operations Plan & Resource Management
11.		Geo Spatial Standards like GML & KML etc.
12.		Business Process Model and Notation (BPMN) or equivalent for KPI Monitoring.
13.	Command & Control Center Components	Web server to manage client requests. Client should provide web-based, one-stop portals to event information, overall status, and details. The user interface (UI) to present customized information in various preconfigured views in common formats. All information to be displayed through easy-to-use dashboards.
14.		Application server to provide a set of services for accessing and visualizing data. Should be able to import data from disparate external sources, such as databases and files. It should provide the contacts and instant messaging service to enable effective, real-time communication. It should provide business monitoring service to monitor incoming data records to generate key performance indicators. It should also provide the users to view key performance indicators, standard operating procedures, notifications, and reports, spatial-temporal data on a geospatial map, or view specific details that represent a city road, building or an area either on a location map, or in a list view. The application server should provide security services that ensure only authorized users and groups can access data. Analytics functionality can be part of application server or separate server
15.	Incident Management Requirements	The system must provide Incident Management Services to facilitate the management of response and recovery operations:
16.		Should support comprehensive reporting on event status in real time manually or automatically by a sensor/CCTV video feeds.
17.		Should support for sudden critical events and linkage to standard operating procedures automatically without human intervention.
18.		Should support for multiple incidents with both segregated and/or overlapping management and response teams.
19.		Should support Geospatial rendering of event and incident information.
20.		Should support plotting of area of impact using polynomial lines to divide the area into multiple zones on the GIS maps.

S/N	Parameters	Minimum Specifications
21.		Should support incorporation of resource database for mobilizing the resources for response.
22.		Should provide facility to capture critical information such as location, name, status, time of the incident and be modifiable in real time by multiple authors with role associated permissions (read, write). Incidents should be captured in standard formats to facilitate incident correlation and reporting.
23.		The system must identify and track status of critical infrastructure / resources and provide a status overview of facilities and systems
24.		Should provide detailed reports and summary views to multiple users based on their roles.
25.		A Reference Section in the tool must be provided for posting, updating and disseminating plans, procedures, checklists and other related information.
26.		Provide User-defined forms as well as Standard Incident Command Forms for incident management.
27.	Integrated User Specific & Customizable Dashboard	Should provide integrated dashboard with an easy to navigate user interface for managing profiles, groups, message templates, communications, tracking receipts and compliance
28.		<ul style="list-style-type: none"> Collects major information from other integrated City sensors/platforms. Should allow different inputs beyond cameras, such as, PC screen, web page, and other external devices for rich screen layout Multi-displays configurations Use of, GIS tool which allows easy map editing for wide area monitoring (Google map, Bing map, ESRI Arc GIS map, etc.).
29.		Should provide tools to assemble personalized dashboard views of information pertinent to incidents, emergencies & operations of command center
30.		Should provide historical reports, event data & activity log. The reports can be exported to pdf or html formats.
31.		Should provide dashboard filtering capabilities that enable end-users to dynamically filter the data in their dashboard based upon criteria, such as region, dates, product, brands, etc. and capability to drill down to the details
32.	Integration with Social Media & Open	Should provide integration of the Incident Management application with the social media. Should Provide analytics based on the social media feed, other big data sources as identified by AMC/SCADL and collected from the open

S/N	Parameters	Minimum Specifications
	Source Intelligence	source intelligence and collate with the surveillance inputs to alert the responders for immediate action on the ground.
33.		Should extract messages and display it in an operational dashboard.
34.		Should be able to correlate the extracted message from the social media with existing other events and then should be able to initiate an SOP.
35.		Should be able to identify the critical information and should be able to link it to an existing SOP or a new SOP should be started.
36.		Should provide notifications to multiple agencies and departments (on mobile) that a new intelligence has been gathered through open source/social media.
37.	Device Status, Obstruction Detection and Availability Notification	Should provide icon based user interface on the GIS map to report non-functional device.
38.		Should also provide a single tabular view to list all devices along with their availability status in real time.
39.		Should provide User Interface to publish messages to multiple devices at the same time.
40.	Event Correlation	Command & Control Center should be able to correlate two or more events coming from different subsystems (incoming sensors) based on time, place, custom attribute and provide correlation notifications to the operators based on predefined business and operational rules in the configurable and customizable rule engine.
41.	Standard Operations Procedures (SOP)	Command & Control Center should provide for authoring and invoking unlimited number of configurable and customizable standard operating procedures through graphical, easy to use tooling interface.
42.		Standard Operating Procedures should be established, approved sets of actions considered to be the best practices for responding to a situation or carrying out an operation.
43.		The users should be able to edit the SOP, including adding, editing, or deleting the activities.
44.		The users should be able to also add comments to or stop the SOP (prior to completion).
45.		There should be provision for automatically logging the actions, changes, and commentary for the SOP and its activities, so that an electronic record is available for after-action review.

S/N	Parameters	Minimum Specifications
46.		The SOP Tool should have capability to define the following activity types:
47.		Manual Activity - An activity that is done manually by the owner and provide details in the description field.
48.		Automation Activity - An activity that initiates and tracks a particular work order and select a predefined work order from the list.
49.		If-Then-Else Activity - A conditional activity that allows branching based on specific criteria. Either enter or select values for Then and Else.
50.		Notification Activity - An activity that displays a notification window that contains an email template for the activity owner to complete, and then sends an email notification.
51.		SOP Activity - An activity that launches another standard operating procedure.
52.	Key Performance Indicator	Command & Control Center should be able to facilitate measurement or criteria to assay the condition or performance of departmental processes & policies.
53.		Green indicates that the status is acceptable, based on the parameters for that KPI, no action is required.
54.		Yellow indicates that caution or monitoring is required, action may be required.
55.		Red indicates that the status is critical and action is recommended.
56.	Reporting Requirements	Command & Control Center should provide easy to use user interfaces for operators such as Click to Action, Charting, Hover and Pop Ups, KPIs, Event Filtering, Drill down capability, Event Capture and User Specific Setup
57.		The solution should generate Customized reports based on the area, sensor type or periodic or any other customer reports as per choice of the administrators
58.	Collaboration Tools	Should provide tools for users to collaborate & communicate in real-time using instant messaging features.
59.	Communication Requirements	The solution should adhere to the below mentioned communication requirements.
60.		Provide the ability to search/locate resources based on name, department, role, geography, skill etc. for rapidly assembling a team, across department, divisions and agency boundaries, during emergency

S/N	Parameters	Minimum Specifications
61.		Provide the capability to Invite - Using information provided during the location of those individuals or roles, invite them to collaborate and to share valuable information.
62.		Provide a single web based dashboard to send notifications to target audiences using multiple communication methods including voice-based notification on PSTN/Cellular, SMS, Voice mail, E- mail and Social Media
63.		The solution should provide Dispatch Console integrates with various communication channels. It should provide rich media support for incidents, giving dispatchers the power to consolidate information relating to an incident and instantly share that information among responder teams. It should assess the common operating picture, identify & dispatch mobile resources available nearby the incident location. Augment resources from multiple agencies for coordinated response.
64.	Authentication	Use authentication information to authenticate individuals and/or assign roles.
65.	Instant messaging	Provide ability to converse virtually through the exchange of text, audio, and/or video based information in real time with one or more individuals within the emergency management community.
66.	Events and Directives control	Should provide the capability for the events that are produced from a sub-system and are forwarded to the Command & Control Center. Events could be a single system occurrence or complex events that are correlated from multiple systems. Events could be ad hoc, real-time, or predicted and could range in severity from informational to critical. At the Command & Control Center, the event should be displayed on an operations dashboard and analysed to determine a proper directive.
67.		Directives issued by the Command & Control Center should depend on the severity of the monitored event. Directives will be designed and modified based on standard operating procedures, as well as state legislation. A directive could be issued automatically via rules, or it could be created by the operations team manually.
68.	What-if Analysis Tool	The solution should provide the capability to manage the emergencies and in-turn reducing risks, salvaging resources to minimize damages and recovering the assets that can speed up recovery.
69.		To take proactive decisions that help minimize risks and damages, the solution should provide Analytical and Simulation systems as part of the Decision Support System. The solution should help simulate what if scenarios. It should help visualize assets/resources at risk due to the pending/ongoing incident, should render impacted region on a GIS/3D map. The solution should help

S/N	Parameters	Minimum Specifications
		build the list of assets, their properties, location and their interdependence through an easy to use Graphical User Interface. When in What if Analysis mode the solution should highlight not only the primary asset impacted but also highlight the linked assets which will be impacted. The user should be able to run the What-if Analysis mode for multiple types of emergency events such as Bomb Blast, Weather events, Accidents etc.
70.	Resource & Route Optimization	Should provide an optimization engine for solving problems expressed as mathematical programming models.
71.		Should provide a software library of constraint programming tools supporting constraint propagation, domain reduction, and highly optimized solution search.
72.		The system should provide the software component for the message broadcast and notification solution that allows authorized personal and/or business processes to send large number of messages to target audience (select-call or global or activation of pre-programmed list) using multiple communication methods including SMS, Voice (PSTN/Cellular), Email and Social Media.
73.	Alert & Mass Notification Requirements	Provide a single web based dashboard to send notifications to target audiences using multiple communication methods including voice-based notification on PSTN/Cellular, SMS, Pager, Voice mail, E-mail and Social Media
74.		Provide function for creating the alert content and disseminating to end users. Provision of alerting external broadcasting organizations like Radio, TV, Cellular, etc., as web-service.
75.		Provide Role based security model with Single-Sign-On to allow only authorized users to access and administer the alert and notification system.
76.	Security & Access Control	Provide comprehensive protection of web content and applications on back-end application servers, by performing authentication, credential creation and authorization.
77.	Internet Security	Comprehensive policy-based security administration to provide all users specific access based on user's responsibilities. Maintenance of authorization policy in a central repository for administration purposes.

S/N	Parameters	Minimum Specifications
78.	Authorization	Should support to enable assignment of permissions to groups, and administration of access control across multiple applications and resources. Secure, web-based administration tools to manage users, groups, permissions and policies remotely
79.	User group	Provide policies using separate dimensions of authorization criteria like Traditional static Access Control Lists that describe the principals (users and groups) access to resource and the permissions each of these principals possess.
80.	Provide multi-dimensional access control	SSO to Web-based applications that can span multiple sites or domains with a range of SSO options.
81.	Flexible single sign-on (SSO)	Support LDAP authentication mechanism
82.	Authentication	Should have ability to respond to real-time data with intelligent & automated decisions
83.	Rule Engine & Optimization	Should provide an environment for designing, developing, and deploying business rule applications and event applications.
84.		The ability to deal with change in operational systems is directly related to the decisions that operators are able to make
85.		Should have at-least two complementary decision management strategies: business rules and event rules.
86.		Should provide an Integrated development environment to develop the Object Model (OM) which defines the elements and relationships
87.		
88.	Situational Awareness COP (Common Operational Picture)	<ul style="list-style-type: none"> The CCA should be able to combine data from various sources and present it as different views tailored to different operator's needs. The CCA should automatically update the information based on alarms and incidents that are presented to it via the business rules engine. The polling and CCA database refresh cycle shall be configurable to match the status of the situation (whether there is an emergency or crisis or just monitoring only). Common Operational Picture should comprise of a comprehensive view of the incident or a group of related incidents as on a specific date and time which should include but not be limited to the following:

S/N	Parameters	Minimum Specifications
		<ul style="list-style-type: none"> ○ Tasks assignment and their status ○ Agencies involved ○ Resources deployed ○ Incident status across relevant parameters of the incident e.g. household affected by a transformer shut down ○ Timeline view of the situation <p>Suggested actions from the system with their status</p>
89.	Task Management	<ul style="list-style-type: none"> • The system should be able to create, assign, track and report on the lifecycle of tasks during a particular incident. • The system should allow a particular task to be decomposed into sub-tasks. • The system should provide an easy to interpret management dashboard view of the progress of all tasks during an incident. • The system should be able to organise the visual representation of tasks into prioritized list, filtered list, as well as colour coded representation for ease of understanding. • The system should be able to perform the following functions around task management: <ul style="list-style-type: none"> ○ Create a task with unique ID. (Subtasks shall follow parent ID with second level numbering). ○ Assign a target completion date and time for the task, either directly or as a time-span from the task's creation. ○ Date and time stamp of the creation of the task. ○ Log and track status of tasks. System should provide capability to define status of tasks during its lifecycle. These status definitions could be mapped to other task attributes such as the task type. ○ Key-word search against task list. • The above attributes shall be colour coded. • The system shall allow the tasks to be filtered on the real-time dashboard by agency then by task status. This filtering should allow an operator to filter for all tasks of a particular state or a combination of state; and by the time remaining until (or time elapsed since) the target completion time. • The system should allow multiple individual workstations to select specific agencies of interest on each workstation simultaneously.

S/N	Parameters	Minimum Specifications
		<ul style="list-style-type: none"> The system should allow the NRDA to display all agencies' tasks simultaneously as well. The tasks should be displayed on a real-time timeline. <p>The criticality of tasks should be dynamically changed depending on the performance of the incident response.</p>
90.	Timeline and Charting	<ul style="list-style-type: none"> The system should provide a facility to see incidents and actions (tasks) added to the CCA in a tabular list form as well as GANTT chart format filtered by day, week, month, year or any specific date range. The system should provide a facility to see incidents, actions and interdependencies between actions in a clear visual graphical manner. The system should be able to filter the information based on at least the following parameters: <ul style="list-style-type: none"> Incident information Resources information Agency type Tasks <p>Criticality or priority</p>
91.	GIS Display	<ul style="list-style-type: none"> Shall view the environment through geospatial or fixed composite computer-generated (JPEG, BMP, AutoCAD, etc.) map Should allow user to view sensor and related name from the displayed map Should allow all resources, objects, sensors and elements on the map to be georeferenced such that they have a real world coordinate. Should visually display a camera sensor with related camera orientation, camera range and camera field of view angle. Should visually display an alarming sensor on map Should visually differentiate sensor alarm severities on map through different color and icon identifiers Should immediately view alarm details (including description, video, etc.) and investigate the alarm from the map Should allow user to choose camera and other sensors from map to view live video and the data Should allow user to choose camera and take live video image snapshot and save to file from any camera Should allow user to choose camera from map to move PTZ cameras

S/N	Parameters	Minimum Specifications
		<ul style="list-style-type: none"> • Should allow user to choose camera to play, pause, stop, fast-forward, rewind, and play recorded video from preset time • Should allow user to choose camera and take recorded video image snapshot and save to file or print from any live or recorded video • Should allow user to jump from one map to the next with a single click of a mouse with map links • Should allow map information “layers” to be displayed/hidden on items such as – <ul style="list-style-type: none"> ○ Sensor names ○ Sensors ○ Sensor range (e.g. camera – orientation, range, field of view angle) <ul style="list-style-type: none"> ○ Locations and zones ○ Perimeter ranges ○ Resource tracks <p>Allow user to zoom in/out on different regions of map graphic</p>
92.	Video Display	<ul style="list-style-type: none"> • Shall view live or recorded video from resizable and movable windows • Should have an ability to perform video controls for video systems from workstation • Shall play, fast-forward, rewind, pause, and specify time to play recorded video • Shall take a video still image (snapshot) from live or recorded video • Shall export video for user specified time and duration • Shall have the capability to move PTZ cameras • Shall view Video in Video Matrix • Shall display in 1x1, 2x2, 3x3 and 4x4 window formats • Shall enable operator to specify video windows to be displayed in matrix • Shall enable matrix settings to be saved per user • Shall view either live or recorded video can be displayed in the video matrix window. • Shall enable video snapshot to be taken and saved from any window pane in the matrix view • Shall rotate video in “virtual” video guard tour • Shall rotate through multiple video views based on predefined video camera sequence and duration. • Shall enable the user to pause the rotation of video and resume the video rotation again • Shall enable times between new video to be adjusted

S/N	Parameters	Minimum Specifications
		<ul style="list-style-type: none"> Shall enable both live video and recorded video to be played through the video guard tour. Shall enable alarms to be generated from any video pane Shall enable user to only view and control video for which they have been assigned permissions by the administrator <p>Shall manually create an alarm from the live or recorded video with specified severity and description</p>
93.	Alarm Display	<ul style="list-style-type: none"> Should have an ability to display alarm condition through visual display and audible tone Should have an ability to simultaneously handle multiple alarms from multiple workstations Should have an ability to automatically prioritize and display multiple alarms and status conditions according to pre-defined parameters such as alarm type, location, sensor, severity, etc. <p>Should display the highest priority alarm and associated data / video in the queue as default, regardless of the arrival sequence</p>
94.	Historical Alarm Handling	<p>Should have an ability to view historical alarms details even after the alarm has been acknowledged or closed.</p> <p>Should have an ability to sort alarms according to date/time, severity, type, and sensor ID or location.</p>
95.	Alarm Reporting	<ul style="list-style-type: none"> Should have an ability to generate a full incident report of the alarm being generated. Should have an ability to display report on monitor and print report <ul style="list-style-type: none"> Should have details of alarm including <ul style="list-style-type: none"> severity, time/date, description and location Captured video image snapshots Relevant sensor data such as SCADA sensors Response instructions Alarm activities (audit trail) Should have an ability to export alarm report in various formats including pdf, jpeg, html, txt, and mht formats <p>Should have an ability to generate an alarm incident package including the full incident report and exported sensor data from the incident in a specific folder location.</p>
96.	Alarm Policies and Business	<ul style="list-style-type: none"> The CCA solution should have the following ability to handle the workflow alarms through graphical user interface.

S/N	Parameters	Minimum Specifications
	Logic Administration	<ul style="list-style-type: none"> Should have an ability to match keywords or text from the alarming subsystem's incident description to raise an alarm using criteria including exact match, exact NOT match, contains match, wildcard match and regularly expression match (such as forced door alarm, denied access, door open too long, etc.) Should have an ability to optionally match alarming subsystem's incident status, incident severity, and sensor type Should have an ability to apply any alarm policy to one or more monitoring area(s) or zone(s) without having to reapplying the policy multiple times. Should have an ability to apply any alarm policy to one or more sensors without having to reapply the policy multiple times. Should have an ability to assign specific actions for each alarm Should have an ability to activate or deactivate alarms as required Should have an ability to create exceptions Should Create batch-wise rules and process them Should Check and rectify logical errors and contradictory rules Should have an ability to schedule execution of rules Should Suspend or Terminate the application of rule <p>Should archive unused or deactivated rules</p>

45) CCC Contact Center

Contact Centre	<ol style="list-style-type: none"> For upto 10 agents Automatic call distribution, Automatic identification of incoming number based on landline and mobile number mapping Call recording mapped to incident tickets Customizable agent and supervisor desktop layout Inbound and outbound capability Call control Multisession web chat Email Live data reporting gadgets Phonebook Multiline support Speed dial in IP phones
-----------------------	---

Radio network interoperability

1. IP Push to Talk Radio: Instant communication to critical first responders via push to talk over IP. This will enable All communication across various business sites.
2. The radio over IP solution must integrate any analog or digital radio system, any to any Push To Talk (PTTT) communications.
3. The system shall create virtual talk groups (VTGs) to facilitate Push-to-Talk (PTT) communications between users of multiple types and technologies of Land Mobile Radios with users of PCs, landline phones, cellular and android phones, and IP phones.
4. The system shall provide a High Availability option of adding a secondary hot standby server to provide high availability with no single point of failure. If a primary server fails, the secondary server automatically takes over service without communication interruption
5. The solution must send encrypted data for PTT communications.
6. The system shall provide a web service API to integrate System with third party applications, such as Command and Control
7. The system shall support role-based management to provide compartmentalized functions for personnel who need to perform different roles.
8. System should be capable to the system shall provide an easy-to-use Web interface. Authorized personnel shall be able to access the System Server from any location by using a supported browser and a network connection
9. Integrate with IP phones to talk to radio walkie talkies / Any other compatible Phone
10. The system shall provide Loop Prevention: As multiple dispatchers patch channels together, there is always the possibility of creating a channel loop that causes audio feedback into the communication path. The system should automatically identify potential audio loops and resolve them before they become an issue
11. The System Server shall provide an audit trail for analysis, critique, and operations management. Detailed activity logging shall allow administrators to determine which user actions were performed and when they were performed

46) VMS Software

Sr No	Parameter	Minimum Specification
1.	General	<ul style="list-style-type: none"> The VMS should be built on “Open Platform” i.e. should be able to support any ONVIF compliant IP cameras without any limitation to any kind of licensing. VMS server shall be deployed in a clustered server environment/Support in built for high availability and failover for directory & recording servers VMS shall be capable of being deployed in a virtualized server environment without loss of any functionality. All CCTV cameras locations shall be overlaid in graphical map in the VMS Graphical User Interface (GUI). The cameras selection for viewing shall be possible via clicking on the camera location on the graphical map. The graphical map shall be of high resolution enabling operator to zoom-in for specific location while selecting a camera for viewing.
2.	Scalability	The VMS shall have ability to connect and integrate other technologies and third party software systems (e.g. ANPR, RLVD, Face Detection, Speed Violation Detection, Environmental Sensors etc.) and act as a singular platform for entire surveillance and security system. The system should be able to bi-directionally and dynamically exchange data between various software applications in real-time as well as schedule transfer. It should Support for unlimited cameras, servers, sites and clients. Support for storage expandability.
3.	User Management	Centrally controlled user management - Users, roles, rules and privileges should be stored on the central VMS server allowing any authorized user to log into any workstation.
4.	Device Discovery	The VMS shall have ability to easily install, configure, modify, search and remove surveillance devices with automatic discovery of IP devices.
5.	Event management	The VMS shall have ability to enforce custom settings for event detection, alarm notification, recording, input/out (I/O) control, and other features in response to events. The alarm management module shall support graphical displays with interactive icons to display the status of the cameras & other inputs.
6.	Software/Patch Upgrade	<ul style="list-style-type: none"> It Should allow quick software and patch upgrade and support of new devices, drivers and operating systems. System should be able to implement software upgrades without requiring all hardware components to be reconfigured For future requirement, migration to h.265 should happen with a simple firmware upgrade

7.	Recording & Transfer	<ul style="list-style-type: none"> - Should support dual streaming - Should allow each stream to be viewed independently by client viewer. - Recording from connected cameras Should be stored in individual databases. - Should support multiple storage formats - Should support recording in all resolution at desired FPS - Should support video cum audio recording - shall support automatic failover for recording - shall be capable of transferring recorded images to recordable media (such as CD/DVD and/or tapes) - or Video Exports with VMS's Native Format along with Watermark and Encrypted with SSL / TLS technology, one can protect the video tampering and prove that the video is not tampered
8.	Motion Zone Masking	VMS should Support Exclusion of Motion /Masked Zones to enhances optimized recordings and storage.
9.	Customized Record Retention	Should support Customized recording retention period for specific camera, group, area etc.
10.	Remote User Support	Should support multiple remote users via network/web browser/client software
11.	Device Grouping	<ul style="list-style-type: none"> - The VMS shall have ability to logically group devices based on installation location, device type, configuration type or any other predefined rules. - Individual cameras/devices should have the capability to inherent rules from parent group/subgroup.
12.	Parameter Configuration	The VMS shall have ability to configure multiple streams with different quality parameters e.g. Codec (H.264, H.265 MPEG, JPEG) , resolution, frame & bit rate etc.
13.	Image Stabilization	The VMS shall have Electronic Image Stabilization feature
14.	Device Search	The VMS shall have ability to search and view device(s) based on standard criteria like ID, Name, Location, Group, Type etc.
15.	Storage Indexing	VMS should store video feeds in a standard folder tree structure so that it becomes easy for system admin to browse videos categories based on year, month, date and time wise. Also the file name should indicate important attributes like camera location, date, time etc.
16.	Video Wall / Monitor Support	<ul style="list-style-type: none"> - Multiple monitor support: The system should allow connecting multiple monitors on single client workstation and display different contents on each of the connected monitor. - All panes / tiles should indicate mode (live or recoded), source (camera name/location) and date/time and applied quality information (FPS, CODEC).

		<ul style="list-style-type: none"> - The font color shall be changed automatically in sync with the video/image to have a clear text reading at any point of time. - A matrix view should support multiple formats on video wall and any number of multiple screen divisions.
17.	PTZ controls	PTZ configuration and control including presets, patterns, patrolling, priority, Zoom in/out and permissions.
18.	Shortcut Keys	Along with menu-driven interface, a VMS should also support custom shortcut keys to help operators quickly switch between different modules/screens, change views or panes/tiles and to carry out playback functions.
19.	Image Snapshot	System should allow creating a still image from live or recorded feed and storing it into a workstation.
20.	Digital Zoom	Digital zoom to enlarge portion of an image to provide superior zooming capability.
21.	Display Interface	Option to view surrounding cameras: The system should enable operators to select master camera feed and based on group/subgroup details, its surrounding cameras should be automatically displayed on separate panes. These panes/tiles should be dynamically generated so that operator does not need to manually pull the feeds from desired cameras.
22.	Video Search and retrieval	The VMS shall have ability to quickly search and retrieve recordings: Search methods should include search by camera(s), group, date/time, alarm/event / bookmark list, smart (motion) search by creating motion index or by generating thumbnail summary of a video archive to locate specific event.
23.	Playback Control	The system should offer following playback controls like Play/Pause, Lock speed, Forward playback (1x, 2x, 4x), Reverse playback (-1x, -2x, -4x), Slow forward playback (frame by frame, 1/8x, 1/4x, 1/3x, 1/2x, 1x), Slow reverse playback
24.	Camera Tampering	<p>The VMS should provide a centralized camera tampering detection solution in real-time by automatically identifying tampering to ensure video image capture and integrity. The solution sends an alert when the following potential tampering is detected:</p> <ul style="list-style-type: none"> • Scene too bright — e.g. flash light, direct sun, laser pointer that is pointed at the camera, causing it to become over saturated. • Scene too dark — not enough light to see a clear image, if camera is covered. • Camera is covered or blocked — if something is blocking or partially blocking most of the camera's field of view. • Camera redirection detection — if camera is redirected from its' initial position of field of view (FOV). • Unfocused or blurred view — if the camera was sprayed with rain or its focus changed. <p>The System should be able to detect tampering on any IP camera that has been discovered in the VMS</p>

25.	Mobile App	The bidder needs to provide a Mobile App and integrate it with the VMS system for 2-way communication with the Video Management System in a secure manner. The App should be able to provide Role-based access to the users
26.	Reports	The system should provide interactive reporting interface with standard and user-defined custom reports and filtering options to: <ul style="list-style-type: none"> - Review currently logged in users and functions being performed. - Retrieve audit trails - user activities, errors and system logs. - View list of hardware units and selected configuration options. - List down configured users and corresponding roles & permissions. - View details of bookmarks, event/alarm history and exported evidences.
27.	SDK	The VMS must be supplied along with its well documented Software Development Kit (SDK): The SDK should include a rich, easy-to-use Application Programming Interface (API) that supports the most common programming languages.

47) Video Analytics Application with licenses

S/N	Specification
1.	The software/ system should be capable to identify Unattended Objects, Baggage's, Persons, vehicles etc. through video analytics Techniques/Algorithms
2.	The System should support the Object Origin feature
3.	Should be able to track a Person/ moving Object till the last point of the camera view
4.	Should generate an Alarm/Alert in case of detection of an Unidentified Object/Baggage
5.	The System Should be capable to do the analytics on Live Video Cameras as well as Stored Video records from such cameras
6.	The applications should also be able to do People search based on a given description/attributed/Sketch/Full length photograph
7.	Should have an interface to Create sketches, Composite (Human like Figure) of the suspect based on description. There Shall be different options available for describing hair color and style, Facial Attributes, shirts, trousers, patterns, etc.
8.	The applications should be able to integrate with the VMS of the Command and Control Center
9.	The System should support any architecture namely distributed, centralized and hybrid
10.	It should support Support commercial-off-the-shelf computing hardware without the need of any proprietary hardware
11.	Able to produce reliable analytics at lower resolutions like 4CIF resolution in order to save the computation
12.	It should support open platform Video Management System (VMS)
13.	It should get video from camera or VMS and send alarms to VMS to be viewed in VMS client
14.	It should support multiple regions of analytics on single video feed

48) Speed Detection Application with licenses

S/N	Specification
1.	The Vehicle Speed Detection system should be a camera based Video analytics system where in the speed of the vehicle is automatically calculated and violations is detected based on the permissible speed limits.
2.	The Automatic Speed Detection application will have to be integrated with the ANPR and e-challan application (to be developed under the scope of this RFP) of the Ahmedabad City Police Department and the Central Database of the Transport Department (VAHAN Database managed by NIC), NCRB such that e challans can be generated by the system through an automated process.
3.	The Camera system shall be capable of measuring speeds with an accuracy of 90% in detecting speed limit violations and photographing the incident.
4.	The system should be capable to detect Speed of the violating vehicle even at very high speed up to 150 Km/ Hour
5.	Both day and night time violations should be captured with the same level of accuracy
6.	The system should be able to generate alarms /alerts based on the vehicles status and category like “Wanted”, “Suspicious”, “Stolen” etc. as categorized by the NCRB database.
7.	The Speed Violation details and alert and E-challan related videos/ photo feed should go to the central control room, whereas the processing and recording of the video footage of speed violation
8.	Should be able to integrate with the Video Management Software to be proposed under this RFP
9.	Should be able to store the details captured in Storage system as per the guidelines received from AMC/SCADL/Police Department

49) ANPR Application with enterprise license

S/N	Specification
1.	Vehicle Detection and Video Capture Module: - The System should automatically detect a vehicle in the camera view using video detection and activate license plate recognition
2.	The System shall automatically detect the license plate in the captured video feed in real-time of all passing vehicles irrespective of traffic violation and non-violation
3.	The system shall perform OCR (optical character recognition) of the license plate characters (English and Gujarati alpha-numeric characters in standard fonts).

	The system shall be robust to variation in License Plates in terms of font, size, contrast and color and should work with good accuracy for all type of vehicles cars, HGV, LGV , PSV and two wheelers
4.	The System shall store JPEG image of vehicle and license plate and store it in a database along with date and time stamp along with site location details.
5.	The System shall be able to capture license plate in day and night operation.
6.	The System should be able to capture license plates for vehicle moving up to the speed of 150 Km/Hours at: <ul style="list-style-type: none"> • 80 % accuracy for Standard English alpha-numeric fonts and HSRP • 75% accuracy for Gujarati Font(4 Variants)
7.	The system should have option to take input of registration numbers according to the hot listed categories like “Wanted”, “Suspicious”, “Stolen” etc. by authorized personnel.
8.	On successful recognition of the number plate, system should be able generate instantaneous and automatic alarm to alert the control room for vehicles which have been marked as "Wanted", "Suspicious", "Stolen", "Expired". (System should have provision/expansion option to add more categories for future need).
9.	The system shall enable easy and quick retrieval of snapshots, video and other data for post incident analysis and investigations. For example a database could be searched using criteria like date, time, location and vehicle number
10.	The system should be able to generate suitable MIS reports that will provide meaningful data to concerned authorities and facilitate optimum utilization of resources. These reports shall include. <ul style="list-style-type: none"> ▪ Report of vehicle flow at each of the installed locations for Last Day, Last Week and Last Month. ▪ Report of vehicles in the detected categories at each of the installed locations for Last Day, Last Week and Last Month. ▪ Report of Vehicle Status change in different Vehicle Categories.
11.	The system should be able to store license plates numbers of at least 10,000 suspected vehicles at a time and should generate an Alert in form of Video popup at the Monitor and/or SMS on Cell phones in case such vehicle has been captured by the ANPR system.
12.	The system shall have Search option to tune the reports based on license plate number, date and time, site location as per the need of the authorities.
13.	The system shall have option to save custom reports for subsequent use. The system shall have option to export report being viewed to common format for use outside of the ANPR or exporting into other systems.
14.	The system should provide advanced and smart searching facility of License plates from the database. There should be an option of searching number plates almost matching with the specific number entered (up to 1 and 2 character distance).

15.	Should be able to integrate with the Video Management Software to be proposed under this RFP
16.	Should be able to store the details captured in Storage system as per the guidelines received from AMC/SCADL/Police Department

50) Application and System Software and licenses for RLVD

S/N	Specification
1.	The RLVD should use the Video/Image processing techniques to identify the red light violator
2.	The system should be able to identify red signal light either through the Camera or through the Traffic Controller to know signal status.
3.	The solution should synchronize the record of Red Light violation, Number plate of vehicle and 3 snaps clearly showing the vehicle is crossing the stop line while signal is RED which can be used as evidence where required. The solution will be used for multiple type of violation including Red Light Violation, three seating, not wearing helmet, seat-belt, wrong side/lane driving etc. It should be able to intimate the incidence in real time through SMS to designated Cell phone, so that this facility can be used to alert the traffic personnel posted at the next traffic intersection.
4.	The system should generate Alarms at control room software if any signal is found not turning RED within a specific duration of time.
5.	The system should provide facility to search for the cases of violations occurred during any specific span of time, and provide a statistical analysis of the number of such incidences occurring during various days of the month, various months of the year in graphical forms. A report of all such incidences should be available and transferable in hard copy during any selected span of time.
6.	The accuracy of the RLVD system should be identify Red Light Violations with an accuracy of at least 90% both during day and Night time
7.	The system should be able to show Live video in multiple Matrix (as required) layout for all the cameras in the system at real time.
8.	Should be able to integrate with the Video Management Software to be proposed under this RFP
9.	Should be able to store the details captured in Storage system as per the guidelines received from AMC/SCADL/Police Department

51) Anti-virus Software for Servers

Sr. No.	Specification
1.	Shall be able to scan through several types of compression formats.
2.	Must update itself over internet for virus definitions, program updates etc. (periodically as well as in push-updates in case of outbreaks)
3.	Able to perform different scan Actions based on the virus type (Trojan/ Worm, Joke, Hoax, Virus, other)
4.	Shall be able to scan only those file types which are potential virus carriers (based on true file type)
5.	Shall be able to scan for HTML, VBScript Viruses, malicious applets and ActiveX controls
6.	Shall provide Real-time product Performance Monitor and Built-in Debug and Diagnostic tools, and context- sensitive help.
7.	The solution must support multiple remote installations
8.	Shall provide for virus notification options for Virus Outbreak Alert and other configurable Conditional Notification.
9.	Should be capable of providing multiple layers of defense
10.	Shall have facility to clean, delete and quarantine the virus affected files.
11.	Should support in-memory scanning so as to minimize Disk IO.
12.	Should support heuristic scanning to allow rule-based detection of unknown viruses
13.	Updates to the scan engines should be automated and should not require manual intervention
14.	All binaries from the vendor that are downloaded and distributed must be signed and the signature verified during runtime for enhanced security
15.	Updates should be capable of being rolled back in case required
16.	Should support various types of reporting formats such as CSV, HTML and text files
17.	Shall be able to automatically push any updates, patches, fixes to all client machines to ensure up-to-date antivirus protection for all IT devices and systems.

52) Backup Software

Sr. No.	Specification
1.	The software shall be able to back up the necessary and relevant video feeds from storage, various databases, etc.
2.	Should support file level backup/recovery
3.	Should perform Scheduled unattended backup using policy-based management for all Server and OS platforms
4.	The software should support on-line backup and restore of various applications and Databases
5.	Should support database platforms like Microsoft Exchange Server, Oracle, Microsoft SQL Server, Microsoft SharePoint, Sybase, MySQL, Informix, IBM Domino (Lotus), SAP, IBM DB2, etc
6.	Should support backup hardware like tape, virtual tape, optical, disk, interface hardware, etc.
7.	The backup software should be capable of having multiple back-up sessions simultaneously

Sr. No.	Specification
8.	The backup software should support different types of backup such as Full back up, Incremental back up, Differential back up, Selective back up, Point in Time back up and Progressive Incremental back up and snapshots
9.	The backup software should support different types of user interface such as GUI, Web-based interface
10.	Should have logging and reporting features

53) LED Luminaire

Parameters	Value	Remarks
Operation Mode	On/Off/Dim	Light should be able to dim as per the command given from Command Center
Light Source	High Power SMD LED > 2W	
LED chip make	CREE / Osram / Philips Lumileds/ Nichia / LG or equivalent	Authorization from LED manufacturer to be submitted along with tender document
LED Life	Manufacturer shall submit proof of procurement of LEDs and LM-80 Test reports of specific LED used in the proposed Luminaire	LM-80 Test report
LED chip efficiency	> 135 Lumens/watt at Tj 25 C	LED Technical Datasheet
Luminaire Wattage	To be designed by the manufacturer to bring about the required lux levels	Lighting Design file to be submitted. Manufacturer shall design the luminaire with minimum wattages as possible to bring the required lux level.
Optical Pattern	Asymmetrical Batwing Pattern	To be verified from Test Report
Luminaire Efficacy (System)	> 100 lm/W	As per IES LM-79-2008 To be verified from Test Report
Operating Voltage Range	120V - 270V	As per IES LM-79-2008 To be verified from Test Report
Operating Frequency	50 Hz +/- 3% Hz	As per IES LM-79-2008 To be verified from Test Report

Parameters	Value	Remarks
Total Harmonic Distortion (Supply Current)	< 10%	To be verified from Test Report
Power Factor	> 0.95	As per IES LM-79-2008 To be verified from Test Report
Usage Hours	Dusk to dawn (12 hours)	-
Operating current	550 - 1000 Ma	-
LED Life	50000 Burning hours with 70% Lumen maintenance	LM 80 Report to be submitted with tender documents
Chromaticity Coordinates	For both X & Y	As per IES LM-79-2008
Correlated Color Temperature	5000 K - 6000 K (suitable for "Cool White" light)	As per IES LM-79-2008 To be verified from Test Report
Color Rendering Index (CRI)	> 70	As per IES LM-79-2008 To be verified from Test Report
Luminous Intensity Data	As per IES LM-79-2008	As per IES LM-79-2008 To be verified from Test Report
Average Lux	35 for Main Carriage Way & 30 for Side Roads	To be verified from the design submitted by bidder and cross-verification with IES file. Field Test to be conducted
Uniformity Ratio (Emin/Eavg)	> 0.5	To be verified from the design submitted by bidder and cross-verification with IES file.
Ingress Protection	IP 65	To be verified from Test Report
Optics/Lenses	Each LED should be equipped with UV protected secondary lens to bring about the required uniformity as mentioned above	Field Test to be conducted
Over voltage cut off with auto restart	> 280 VAC	To be verified from Test Report
Surge Test as per IEC 61000-4-5	4 KV	To be verified from Test Report

Parameters	Value	Remarks
Housing	High quality Aluminum Die Cast body with extruded aluminum heat sink and with separate Driver compartment. The compartment should be such that driver can be maintained / replaced without disturbing the LED module. The housing should have capability of installing Control Node on top of the fixture along with a NEMA receptacle.	To be verified from Sample
Luminaire configuration / technical requirement	Side entry type. Shall consist of separate optical and control gear compartments. It should be easy replaceable in the field condition.	To be verified from Sample
Working Humidity	10% to 90% RH	-
Driver Efficiency	> 85%	-
Manufacturer Logo	Embossing on the Luminaire	To be verified from Sample
Pole Position Monitoring	Street Light Pole Position shall also be monitored. In case of pole accident/pole tilting, it should give alarm for that pole.	
Certifications	LM 79, LM 80, L70	

Pole Spacing & Height varies throughout the roads. Hence the bidder has to visit the site and propose wattages in order to achieve the required lux levels and uniformity ratio. AMC shall call for mock test/demonstration to evaluate the lux level and uniformity performance, which shall be done without any cost.

The OEM of Smart Street Lighting system must have executed minimum 3 Smart Street lighting projects with individual control anywhere in India and the proof of the same shall be enclosed in the bid in the form of order copies/completion certificates.

54) LED Control Node for Individual lamps

1. NEMA interface for true plug and play installation that includes dimming and motion based controls.
2. Remote Control and Scheduling: The control node must support at least five lamp control modes. Control can be based on user configurable ON/OFF/DIM schedules programmed on

a daily / monthly / yearly / special events basis or can be controlled locally using a built-in astro-clock that calculates sunset and sunrise times using location and time zone data throughout the year.

3. Complex ON/OFF/DIM schedule can be defined easily with Mixed Mode Schedule interface. Lights can be scheduled for the precise use to save more energy.

4. Dimming Control: The controller must support dimming of any lamp with a 0-10V or PWM input dimmable ballast with up to 10 dimming schedules.

5. Power Metering: The controller should be able to monitor electrical parameters such as Current, Voltage, Frequency, Power Factor, KW and Kwh with an Accuracy of 0.5% as per the IEC standard.

6. A Photocell in every Node: Lighting Controllers should be with inbuilt photo-sensor which makes the units operational the moment it is plugged into the Lights.

- Commissioning Phase: Controllers can operate immediately upon installation without dependency on the network. This saves huge cost which is incurred into the installation and commissioning of each node.
- More Reliable Operations: Operations are not affected by any RTC (Real Time Clock) drift as photocell inputs can be used as an override.
- Cloudy Conditions: Redundant backup to time-based scheduling in the event of daylight weather changes.

7. A Battery Backed Real Time Clock: Each node should have inbuilt Real Time clock which is battery backed-up. This makes in the units completely self-contained during power failure and it doesn't have to rely on the network to get the updated time. It ensures all time based modes are completely operational as soon as power is restored to the node. Timer is highly accurate with accuracy of 1 seconds.

8. Extra Digital (2) & Analog (1) IOs: These inputs allow interfacing with external sensors. A typical use includes implementing advanced motion based lighting controls widely used for parking garage type of applications. Others include:

1. Ambient light sensors can be integrated for day light harvesting
2. Input for tilt sensor for "knock down" alerts.
3. Other adaptive lighting or advanced lighting controls by interfacing sensors like Traffic Density, Pedestrian etc.

9. Ability to Configure/Commission/Fault Maintenance using the Handheld Configurator: Handheld Configurator: Intelligent Handheld Configurator is a wireless device that serves as a tool to configure and verify each Lighting Controller (SLC) and Light Fixture at the time of Installation and Commissioning. This can also be used in repair verification. An Easy to Use Keypad/LCD interface allows users to manage all aspects of installation, commissioning, maintenance and routine operations. Some key features are:

- Connectivity to the network verified (DCU/Gateway)
- Ability to test all operational control modes

- Verify Lamp On/Off/Dim functionality
 - Read all energy parameters
 - Write/Reset critical parameters in non-volatile memory
10. **Fault Monitoring:** System should have Extensive fault monitoring features that reports lamp burn outs, lamp cycling, ballast failure, over/under voltage, abnormal power consumption, low power factor, communication failure and more. All faults are sent to the LightingGale Management System that generates alarms for visualization and fault rectification.
 11. **Alarm Call Service:** System should be able to send Alarms which can be sent directly to relevant users via Emails or Text Messages (SMS) when they occur. Messages are time stamped and contain key parameters associated with the fault/alarm.
 12. **Burn Hours:** The controller keeps track of lamp burn hours for predictive maintenance, allowing pro-active lamp replacement.
 13. **High Reliable and Robust Communication Network:** Lighting Controllers installed on Individual LED Luminaries must communicate with the Gateway over a wireless network which could use a standard Zigbee Pro/ 6 Lowpan mesh network protocol which is an open and interoperable standard that is based on IEEE 802.15.4. Being a standard open protocol, the main advantage for our clients is that they can integrate other devices into the same network. This allows for extending the Streetlight network to include other devices. The network itself is a very robust self-healing and self-forming mesh network that allows for highly reliable communication over long distances using low powered radios. It operates at 2.4GHz / 865-868 Khz and has a transmission range of up to one mile between nodes with no obstructions. In a typical city installation, its transmission range is around one kilometer. Each Gateway support more than 1000 Lighting Controller nodes.
 14. **High Security Network:** All communication between the Lighting Controllers and Gateway and between Gateway and the central server should be AEC 256-bit encrypted.
 15. **Over the Air Upgrade:** Each Lighting Controller Firmware can be upgraded remotely even at a distance of 10KMs
 16. **Certifications:** Individual Controllers should be UL773 and CE certified. Zigbee or any Equivalent communication Module should be FCC certified. Each meter should be able to measure energy parameters with 0.5% accuracy as per the IEC standard. Each unit should have been designed as per the ANSI standard.

Feature	Description
Controller	Powerful 32 bit Microcontroller, With Flash, Watchdog Timer protection
Real Time Clock	Battery Backed RTC
Power Metering	Parameters Measured: Voltage, Current, Power Factor, Frequency, KW and Kwh

Feature	Description
Metering Accuracy	0.5% ,Certified as per IEC standard
Switching Capacity	15A maximum. Relay should be inrush current rating of 110A
Power Input Supply	85V to 305V AC SMPS Specifications: <ul style="list-style-type: none"> • Protections: Short circuit / Overload / Over voltage / Over temperature • Ultra-miniature size, light weight • Cooling by free air convection • Isolation class • UL60601-1/IEC60601-1/EN60601-1 medical safety approved • No load power consumption<0.5W • 100% full load burn-in test • Fixed switching Frequency at 67KHz • High Reliability
Power Consumption	Less Than 1W
Radio	2.4GHz, IEEE 802.15.4 / 865-868 Khz EM357 Chip with Skyworks PA RF Data Rate: 250 kbps Transmit Power: +20 dBm Receiver Sensitivity: -104dBm Network Type: Self-forming mesh network Network Fault Tolerance: Self-healing mesh Open Field Range: 5000 ft/1.5 k Data Protection: 256 bit AES encrypt Hardware: IEEE 802.15.4-2003 CSMA-CA algorithm
GPS module Specifications	<ul style="list-style-type: none"> •Support EASY self-generated orbit prediction •Support EPO orbit prediction •Support AGPS •Support SBAS ranging (WAAS, EGNOS, GAGAN, MSAS)

Feature	Description
	<p>Performance data</p> <ul style="list-style-type: none"> •Receiver type: 22 tracking/66 acquisition channel GPS receiver GPS L1, C/A Code •Max. Update rate: 10Hz •Sensitivity: <ul style="list-style-type: none"> Tracking: -165 dBm Reacquisition: -160 dBm Cold starts: -147 dBm •Time-To-First-Fix: <ul style="list-style-type: none"> Cold starts: 31 s (typical) Warm starts: 30s Hot starts: <1s EPO Assist: 13s (CTTFF) • Accuracy <ul style="list-style-type: none"> Automatic Position3: 2.5m CEP Speed: 0.1m/s •Operation temperature: -40C~+85 C
Dimming Interface	<p>Control Voltage: 0-10V, Maximum Current: 10mA with Short Circuit protection</p> <p>PWM Dimming: 10V p-p, 400Hz, Maximum Current: 10mA (Sink)</p>
Surge Protection	CAT C
Operating Conditions	-40 C to +70 C , 20% to 90% Rh non-condensing
Certifications	UL773 , CE, FCC Certified Radio, IEC Certified Power Metering
Enclosure	UV treated Poly Carbonate, IP67

55) LED Wireless Communication system

Communication sub system is the key to the entire project as it is responsible for communicating the proposed data from the iSLCs to the master control station. This communication should be through a wireless G.S.M./ RF communication backbone as it offers the most advanced and the cheapest option with the best coverage as shown in figure 1. ISLC shall communicate with a Wireless Gateway unit over 2.4Ghz free RF band. About 250 ISLC's shall be connected to one Gateway. All Gateways shall in turn communicate with the MCS over GSM / GPRS network.

SPECIFICATIONS OF RF MODULE (REQUIRED FROM ISLC TO GATEWAY)

- **General features:**

- 2.4GHz Zig Bee Network / 6 Lowpan 865-868 Khz. License free band
- Open field Range Up to 3500 ft. (1 km) Line of Sight
- Low power
- Capable of Mesh Networking
- Normal operation temperature:
-20 °C to +55 °C
- Restricted operation temperature:
-20°C to -25 °C and +55 °C to +70 °C
- Storage temperature:
-40°C to +80 °C

- **SPECIFICATION OF GSM/GPRS MODULE (REQUIRED FROM GATEWAY TO MCS) General features:**

- Dual band GSM900 and GSM1800
- Compliant to GSM phase 2/2+
 - Class 4 (2W@ 900 MHz)
 - Class 1 (1W@ 1800/1900MHz)
- Control via AT commands

(GSM 07.07, 07.05 and enhanced AT Commands)

- SIM application toolkit
- Supply voltage range 3.4 ... 4.5 V
- Low power consumption
- Normal operation temperature:
-20 °C to +55 °C

- Restricted operation temperature:
-20°C to -25 °C and +55 °C to +70 °C
- Storage temperature:
-40°C to +80 °C

56) LED Wireless Communication software

The entire communication shall be wireless based. The system shall be data transmission type only and not support any voice communication. Central station shall be loaded with software, which will have the following communication related features for the user:

- All the system alarms at respective station should be available.
- Receipt of routine updates regarding the health of the system and also any alarm shall also be available to the MCS in the form of SMS message only. No talk time shall be consumed for this purpose.
- The system shall be fully password protected for change, edit and deletion of any configuration related information.
- The user shall even be able to acquire the data of key parameters through an query.
- In order to save on the transmission of repetitive messages, like Mains power fail, there should be a “message identification and filtration” feature in the software such that data transmission is kept to the minimum.
 - System should be capable to provide email notification if demanded.

The Wireless Gateway shall be able to perform the following tasks.

▪ **Field Data Handling:**

The Wireless Gateway shall be a link between the MCS and ISLCs within a particular zone. Since the communication mode with the ISLC is RF which requires line of sight, it is assumed that each Gateway shall be able to communicate with about 250 ISLC's using mesh networking.

▪ **SLC Data Handling:**

The Wireless Gateway shall transmit the data to the MCS using GSM/GPRS network.

▪ **Data Management and Storage as Stand Alone processor:**

The Wireless Gateway shall be able to operate and handle all the data from the iSLC's as a Stand Alone Processor. It shall be able to store the data in its memory thus ensuring No loss of data in the event of failure of the GSM/GPRS network. This stored data shall be sent to MCS once it resumes its normal operation.

▪ **Message Pending indication:**

The Messages received from the iSLC which is still not transferred to the MCS shall be indicated by the Wireless Gateway.

▪ **Low signal Strength indication and alarming:**

The Wireless Gateway should be able to display the current Signal strength of the GSM network at all times.

Sr. No.	Description	Specification
1.	CPU	32-bit micro-controller operating on 72 Mhz (64 Dhrystone MIPS) based
1.	Programming Memory	512 Kbytes
2.	Data Memory	160 Kbytes SRAM
3.	Primary Data Storage	256 Kbytes of memory to store data in case of communication link failure.
4.	RTC	Real time clock for time based operations
5.	Communication Ports for Field and MCS communications	Two-way simultaneous communication with 250 ISLCs using RF and MCS using GSM/GPRS mode.
6.	Wireless Communication with Control Node	<ol style="list-style-type: none"> 2.4GHz Zig Bee Network / 6 Low Pan. License free band Open field Range Up to 3500 ft. (1 km) Line of Sight Low power Capable of Mesh Networking
7.	Communication Protocol support	Should be able to communicate with field iSLCs and MCS-FEP with any of the following protocols: <ol style="list-style-type: none"> MODBUS TCP and ASCII IEC 870-5-101
8.	USB Support	1 USB Slave Port
9.	Enclosure	100x150x200
10.	Operating temperature	0 to 70° C
11.	Storage temperature	-20 to 80° C
12.	Humidity	95% condensing
13.	Vibration	IS standard, 5-300 Hz
14.	Protection	IP 55
15.	Mounting	Floor Mounting

Sr. No.	Description	Specification
16.	Model	Vendor Specific
17.	Power Supply	Power Supply shall be high efficiency SMPS type with large input range to meet site power conditions as follows: 230VAC +/- 20%

A Web based SCADA (Supervisory Control And Data Acquisition) system primarily used to configure, monitor, and acquire various types of data such as the Voltage, Current, and Status of the streetlight (i.e. whether it is On or Off) has to be provided. The advantage of using shall be being a web-based application, authorized users can view the Status (latest data), Reports, Trends (Graphical representation of data fetched), and Alarms (Intimation of Normal, Low or Critical conditions) of a particular remote site from any location. Users should also be able to control the streetlights using this application.

SCADA stands for **Supervisory Control and Data Acquisition** and are essential parts of the energy management system. As the name indicates, SCADA systems focus on the supervisory level used for control, operation and monitoring. In order to support SCADA data transmission, a communication network is essential. The ability of a SCADA system to not only monitor the status of equipment, but to control the remote equipment from a central location, allows more efficient and cost-effective management of remote sites. Response time to emergencies is significantly reduced. It provides controls to receive the streetlight status (ON/OFF) at configured intervals.

The control system should consists of a central host or Master Control System (MCS), Gateway, Street Light Controllers (SLCs), and a collection of software used to monitor and control remotely located field data elements.

The SLC shall be hardware device located on the luminaries' from which data is to be fetched. The SLC shall contain an RF Module, which shall communicate with the Gateway. A group of SLCs shall communicate their data to the Gateway. The Gateways shall transmit the data to the Master Control System via a GPRS Network to a software application. The centralized software application shall also contain a SIM Card. The details received through SMS are to be updated in the centralized Database. As a result, the authorized users should be able to log on to the web based application via a web browser and access the details stored in the centralized Database.

A summary list of features that are mandatory are highlighted below:

Mimics

- Display the latest Analog/Digital data in maps and graphics.

Status

- Display the latest Analog/Digital data received from SLCs.

Trends

- Display historical/live Analog/Digital data in the form of Graph.
- Provision to view Analog/Digital data between the selected date and time for multiple channels.
- Provision to configure the *Start Date, Time* and *Limits* (High-Low, High-High, Out-High and Normal) within which the Data is to be graphically represented.
- Enables Template definition and allows user to view the Trends as per the *Template, Chart Type (Bar, Line, Pie and Area)*, and *Appearance (2D/3D)* selected.
- Allows user to simultaneously view two different graphs of Analog/Digital Channels by selecting Multi Axes option.
- Provision to export the chart image (graphs) in the file formats *JPEG, BMP, PNG, GIF, TIFF* and *Metafile*.

Reports

- Define Customized Alarms and Normal Reports by selecting various combinations of Analog and Digital Channels and view the data fetched between selected date and time.
- Display Minimum, Maximum and Average of Analog data fetched between selected date and time.
- Create schedules for automatic execution of reports and receive them via e-mail at configured intervals.
- Customize *Report Header* to be displayed in the Reports.
- Display the reports of various diagnostics carried out on SLCs, Gateways, RF communication and GPRS communication.

Alarms

- Display the Alarms between selected *date and time*.
- Depending on the Channel Value fetched from the SLC, display the *Alarm Type (HH, L, etc)*, *Alarm Priority (Normal, Low, Critical)*, *SLC Name, Channel Description* and *Channel Value*.
- Acknowledge Alarms after the site engineer solves problem.
- Receive Alarms in case of critical situation on configured Mobile numbers.

User and Group Definition

- Secured and Controlled access to web based software through authentication & authorization.
- Configure user accounts by assigning a *User ID* and *Password*.
- Simplify user management through group definition and allocation of users to groups.
- Assign application menu security to users and groups for restricted access.

Configure Street Light Controllers (SLC)

- Define SLC and configure the *MCS Modem Number* for sending SMS messages to the centralized software application.
- Easily manage the SLCs by grouping them based on the Gateways (gateways) to which they transfer data.
- Create and assign schedules and modes for operation of the streetlights (to be controlled by SLCs).
- Force ON/OFF switching of the streetlights in case of emergency.
- Allot the streetlights (and in turn SLCs) to customized regions to easily zoom on to the streetlights of interest in the map.
- Acknowledge command receipts to ensure that commands sent have actually been executed.

Power and Status Parameters

- Provision to define *Power* (analog - range of numeric values) and *Status* (d- digital - 0 and 1) parameters for SLCs.
- Enables user to specify Lower (*Low Range, Low Limit, Low and Outer Low Limit*) and Higher (*High Range, High Limit, High Limit and Outer High Limit*) range of values for *Power* Channels.
- Define the *Alarm Priority* (*Normal, Low, Critical*), *Alarm Inactive* (No/Yes) and *Trend Page* on which the **Trends** (Graphical display of data) for respective Power Channels will be displayed.
- Fetch the *Power* (analog) data and accordingly display the Alarm Type (L, LL, H, HH) and Priority (Normal, Low, Critical).
- Provision to display the High and Low Ranges of *Power* (analog) data in different colors through Trends.
- Enables control and retrieval of the status of a Channel for a remotely located SLC at a configured polling interval.
- Provision to configure desired Digital value (ON/OFF) and Analog parameters values for a remotely located SLC.

Device Security

- Assign each Gateway to a User Group to implement area-wise management as well as security of the SLCs.

Dashboard

- Customizable information-rich dashboard to display Trends, Reports, Alarms and Mimics in a single view.

Archive, Purge and Recover Data

- Archive data other than the latest ones for faster performance.
- Export and purge apparently unwanted data to reduce information clutter and size.
- Import the exported data as and when required.

Maintenance

- Create a list of fault types that can occur in the functioning of the SLCs.
- Log maintenance issues that occur based on the fault type and generate work orders to users for resolution of the same.
- View customized reports on the maintenance activities.
- View entire history of maintenance activities carried out on the SLCs.

Assets

- Create and maintain a list of SLC assets with their respective attributes.

Live Alerts

Automatic live alerts are generated by the application to notify the users for any faults detected in the Gateways and for receipt of new command acknowledgements from the Gateways