QUALITATIVE REQUIREMENT OF PERIMETER INTRUSION DETECTION SYSTEM (PIDS)

Two types of Integrated security solutions (PIDS) as under.

(A) **Type-1 Security:** The solution comprises of the following components:

     a. Electrical Smart Power Fence (ESPF)

     b. CCTV camera (Fixed and PTZ camera)

     c. UPS power supply

     d. IT infrastructure (Hardware and Software)

(B) **Type-2 Security:** The solution comprises of the following components.

     a. Underground Vibration Detection System (UVDS)

     b. CCTV camera (Fixed and PTZ camera)

     c. UPS power supply

     d. IT infrastructure (Hardware and Software)

Type-1 Security

- ESPF can be mounted on existing boundary wall.
- ESPF can also be mounted on chain link fence with proper support.
- ESPF can also be installed in open area of the campus boundary with suitable arrangements.
- The ESPF gives a high voltage electric shock (non-lethal) to the intruder when he touches/cuts/tampers the wire. This event triggers alarm at the nearby hooter and strobe light as well as triggers the alarm in C2 software at the command-and-control center.
- The live feed of intrusion attempt can be visualized in command-and-control center, as C2 software would display video feed of the nearby CCTV cameras on display. The C2 operator can focus PTZ camera towards the intruder for further investigation.
- This security surveillance will be available 24x7 throughout year(s) and CCTV video recording for 30 days will be available in storage.
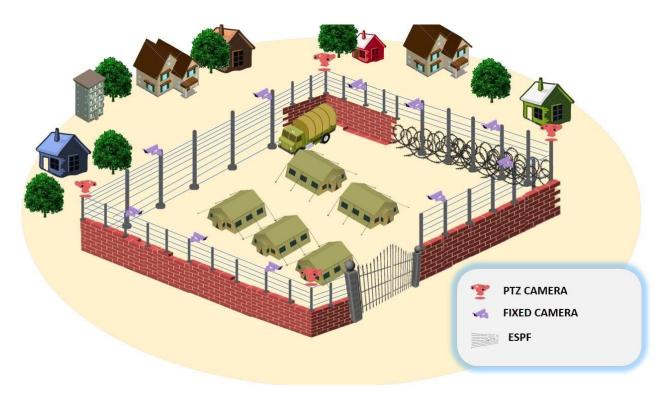
Figure 1: Type-1 Integrated Security Solution

Type-2 Security

- UVDS can be installed in boundary.
- The UVDS sensor cable (OFC) is buried underground along the boundary of the camp area.
- UVDS picks up the intrusion attempts by means of sensing the vibration caused by walking/crawling/running/digging/tunneling activities by human or machine. Movement of vehicles also is sensed by the system.
- The live feed of intrusion attempt can be visualized in command-and-control center, as C2 software would display video feed of the nearby CCTV cameras on display. The C2 operator can focus PTZ camera towards the intruder for further investigation.
- This security surveillance will be available 24x7 throughout year(s) and CCTV video recording for 30 days will be available in storage.

Figure 2: Type-2 Integrated Security Solution

1. Qualitative Requirements (QR)

Qualitative requirements of components applicable in type-1 and type-2 securitysystem are as under

Electrical Smart Power Fence (ESPF)

Sl. No	Technical Requirements / Parameters
1.	An electrical smart power fence (ESPF) is installed on the perimeter. It's a non – lethal electric smart power fence, which serve dual functions i.e deterring intruders by a non-lethal high voltage low current DC shock and sounding an alarm both at the place of attempted intrusion and at Control Room to facilitate suitable contingency response. Anyone who touches the power fencing when the system is armed will be repelled by a short, sharp, painful, but regulated safe pulsed DC high voltage shock. Alarm will be generated when someone attacks, tries to climb through or tampers with the power fencing system. The system is integrated with other sensors such as CCTV cameras and thermal cameras in slew to clue mode along with its integration at Control Room for control and monitoring of the system.
2.	The ESPF is conducting wires firmly fixed on supporting post mounted firmly on perimeter wall/ fence/ ground.
3.	The ESPF withstand strong winds (up to 50 knots) and weather conditions like snow, hailstorm, sandstorm prevailing in area.
4.	All posts are fixed securely to the wall while withstanding the tension. Corner post suitably strengthened to ensure stability and strength of the fence. Warming signboards indicating Caution electrical power fence in minimum three languages which includes one local language at every 50m are installed all long the ESPF.
5.	The system generates alarm in case of cutting of any wire, shorting the wires, tampering of energizer or power failure.
6.	The system performance is unaffected in day or night conditions and the system is capable of detecting and locating multiple simultaneous intrusions.
7.	Energizer cabinet complies with IP 66 standards for outdoor installation. Energizer conforms to safety requirement as per latest international safety standards IEC/EN 60335 or equivalent.
8.	Energizer must indicate change in resistance owing to vegetation.

Sl. No	Technical Requirements / Parameters		
9.	Wire		
	(a)	Material	Mild steel
	(b)	Coating	Galvanized with minimum zinc coating 325 gm/m^2 or more
	(c)	Diameter (mm)	2.0 or more
	(d)	Resistance ('Ω/ km)	Less than 100
	(e)	Tensile strength (kg/mm 2)	At least 125
10.	Energizer		
	(a)	Type	Pulse
	(b)	Maximum Voltage (kV)	Less than 10
	(c)	Pulse energy (J)	At least 3 to 5
	(d)	Peak current (A)	10
	(e)	Output characteristics	As per Para 5. 101 of IS 302-2-76 (1999)
	(f)	Battery back-up (AH)	At least 14
11.	System Installation		
	(a)	Height of ESPF (cm)	150
	(b)	Distance between adjacent wires (cm)	Maximum 10
	(c)	Distance between the top of the wall to the bottom of ESPF (cm)	Maximum 10
	(d)	Strain Poles	
		(i) Material	Galvanized MS
		(ii) Section	50x50 mm galvanized pre Hold square tubing with Minimum thickness of 2mm
		(iii) Size (mm)	Minimum 30x30
		(iv) Height above wall (cm)	150

SI. No		Technical Requirements / Parameters	
		(v) Distance between adjacent poles (m)	Maximum 20
	(e)	Intermediate Poles	
		(i) Material	Galvanized MS
		(ii) Section	Square Tube
		(iii) Size (mm)	minimum 20x20
		(iv) Height above wall (cm)	150
		(v) Distance between adjacent poles (m)	Maximum 30
	(f)	Insulator (for Strain Poles)	
		(i) Material	UV stabilized plastic
		(ii) Breakdown voltage (kV DC)	At least 15
		(iii) Working load	140 kg
	(g)	Insulator (for intermediate pole)	
		(i) Material	UV stabilized plastic
		(ii) Breakdown voltage (kV DC)	At least 15
		(iii) Vertical break down load	40 kg
	(h)	Zonal length	200m or less
12.		Constant False Alarm Rate (CFAR)	0

Underground Vibration Detection System (UVDS)

SI. No.	Parameter	Specifications
i.	The underground vibration detection system (UVDS), is an optical fiber cables (OFC) based sensors, which provides intrusion detection against intruders, vehicles and tunnelling, using a buried optical fiber cable.	
ii.	The system is capable of distinguishing disturbances from background	

Sl. No.	Parameter	Specifications
	vibrations.	
1.	Sensor	
(a)	Accuracy	Within +/- 10m
(b)	Detection Resolution (Ability to Discern between two disturbances)	Not exceeding 50m
(c)	Detection Zones	Software configurable
(d)	Detections	
(e)	(i) Normal walking Human	Min 3m
	(ii) Running Human	Min 10m
	(iii) Crawling Human	Min 1m
	(iv) Moving Vehicle (light)	Min 10m
	(v) Moving Vehicle (heavy)	Min 20m
	(vi) Manual Digging	Min 20m
	(vii) Tunnel Digging	Min 20m
(f)	Cut cable Detection Accuracy	Min 30m
(g)	False Alarm Rate (FAR)	< 1/ km / month
(h)	Environmental Operating Temperature	-40deg to +70deg
(j)	Weather proofing	IP67
2.	Fiber Characteristics	
(a)	Fiber Type	Single Mode
(b)	Optical loss	< 0.25dB / km
3.	Control Room	
(a)	Form factor	19- inch rack mount
(b)	Interface	Networking
(c)	Alarm Interface	Audio
(d)	Server Configuration	High Availability

CCTV camera (Fixed and PTZ camera)

Fixed Camera

Sl. No.	Technical Requirements / Parameters		
1.	The Visible/ Near-IR Camera based Video Surveillance System are installed at perimeter for effective surveillance from Control Room. A combination of vari-focal cameras of low and high focal lengths are installed at suitable distance along the perimeter to provide gap free coverage.		
2.	The coverage area of Fixed Camera is illuminated with in-built infrared illuminator for surveillance during night.		
3.	The fixed cameras are installed on the poles at suitable heights not less than 7m.		
4.	Cameras of fixed and variable focal lengths are installed such that the camera system covers the entire perimeter without any gap up to a height of at least 4.5m.		
6.	The system performance is unaffected in day or night conditions and the system is capable of detecting and locating multiple simultaneous intrusions.		
	Parameter		Requirement
7.	Imager (Pick-up deviser)		
	(a)	Size (inch)	Minimum 1/3
	(b)	Sensor Type	CMOS/CCD
	(c)	Scan Type	Progressive
8.	Lens		
	(a)	Type	Vari-focal,
	(b)	Focal Length (mm)	Focal length (mm): Varifocal camera with the combination of lenses with focal length within the range of 4-50 mm may be used to functionally achieve the layer-2 protection
	(c)	Zoom Control	Manual
	(d)	Focus Control	Manual
	(e)	Size (inch)	Minimum size of the imager
	(f)	Iris	Auto Variation
9.	Minimum Illumination (Lux)		
	(a)	Color Mode	0.5
	(b)	Night Mode	0.05 (without IR illuminator)

SI. No.	Technical Requirements / Parameters		
			0.0001 (with IR illuminator)
10.	Sensor Resolution (Mega Pixels)		Minimum 2
11.	Video compression		H.264 or better
12.	Maximum Shutter Speed (sec)		1/8000 or faster
13.	Frame Rate		At least 25 fps with max resolution
14.	Video Standard		PAL
15.	Wide Dynamic Range (WDR) (dB)		At least 70
16.	Data Rate		6 Mbps for H.264 Video compression
17.	Interface		Open Network Video interface Forum (ONVIF)
18.	Alarm Trigger		
	(a)	Motion Detection	Required
	(b)	Tampering Alarm	Required
	(c)	Network disconnect	Required
19.	Dust/Water Protection Level		IP 66
20.	Dual Stream		Dual H.264 Streams or better
21.	Automatic White Balance		Required
22.	Black Light Compensation		Required
23.	Network connectivity		
	(a)	Ethernet	IEEE 802.3
	(b)	Connector	RJ-45
	(c)	PoE	IEEE802.3AT
24.	Outdoor Enclosure		IP 66 Enclosure along with, anti-condensation, heater, Sunshield, Blower, Vandal proof compliance to IK10 or else compliance to Mil 810 F:
25	IR illumination		Inbuilt (at least 70 m)

PTZ Camera

Sl. No.	Parameters		Requirements
Pan-Tilt Mechanism			
a.	Pan		
	(i)	Angle	Continuous 360º
	(ii)	Preset Speed (º/s)	At least 90
	(iii)	Manual Speed (º/s)	Minimum range of 1 to 90
b.	Tilt		
	(i)	Angle(º)	+10 to -90 (- is downward &+ is upward from horizontal Plane)
	(ii)	Pre-set Speed (º/s)	At least 25
	(iii)	Manual Speed (º/s)	Minimum range of 1 to 25
c.	Sensor position display (Pan & Tilt)		Required
d.	Image Sensor		
	(i)	Detector Type	Micro -Bolometer
	(ii)	Pixel size (µm)	Not more than 17
	(iii)	Number of pixels	At least 640 x 480
e.	FOV		
	(i)	Horizontal	20-30 (Wide), 2-8 (Tele)
	(ii)	Vertical	20-30 (Wide), 2-8 (Tele)
f.	Spectral Range		8-12µm or wider
g.	Lens focal length (mm)		Wide:- Up to 26 mm Tele:- 80 mm and above
h.	Optical Zoom		At least 4 X
i.	Noise Equivalent Temperature Difference (NETD)		Not more than 0.1 K at f/1.0

Sl. No.	Parameters		Requirements
j.	Minimum Resolvable Temperature Difference (MRTD)		Not more than 0.2 K at 0.6 cycles/mrad
k.	Calibration feature (Non Uniformity Correction-NUC)		Required
l.	Multiple sector blanking feature		Required
Visible Region Sensor (Camera)			
m.	Image (Pick-up deviser)		
	(i)	Size (inch)	Minimum 1/3
	(ii)	Sensor Type	CMOS / CCD
	(iii)	Scan Type	Progressive
n.			
	(i)	Focal Length (mm)	5-100 or wider
	(ii)	Optical Zoom ratio	At least 16 X
o.	Resolution (Mega Pixels)		Minimum 2
General			
p.	Operating weather Conditions		-30 to 50º C
			Relative Humidity: 5 to 90 %
r.	Maximum Frame rate (fps)		At least 25
s.	Display format capability		White – hot & black – hot
t.	Dust and water Protection		IP 66 compliance
u.	Interface		ONVIF
v.	Onboard storage (Gb)		At least 64
w.	Video streaming		
	(i)	Number	At least 2 (dual)
	(ii)	Standard	H.264 or better
x.	Adjustments		
	(i)	Brightness	Required

Sl. No.	Parameters		Requirements
	(ii)	Contrast	Required
y.	Sensor position display		Required
z.	Outdoor Enclosure		IP 66 Enclosure along with, anti-condensation, heater, Sunshield, Blower, Vandal proof compliance to IK10 or else compliance to Mil 810 F:

UPS power supply

Sr. No	Feature	Required Parameters
1	Type	5KVA/10kVA/20kVA True Online Double Conversion UPS. 1-Phase Input / 1-Phase Output. Note: UPS Capacity according to size of perimeter
2	Input Voltage	230 VAC (+ 10% & -20% or better), Single Phase
3	Input Frequency	50 Hz ±5%
4	Inverter type	1. High switching frequency with PWM (Pulse Width Modulation)
		2. Use of IGBT as power switching devices
5	Input Power Factor	≥0.98
6	Output Voltage	230VAC ±2% or better, Single phase
7	Output frequency	50 Hz ± 0.25% (Battery Mode)
8	Output Power Factor	≥0.90
9	Crest Factor	3:1 or better
10	Efficiency at full load	≥90%
11	Total Harmonic distortion	Less than ±3% for Linear load

Sr. No	Feature	Required Parameters
12	Overload Ability	Minimum 1 minute for 120% overload
13	Battery Type	Sealed maintenance Free (SMF)
14	Battery Backup	Minimum 30 Minutes on full load of 9.0 KW
15	Noise level	<60 dB at 1 meter distance
16	LCD/LED Indication	Mains ok, Low battery, On battery, Bypass, Error/Fault, Replace battery
17	Operating Temp	0 to 45°C or better
18	Relative humidity	20- 90% non-condensing
19	Metering Instruments	O/P Voltage, O/P frequency & Current, Battery Current, Input Frequency
20	Communication	SNMP Card for Network Connectivity, status monitoring
21	Protection	Output: Short Circuit, Overload, Over Voltage, Under Voltage at battery terminals
		Input: Instant High Voltage Protection
		Input Over/ Under Voltage Cutoff
		DC Overvoltage & DC Under voltage.
		Back-feed protection required.
22	Cooling	Forced Air Cooled
23	Certification	(i) ISO 9001
		(ii) CE& BIS
		(iii) IEC/EN 62040 or equivalent

IT infrastructure (Hardware and Software)

Active Items

L2 switch

SL. No.	Parameter	Specification
1	Type	8 port Ethernet, Managed L2 POE switch with 2 SFP Uplink ports.
2	Operation	The switch must provide wire speed Switching with Non-blocking full duplex performance.
3	Interface	• RJ45 Ports: 8 No's of 100/1000 BaseT(X) • SFP Uplink Ports: 2 No's of SFP port. Loaded with 2 No's of 1G SM SFP LX modules of same OEM.
4	Performance	Switching bandwidth: 5.6 Gbps Forwarding Bandwidth 2.8Gbps
5	Hardware	128MB DRAM 160MB onboard flash memory
6	Protocol features	• 100Base-T • 1000 Base-X • STP/RSTP/MSTP • IEEE 802.1Q VLAN • POE • Multicast
7	Software features	LLDP, MSTP, STP Portfast, ICMP Vlans, static IP, Trust Ingress DSCP, COS, Priority Port, port - security, IGMP querier, DHCP server SNMP v2/v3, SNMP traps, syslog, IGMP snooping, DHCP snooping, BPDU guard, Etherchannel, Alarms, PoE capability, Smartport Macro, SPAN/Port Mirroring, Strom Control, EtherNet/IP (EDS)
8	Security features	SSH, SNMPv3, Port-Security, Dynamic ARP Inspection
9	Environment Features	• Operating temperature: -10 to 60°C • Relative Humidity: 5% to 95% noncondensing

10	Power Requirements	• Power supply adapter to be supplied to power the switch from 220V AC 50Hz. • Minimum power budget for POE 60W.
11	Standards	● IEEE 802.1D MAC bridges, STP ● IEEE 802.1p Layer 2 COS prioritization ● IEEE 802.1q VLAN ● IEEE 802.1s Multiple SpanningTrees ● IEEE 802.1w Rapid SpanningTree ● IEEE 802.1AB LLDP ● IEEE 802.3ad Link Aggregation (LACP) ● IEEE 802.3 10BASE-T specification ● IEEE 802.3u 100BASE-TX specification ● IEEE 802.3ab 1000BASE-T specification ● IEEE 802.3z 1000BASE-X specification

L3 Switch

SL. No.	Parameter	Specification
1	Type	1U rack mount, 24 SFP port Ethernet, L3 switch with 2 SFP+ Uplink ports.
2	Operation	The switch must provide wire speed Switching with Non-blocking full duplex performance.
3	Architecture	• SFP ports: 24 No's of 100/1000 SFP ports. Loaded with 16 No's of 1G SM SFP LX modules of same OEM and 8 No's of 1G copper RJ45 SFP. • Uplink ports: 2 No's of 10G SFP+ ports. Loaded with 2 No's of 10G SM SFP+ LR modules of same OEM
4	Performance	• Forwarding rate: 68.4 Mpps • Switching bandwidth: 92 Gbps
5	Hardware	• DRAM: 4GB • FLASH: 2GB
6	Protocol features	1000 Base-T 1000 Base-X STP/RSTP/MSTP IEEE 802.1Q VLAN

		Unicast Routing: Static Routing, RIPV1/V2, OSPF, BGP, EIGRP Multicast Routing: PIM-DM, PIM-SM, PIM-SSM
7	Quality of service	QoS (IEEE 802.1p)
8	Security features	IEEE 802.1x, port security, Dynamic Host Configuration Protocol (DHCP) Snooping and Guard, Dynamic ARP Inspection, Access Control Lists (ACLs), RADIUS/TACACS+, SNMPv3, HTTPS, SSH,
9	Environment Features	- Operating temperature: -5 to 45°C - Relative Humidity: 5% to 90% noncondensing
10	Power Requirements	- Integrated redundant power supplies - Dual power supply adapter to be supplied to power the switch from 220V AC 50Hz

C2 server

S.No.	Specification
1	Processor: Intel Xeon Silver 4200 series, min 2.1 GHz processor base frequency
2	Number of core: 2x8 (16) core
3	RAM: 64 GB DDR4
4	HDD for OS: 2x600GB SAS
5	HDD for app: 1TB
6	OS: Windows / RHEL latest OS

VMS Server

S.No.	Specification
1	Processor: Intel Xeon Silver 4200 series, min 2.1 GHz processor base frequency
2	Number of core: 2x8 (16) core
3	RAM: 64 GB DDR4
4	HDD for OS: 2x600GB SAS
5	HDD for app: 1TB
6	OS: Windows / RHEL latest OS

Video Recording Server

S.No.	Specification
1	Processor: Intel Xeon Silver 4200 series, min 2.1 GHz processor base frequency
2	Number of core: 2x8 (16) core
3	RAM: 64 GB DDR4
4	HDD for OS: 2x600GB SAS
5	HDD for app: 1TB
6	OS: Windows / RHEL latest OS

NTP Server

S.No.	TECHNICAL SPECIFICATIONS:
1	GPS/GLONASS satellite supported L1/L2/L5 Frequency band, Rack Mount Type, NTP SERVER to maintain and display IP based NTP time across the network containing L2/L3 switches shall be supplied by the bidder. NTP server shall act as a master clock with accuracy better than 50 ms in the network to which other clients shall interconnect over the network using NTP client software on Windows or Linux OS and synchronize periodically. It shall provide diagnostic and status ports/ indications for automatic/ manual intervention
2	The GPS NTP Server shall be equipped with two independent network interfaces (10/100 Mbps Ports).
	TECHNICAL FEATURES:
3	NTP Server shall support all the required networking protocols.
4	SNMP v3 support for status and configuration and SNMP Trap messages
5	The GPS NTP Server shall be supplied and configured by bidder, with a GPS Antenna/Converter Unit and standard RF/ RG58 coaxial cable, as per site requirement.

Server for ESPF/UVDS, AAA domain controller, AD patch management

S.No.	Specification
1	Processor: Intel Xeon Silver 4200 series, min 2.1 GHz processor base frequency
2	Number of core: 2x8 (16) core
3	RAM: 64 GB DDR4

4	HDD for OS: 2x600GB SAS
5	HDD for app: 1TB
6	OS: Windows / RHEL latest OS

NAS storage

Sl. No	Parameter	Minimum Specifications
1.	Solution/ Type	NAS storage
2.	Size	100 TB or more
3.	Hardware Platform	• Rack mounted form-factor • Modular design to support controllers and disk drives expansion
4.	Controllers	• At least 2 Controllers in active/active mode • The controllers / Storage nodes should be upgradable seamlessly, without any disruptions / downtime to production workflow for performance, capacity enhancement and software / firmware upgrades. The proposed solution must support scaling up to minimum 4 controllers in
5.	RAID support	• Should support various RAID Levels
7.	Redundancy and High Availability	• The Storage System should be able to protect the data against single point of failure with respect to hard disks, connectivity interfaces, fans and power supplies

8.	Management software	• All the necessary software (GUI Based) to configure and manage the storage space, RAID configuration, logical drives allocation, snapshots etc. are to be provided for the entire system proposed. • Licenses for the storage management software should include disc capacity/count of the complete solution and any additional disks to be plugged in the future, up to 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

Workstation

Sl.No	Features	Description:
1	Processor	Intel Core I-7 Processor, latest generation
2	Memory	Min.8GB, DDR-3 or better
3	Graphic Card	Minimum 4 GB on-board video memory
4	HDD	500 GB or better; SATA @ Min.7500 RPM – 8MB Cache
5	Ethernet	Dual Port Gigabit Ethernet, Auto Negotiating Ethernet controller
6	OS	Windows 8 Professional (64 bit)/Latest Windows OS/Linux
7	Monitor	21" LED, Ultra HD Display
8	Speakers	Shall have built-in/external speakers

KVM with Console

SN		Specifications
1.	Minimum Connections	8 Server
2.	System Cable	Cat 5/Cat6
3.	Port Selection	Hot keys, User Interface
4.	Power Supply	230 V AC
5.	Mounting	Rack Mountable in server rack.
6.	Keyboard, Mouse Support (with/without	PS/2 , USB
7.	Video	The video shall be displayed at the user stations without any distortion/skew etc.
8.	Security	Password/ Multiple user profiles Allowing/disallowing access of particular machines to a user profile.
9	User to Switch Distance	30 Meters or less
10	Servers to Switch Distance	15 Meters or less
	Computer connections (CPU End)	
1	Video Type	DVI or VGA as required
2	Keyboard and Mouse Type	PS/2 or USB as required
3	Mounting	The device shall be fixed with proper fixtures in the server rack.
	User consoles	
1	Video Type	DVI or VGA as required
2	Keyboard and Mouse Type	PS/2 or USB as required
3	Mounting	Suitable mounting arrangement shall be provided.

Desktop PC

Sl. No.	Technical Features	Specification
1.	Processor	10th Generation Intel core i5 (8M Cache, upto 3.6 GHz) or latest
2.	Chipset	Intel latest chipset
3.	Operating System	Microsoft Windows 10 or latest
4.	Memory	Minimum 16 GB DDR4 expandable upto 32 GB
5.	Communication	LAN Integrated 10/100/1000, GbE Network connection
6.	Ports (Minimum)	USB 2 /3 – 4 HDMI RJ-45 Display Port
7.	Optical disc drives	CD/DVD + RW
8.	Storage	Minimum 1TB @ 7200rpm SATA HDD or higher
9.	Graphics	Minimum 1 GB Dedicated Graphics Card
10.	Power supply unit	180W up to 85% efficient
11.	Peripherals	Wireless keyboard, Wireless Mouse, 22" Monitor, Display Cable

Display

SN	Item Description	Specifications
i	Screen Size	55"
ii	Video Resolution	Full HD 1920x1080
iii	Brightness	500 Nits
iv	Contrast Ratio	4000:1
v	Viewing angle (H/V)	178 Degree

vi	Response Time	6 ms
vii	Digital Input	HDMIx2, DVI-I, DP
viii	Analog Input	through DVI-I
ix	USB Port	2
x	External Control	RJ45
xi	Display Control	Through remote
xii	Regulatory Approvals/ Certifications	UL/CE/IEC/BIS for safety, CE/FCCfor EMC & Immunity

Passive Items

42 U rack

SN	Parameter	Specifications
1	Basic Structure	19" floor standing rack. Width = Standard 19". Depth= 1000m. Height = 42U. The colour of rack will be black.
2	Doors	The front door shall be fully perforated, shall have hinges handles and locks. The rear door shall be fully perforated, shall have hinges handles and locks. The two side panels shall have quick release fasteners /latches. Rack shall have proper ventilation.
3	Blanking plates	Blank spaces (on front side) shall have 1U blanking plates fill up all the remaining gaps.
4	Accessories	Additional anti-vibration pads/mounts accessories. Four heavy duty, casters wheels with lock arrangement shall be provided, cable manager.
5	PDU	Rack shall have minimum two PDU with circuit breaker (220V 1 phase 50Hz input). Each PDU shall at least 10 No's of 5A/15A sockets of Indian type vertical mount.

Junction Box

SN	Technical Specifications

1	IP 66 Rating
2	Size will as per the actual requirement
3	CRCA Steel with min 1.5 mm gauge
4	The Junction Box will be used in Coastal Environment, So Proper Powder Coating 80-120 micron required. However better method may be deployed
5	Lock with Key
6	Suitable Fastener with Cage Nuts (Approx 20 Nos.)
7	Light Grey Colour
8	Gasket - Polyurethane
9	Round off of all sharp edges
10	PDU with min 6 Socket

Cat 6 Cable (indoor)

Sl. No.	Parameter	Technical Specification
(a)	Cable	04 – Pair, unshielded twisted pair (UTP), of 24 AWG solid conductors with a PVC jacket and complying with TIA/EIA-568-B.2-1, Category 6 and ISO 11801 Class E standards.
(b)	Electrical Characteristic at 20 C	Conductor DC resistance (Max): 9.38/100m Mutual capacitance: 5.6 nF/100m Worst Case cable skew: 45ns/100m
(c)	Separator	The cable should have a Tape/Star fill separator to separate conductor pairs.

Cat 6 Cable (Outdoor)

Sl. No.	Parameter	Technical specification
(a)	Standard	AS per ISO/IEC 11801 requirements
(b)	Insulation	HDPE insulation

Sl. No.	Parameter	Technical specification
(c)	Core	Deleted
(d)	Jacket	HDPE Jacket
(e)	Cable	04 - pair, Shielded twisted pair (STP), of 24 AWG solid conductors.
(f)	Electrical Characteristic at 20 C	Conductor DC resistance (Max): 9.38Ω100m
(g)	Separator	The cable should have a Tape/Star fill separator to separate conductor pairs.

OFC Cable

SN	Specification
1	24 Core SM Armoured OF Cable
2	Multiple tubes
3	Compliant to ITU-T G.652 .D, TIA/EIA 568,ISO 11801,IEC 60794
4	9/125 Micron
5	Cable OD 8.5 MM or More
6	Corrugated Steel Tape Armouring
7	Tensile Strength – 1500 N
8	Compatible to Coastal Environment

Fibre Patch Panel

SN	Specifications
1	12/24 Ports
2	Fully Loaded with Adaptor/Coupler , Pigtails etc
3	LC Duplex SM Adaptor
4	Material – Cold Rolled Steel
5	All 24 Port populated with LC Pigtails

6	Sliding Type LIU/Adaptor Plate
7	Support for 1G and 10 G Speed
8	All mounting Accessories to be provided
9	Compatible to Coastal Environment

Cat 6 Patch Panel

SN	Parameter	Specifications
1	Type	Cat-6, 12-Port, modular UTP Connectors
2	Material type	Fire retardant cold rolled steel (CRS)
3	Jacks	Copper plated
4	Panel	Powder coated steel
5	Port identification	Front & Rear labeling for port & panel identification
6	Accessories	Supporting Accessories for Integrated bend - limiting strain relief for cable entry
7	Temp range	0°C to +50°C

Pole for Fixed camera

Sl. No	Parameter	Minimum Specifications
1.	Pole type	Hot Dip Galvanized after Fabrication with Silver coating of 86 micron as per IS:2629; Fabrication in accordance with IS-2713 (1980)
2.	Height	7 Meters (or higher), as -per-requirements for different types of cameras & Site conditions
3.	Pole Diameter	Min. 10 cm diameter pole (Master System Integrator (MSI) / Implementation Agency (IA) shall choose larger diameter for higher height)

4.	Cantilevers	Based on the location requirement suitable size cantilevers to be considered with the pole
5.	Bottom base	Minimum base plate of size 30x30x1.5 cm
6.	Mounting facilities	To mount CCTV cameras, RLVD Cameras, Traffic Signals, Pedestrian Signals/ Switch, etc.
7.	Pipes, Tubes	All wiring must be hidden, through tubes/pipes. No wires shall be visible from outside.
8.	Protection	Lightning arrester shall be provided, to protect all field equipment mounted on pole.

Pole for PTZ Camera

Sl. No	Parameter	Minimum Specifications
1.	Pole type	Hot Dip Galvanized after Fabrication with Silver coating of 86 micron as per IS:2629; Fabrication in accordance with IS-2713 (1980)
2.	Height	9 Meters (or higher), as -per-requirements for different types of cameras & Site conditions
3.	Pole Diameter	Min. 10 cm diameter pole (Master System Integrator (MSI) / Implementation Agency (IA) shall choose larger diameter for higher height)
4.	Cantilevers	Based on the location requirement suitable size cantilevers to be considered with the pole
5.	Bottom base	Minimum base plate of size 30x30x1.5 cm
6.	Mounting facilities	To mount CCTV cameras, RLVD Cameras, Traffic Signals, Pedestrian Signals/ Switch, etc.
7.	Pipes, Tubes	All wiring must be hidden, through tubes/pipes. No wires shall be visible from outside.
8.	Protection	Lightning arrester shall be provided, to protect all field equipment mounted on pole.

Power Cable

- 3 CORE, 2.5 SQ MM, armored, FRLSH cable

- 4 CORE, 16 SQ MM, armored, FRLSH cable

Software

Video Management Software (VMS)

SN	Specifications
1	The VMS shall have server-client architecture
2	VMS shall have the capability of accepting a range of digital video compression video stream including MPEG4 and H.264. VMS shall have the capability of providing video processing for high resolutions; including Full HD frames minimum frame 25 FPS.
3	It must be capable of integration with Video Analysis software & IP cameras
4	VMS shall include full Settings Data base backup for fast recovery. VMS shall support System log of integral self-diagnostic alarm and event.
5	VMS shall enable reports of Log audit trail of user login, logout and Archiving functions integral reporting application with advanced sortingfilters.
6	User database with login, password and contact details
7	User profiles with configurable permissions and access settings.
8	Integration with many PTZ protocols, virtual or joystick control of all PTZ cameras
9	VMS shall support virtual matrix based on standard PC for video wall display.
10	VMS shall support drag and drop functionality from and to the operator main screen.
11	VMS shall support multi monitor support.
12	VMS shall support video export to AVI format - to be played with any Windows Media Player, with no software installation as a prerequisite.
13	Views and layouts • Different standard (Up to 50) pre-defined layouts for quick view starting from 1x1, 2x2, 1+2 up to 10x10. • Support for Images, HTML pages, Maps, • Camera Drag and drop for easy viewing • Supports Public, Private and grouping of views. • Allows Full Screen View • Digital Zoom • View of Real Time alerts and events • Simultaneous live video and recorded video playback • Real time status display • PTZ Control, optional joystick control • Video Wall Support

SN	
14	Recording • 24x7 recording of Audio and Video up to Full HD(1080 p) • Supports Manual, Continuous, on Event and Scheduled recording Modes per camera • pre-alarm and post-alarm recording with duration configured • Resolution and frame rate can be configured on a per camera basis • Proprietary watermarked recordings • Streaming and recording server supported for rendering additional streams for recording and live viewing • Multi-monitor support • Video Archiving
15	Notifications • All events logged in the software • Filter for notifications and alerts • Alerts on SMS and email, Periodic and instant alerts
16	Alarms • Alarm on any event or system failure. • Acknowledge, comment, cancel and forward the alarms • Optional Automatic closure of alarm incident on receiving reset events

Network Management System (NMS)

SN	Specifications
1	Automatic topology discovery and creation of network maps for Layer 3 and layer 2 network, All the available VLANS
2	Should have powerful administration control
3	Details performance monitoring and management
4	Should have extensive fault management capabilities with Real time Event and Alarm notifications, System Logs and Audit trials
5	Automatic Detection of configuration changes for easy trouble shooting and Isolation
6	Should have extensive centralized trouble shooting tools in built

Command and Control Software (C2)

SN	DESCRIPTION
1	It must ensure situational awareness by displaying relevant data in video wall
2	It shall present a Common Operating Picture (COP) of the real time events in the area of purview.
3	C&C software must be based on open multiple client – server architecture with TCP/IP protocol. Apart from web browser-based access to SOC/C&C software, dedicated thick or thin client version of HMI application has to be supplied by Bidder which has to be loaded in

	OWS/Servers/PCs at locations identified during detail engineering.
4	C&C software 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.
5	Multiple clients shall be able to operate on the system independently from Different location through LAN.
6	C&C software has to be scalable for adding additional work stations and servers.
7	C&C software must provide a real time display and control of all the security systems &visualization of prioritized critical information to the operator avoiding information overload
8	All the users shall have independent user names and password protection and shall be able to operate from different workstations using the same user name and password.
9	System shall support incident and action logging and reporting to allow for post event data analysis required for the ongoing improvement of security processes
10	System must support a comprehensive API (Application Programming Interface) or SDK(Software Development Kit) apart from Industry standard protocol to allow interfacing and integration with existing systems as well as subsystems being supplied as part of scope of this specification.
11	C&C software must support disaster recovery solutions using automatic database replication.
12	C&C shall support Interface & display of Signals from UPS of the Integrated Security System to be interfaced to C&C software.
13	It shall be possible to set procedures for each event mentioning the actions to be done for each event along with the designated person for the actions or assign a directive based on standard operating procedures(SOP), as well as applicable rule engines for any event, which shall be displayed suitably on occurrence of the event.(Eg Pop up display). These procedures will be called Standard Operating Procedure (SOP).
14	Bidder shall configure SOPs based on Employer's input at site. These SOP shallalso include provision of automatic predefined action based on detection of any event/breach or policy violation & will enable/ enact various security functions from security sub-systems installed & configured with C&C software.
15	Such SOP shall enable automatic actions, predefined task allocation and keep track of action taken and incident resolution report based on user defined rule engine. The no"s. of such SOP has to be as per employer's requirement and has to be done by bidder during commissioning as well as warranty and AMC period.
16	Workflow & SOP & Dynamic SOP should be part of C&C software. C&C must support collaborative incidence management i.e. basically configuring multiple operator/responder for single incident management.
17	GIS map of site shall be provided by bidder for Common Operating picture in C2.

_____END OF DOCUMENT_____