

**DRAFT QUALITATIVE REQUIREMENT OF PERIMETER INTRUSION DETECTION SYSTEM FOR  
CENTRAL RESERVE POLICE FORCE**

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)
- a) Electrical Smart Power Fence (ESPF)
- 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 PIDS software at the command-and-control center.
  - The live feed of intrusion attempt can be visualized in command-and-control center, as PIDS software would display video feed of the nearby CCTV cameras on display. The PIDS 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 :: Integrated Security Solution

1. Detailed analysis of Qualitative Requirements (QR)  
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 with built in IR, back to back camera fixing 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. Warning signboards indicating Caution electrical power fence in minimum three languages which includes one local language at every 50 m are installed all along the ESPF.   |

|     |  |  |  |
|-----|--|--|--|
| 5.  | The system generates alarm in case of cutting of any wire, shorting the wires, tampering of energizer or power failure, network disconnection.   |  |  |
| 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 IP65 standards for outdoor installation. Energizer conforms to safety requirement as per latest international safety standards IEC/EN 60335 or equivalent. |  |  |
| 8.  | Wire   |  |  |
|     | (a)  | Material                               | Mild steel   |
|     | (b)  | Coating                                | Galvanized with minimum zinc Coating 325 gm/m <sup>2</sup> or more |
|     | (c)  | Diameter(mm)                           | 2 or more  |
|     | (d)  | Resistance( $\Omega$ /km)              | Less than 100  |
|     | (e)  | Tensile strength (kg/mm <sup>2</sup> ) | At least 125   |
| 9.  | 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 Para5.101 of IS302-2-76 (1999)                              |
|     | (f)  | Battery back-up(hours)                 | At least 3 hrs.  |
|     | (g)  | Operating temp range                   | -20 to +50°C   |
|     | (h)  | Zone                                   | Single energizer to support 200mtr espf zone.                      |
| 10  | IP Based Controller  |  |  |
|     | (a) Should be ethernet based RJ45 interface  |  |  |
|     | (b) Real time monitoring and control to be provided to PIDS software.  |  |  |
|     | (c) It should control the energizer  |  |  |
|     | (d) LCD/equivalent visual indicator for status monitoring of ESPF.   |  |  |
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| 11. | System Installation  |  |  |

|  |     |  |  |
|--|-----|--|--|
|  | (a) | Height of ESPF(cm)   | 120 cm Wall top  |
|  | (b) | Distance between adjacent wires (cm)                           | Maximum 10 cm  |
|  | (c) | Distance between the top of the Wall to the bottom of ESPF(cm) | Maximum 10 cm  |
|  | (d) | Strain Poles   |  |
|  |     | (i)Material  | Galvanized MS  |
|  |     | (ii)Section  | 50 X 50 mm galvanized pre Hold square tubing with Minimum thickness of 2mm |
|  |     | (iii)Size(mm) two support poles                                | Minimum 30x30  |
|  |     | (iv)Height above wall (cm)                                     | 120  |
|  |     | (v) Distance between poles(m)                                  | Maximum 20mtr  |
|  | (e) | Intermediate Poles   |  |
|  |     | (i)Material  | Hot dip Galvanized MS  |
|  |     | (ii)Section  | Square tube  |
|  |     | (iii)Size(mm)  | Minimum 20x20  |
|  |     | (iv)Height above wall (cm)                                     | 120  |
|  |     | (v) Distance between poles(m)                                  | Maximum 3 mtr  |
|  | (f) | Insulator(for Strain Poles)                                    |  |
|  |     | (i)Material  | UV stabilized plastic  |
|  |     | (ii)Break down voltage (kVDC)                                  | At least 15  |
|  |     | (iii)Working load  | 140 kg   |
|  | (g) | Insulator(for intermediate pole)                               |  |
|  |     | (i)Material  | UV stabilized plastic  |
|  |     | (ii)Break down voltage(kVDC)                                   | At least 15  |

|     |                                   |   |
|-----|-----------------------------------|---|
|     | (iii)Vertical break download      | 25kg or better  |
|     | (h) Zonal length                  | 200 m or less   |
| 12. | Constant False Alarm Rate(CFAR)   | 0   |
| 13  | Audio, visual alarm               | Hooter and strobe light to be provided at every 200m  |
| 14  | Earthing and Lightning protection | Each subsystem of ESPF should be protected from lightning, surge and power fluctuations.<br>Each energizer/controller should have its own independent earthing. |

## 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 cover age 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 of 3m above boundary wall with flexibility in height as per the site condition.  |                  |                    |
| 4.      | Cameras are installed such that the camera system covers the entire perimeter for gap free coverage of perimeter  |                  |                    |
| 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  |                  |                    |
|         | (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) | 5- 50 mm or better |
|         | (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)               |
|     |                                 |                    | 0.0001(withIR 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. | AlarmTrigger                    |                    |  |
|     | (a)                             | Motion Detection   | Required                                   |
|     | (b)                             | Tampering Alarm    | Required                                   |
|     | (c)                             | Network disconnect | Required                                   |
| 19. | Dust/ Water Protection Level    |                    | IP66                                       |
| 20. | Dual Stream                     |                    | Dual H.264 Streams or better               |
| 21. | Automatic White Balance         |                    | Required                                   |
| 22. | Black Light Compensation        |                    | Required                                   |
| 23. | Network connectivity            |                    |  |
|     | (a)                             | Ethernet           | IEEE802.3                                  |
|     | (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 810F: |
| 25  | IR illumination     | Inbuilt (at least 60 m)   |
| 26  | Onboard storage(Gb) | At least 64, memory card to be supplied.  |

### PTZ Camera

| Sl. No.                       | Parameters                          | Requirements  |
|-------------------------------|-------------------------------------|---|
| <b>Pan-Tilt Mechanism</b>     |                                     |   |
| a.                            | Pan                                 |   |
|                               | (i) Angle                           | Continuous 360°   |
|                               | (ii) Preset Speed(°/s)              | At least 90   |
|                               | (iii) Manual Speed(°/s)             | Minimum range of 1 to 90                                  |
| b.                            | Tilt                                |   |
|                               | (i) Angle(°)                        | +10 to-90(-is downward &+is upward from Horizontal Plane) |
|                               | (ii) Pre-set Speed(°/s)             | At least 25   |
|                               | (iii) Manual Speed(°/s)             | Minimum range of 1 to 25                                  |
| c.                            | Sensor position display (Pan &Tilt) | Required  |
| <b>Thermal Sensor(Camera)</b> |                                     |   |
| 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.                                   | SpectralRange                                      | 8-12μm or wider                          |
| g.                                   | Lens focal length(mm)                              | Wide:-Upto 26 mm<br>Tele:-80mm and above |
| h.                                   | OpticalZoom  | Atleast4 X                               |
| i.                                   | Noise Equivalent Temperature Difference (NETD)     | Not more than 0.1K at f/1.0              |
| j.                                   | Minimum Resolvable Temperature Difference (MRTD)   | Not more than 0.2 K at 0.6 cycles/mrad   |
| k.                                   | Calibration feature (Non UniformityCorrection-NUC) | Required                                 |
| l.                                   | Multiple sector blanking Feature                   | Required                                 |
| <b>Visible Region Sensor(Camera)</b> |  |  |
| m.                                   | Image(Pick-up deviser)                             |  |
|                                      | (i) Size(inch)                                     | Minimum 1/3                              |
|                                      | (ii) SensorType                                    | CMOS/CCD                                 |
|                                      | (iii) ScanType                                     | Progressive                              |
| n.                                   |  |  |
|                                      | (i) FocalLength(mm)                                | 5-100orwider                             |
|                                      | (ii) OpticalZoom                                   | Atleast 30X                              |
|                                      | (iii) Digital Zoom                                 | At least 16 x                            |
| o.                                   | Resolution(MegaPixels)                             | Minimum2                                 |
| <b>General</b>                       |  |  |
| p.                                   | Operating weather Conditions                       | -20 to 50°C                              |
|                                      |  | Relative Humidity:5to90%                 |
| r.                                   | Maximum Frame rate(fps)                            | Atleast25                                |
| s.                                   | Display form at capability                         | White-hot & black-hot                    |
| t.                                   | Dust and water Protection                          | IP66 compliance                          |
| u.                                   | Interface  | ONVIF                                    |
| v.                                   | Onboard storage(Gb)                                | At least 64, memory card to be supplied. |
| w.                                   | Video streaming                                    |  |
|                                      | (i) Number   | Atleast2(dual)                           |
|                                      | (ii) Standard                                      | H.264 or better                          |



|    |                         |            |   |
|----|-------------------------|------------|---|
| x. | Adjustments             |            |   |
|    | (i)                     | Brightness | Required  |
|    | (ii)                    | Contrast   | Required  |
| y. | Sensor position display |            | Required  |
| z. | Outdoor Enclosure       |            | IP 66 Enclosure along with, anti-condensation, heater, Sunshield, Blower, Vandalproof compliance to IK10 or else compliance to Mil810F: |

### UPS power supply

| Sr.No | Feature                   | Required Parameters   |
|-------|---------------------------|---|
| 1     | Type                      | 5KVA/10kVA/20kVA True Online Double Conversion UPS.1-Phase Input/1-Phase Output.<br>Note: UPS Capacity according to site condition. |
| 2     | Input Voltage             | 230VAC(+10%&-20%or better),SinglePhase  |
| 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%orbetter,Single phase  |
| 7     | Output frequency          | 50Hz±0.25%(BatteryMode)   |
| 8     | Output Power Factor       | ≥0.90   |
| 9     | Crest Factor              | 3:1orbetter   |
| 10    | Efficiency at fullload    | ≥90%  |
| 11    | Total Harmonic distortion | Lessthan±3%forLinearload  |

|    |                      |   |
|----|----------------------|---|
| 12 | Overload Ability     | Minimum 1minute for 120% overload   |
| 13 | BatteryType          | Sealed maintenance Free(SMF)  |
| 14 | Battery Backup       | Minimum 30Minutes on full load  |
| 15 | Noise level          | <60dBat1meterdistance   |
| 16 | LCD/LEDIndication    | Mainsok,Lowbattery,Onbattery,Bypass,Error/Fault,Re<br>placebattery          |
| 17 | OperatingT emp       | 0to45°C or better   |
| 18 | Relative humidity    | 20-90%non-condensing  |
| 19 | Metering Instruments | O/P Voltage, O/P frequency & Current,<br>BatteryCurrent,InputFrequency      |
| 20 | Communication        | SNMP Card for Network Connectivity, status<br>monitoring                    |
| 21 | Protection           | Output:ShortCircuit,Overload,OverVo<br>ltage,UnderVoltageatbatteryterminals |
|    |                      | Input:InstantHighVoltageProtection  |
|    |                      | InputOver/UnderVoltageCutoff  |
|    |                      | DCOvervoltage&DCUndervoltage.   |
|    |                      | Back-feedprotectionrequired.  |
| 22 | Cooling              | Forced Air Cooled   |
| 23 | Certification        | (i) ISO9001   |
|    |                      | (ii) CE&BIS   |
|    |                      | (iii) IEC/EN62040orequivalent   |

## 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            | <ul style="list-style-type: none"> <li>• RJ45Ports:8No'sof100/1000BaseT(X)</li> <li>• SFPUplinkPorts:2No'sofSFPport.Loadedwith2No'sof 1G SM SFP LX modules of same OEM.</li> </ul>   |
| 4       | Performance          | Switching bandwidth:5.6Gbps<br>Forwarding Bandwidth2.8Gbps   |
| 5       | Hardware             | 128MBDRAM<br>160MBonboardflash memory  |
| 6       | Protocol features    | <ul style="list-style-type: none"> <li>• 100Base-T</li> <li>• 1000Base-X</li> <li>• STP/RSTP/MSTP</li> <li>• IEEE802.1QVLAN</li> <li>• POE+</li> <li>• Multicast</li> </ul>  |
| 7       | Software features    | LLDP,MSTP, STP Port fast, ICMP Vlans, static IP, Trust Ingress DSCP, COS, Priority Port, port - security, IGMP querier, DHCP server SNMP v2/v3, SNMP traps, syslog, IGMPsnooping,DHCPsnooping,BPDUguard,Etherchannel,Alarms,PoEcapability,SmartportMacro,SPAN/PortMirroring,Storm Control,EtherNet/IP(EDS) |
| 8       | Security features    | SSH,SNMPv3,Port-Security,DynamicARPInspection  |
| 9       | Environment Features | <ul style="list-style-type: none"> <li>• Operatingtemperature:-10to60°C</li> <li>• RelativeHumidity:5%to95%noncondensing</li> </ul>  |

|    |                    |   |
|----|--------------------|---|
| 10 | Power Requirements | <ul style="list-style-type: none"> <li>Power supply adapter to be supplied to power the switch from 220V AC 50Hz.</li> <li>Minimum power budget for POE+ 240W.</li> </ul>   |
| 11 | Standards          | <ul style="list-style-type: none"> <li>IEEE 802.1D MAC bridges, STP</li> <li>IEEE 802.1p Layer 2 CoS prioritization</li> <li>IEEE 802.1q VLAN</li> <li>IEEE 802.1s Multiple Spanning Trees</li> <li>IEEE 802.1w Rapid Spanning Tree</li> <li>IEEE 802.1AB LLDP</li> <li>IEEE 802.3ad Link Aggregation (LACP)</li> <li>IEEE 802.3 10BASE-T specification</li> <li>IEEE 802.3u 100BASE-TX specification</li> <li>IEEE 802.3ab 1000BASE-T specification</li> <li>IEEE 802.3z 1000BASE-X specification</li> </ul> |

### L3 Switch

| SL. No. | Parameter         | Specification  |
|---------|-------------------|--|
| 1       | Type              | 1U rack mount, 24 SFP port Ethernet, L3 switch with 2 SFP+ Uplink ports. (as on requirement basis)   |
| 2       | Operation         | The switch must provide wire speed Switching with Non-blocking full duplex performance.  |
| 3       | Architecture      | <ul style="list-style-type: none"> <li>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. Loaded with Copper 1G modules of same OEM</li> <li>Uplink ports: 2 No's of 10G SFP+ ports. 2 No's of 10G SFP+ LR modules of same OEM as on requirement basis</li> </ul> |
| 4       | Performance       | <ul style="list-style-type: none"> <li>Forwarding rate: 68.4Mpps</li> <li>Switching bandwidth: 92Gbps</li> </ul>   |
| 5       | Hardware          | <ul style="list-style-type: none"> <li>DRAM: 4GB</li> <li>FLASH: 2GB</li> </ul>  |
| 6       | Protocol features | <p>1000Base-T<br/> 1000 Base-X<br/> STP/RSTP/MST<br/> IEEE 802.1Q VLAN</p>   |

|    |                      |   |
|----|----------------------|---|
|    |                      | UnicastRouting:StaticRouting,RIPV1/V2,OSPF,BGP,EIGRP<br>MulticastRouting:PIM-DM,PIM-SM,PIM-SSM  |
| 7  | Quality of service   | QoS(IEEE802.1p)   |
| 8  | Security features    | IEEE802.1x,portsecurity,DynamicHostConfigurationProtocol(DHCP)SnoopingandGuard,DynamicARPInspection, Access Control Lists (ACLs),RADIUS/TACACS+,SNMPv3,HTTPS,SSH, |
| 9  | Environment Features | <ul style="list-style-type: none"> <li>• Operatingtemperature:-5to45°C</li> <li>• RelativeHumidity:5%to90%noncondensing</li> </ul>                                |
| 10 | Power Requirements   | <ul style="list-style-type: none"> <li>• Integratedredundantpowersupplies</li> <li>• Dualpowersupplyadaptertobesuppliedtopowertheswitchfrom220VAC50Hz</li> </ul>  |

### PIDS Server

| S.No. | Specification  |
|-------|--|
| 1     | Processor: IntelXeonSilver4200series,min2.1GHzprocessorbasefrequency or better |
| 2     | Numberofcore:2x8(16)core   |
| 3     | RAM:64 GBDDR4  |
| 4     | HDDforOS:2x600GBSAS  |
| 5     | HDDforapp:1TB  |
| 6     | OS:Windows/RHELlatestOS  |

### VMS Server

| S.No. | Specification  |
|-------|--|
| 1     | Processor: IntelXeonSilver4200series,min2.1GHzprocessorbasefrequency or better |
| 2     | Numberofcore:2x8(16)core   |
| 3     | RAM:64 GBDDR4  |
| 4     | HDDforOS:2x600GBSAS  |
| 5     | HDDforapp:1TB  |
| 6     | OS:Windows/RHELlatestOS  |

### Video Recording Server

| S.N o. | Specification   |
|--------|---|
| 1      | Processor: Intel Xeon Silver 4200 series, min 2.1GHz processor base frequency or better |
| 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 (Optional)

| S.N o. | TECHNICAL SPECIFICATION S:  |
|--------|---|
| 1      | GPS/GLONASS satellites 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 servers 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      | SNMPv3 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/AAA domain controller, AD, patch management

| S.N o. | Specification   |
|--------|---|
| 1      | Processor: Intel Xeon Silver 4200 series, min 2.1GHz processor base frequency |
| 2      | Number of core: 2x8(16) core  |
| 3      | RAM: 64 GB DDR4   |
| 4      | HDD for OS: 2x600GB SAS   |

|   |                         |
|---|-------------------------|
| 5 | HDDforapp:1TB           |
| 6 | OS:Windows/RHELlatestOS |

### NAS storage (OPTIONAL)

| Sl.No | Parameter                        | MinimumSpecifications   |
|-------|----------------------------------|---|
| 1.    | Solution/Type                    | NASstorage  |
| 2.    | Size                             | 100TB or more   |
| 3.    | HardwarePlatform                 | <ul style="list-style-type: none"> <li>• Rack mounted form-factor</li> <li>• Modular design to support controllers and disk drives expansion</li> </ul>   |
| 4.    | Controllers                      | <ul style="list-style-type: none"> <li>• At least 2 Controllers inactive/active mode</li> <li>• 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 supports calling upto minimum 4 controllers in</li> </ul> |
| 5.    | RAID support                     | <ul style="list-style-type: none"> <li>• ShouldsupportvariousRAIDLevels</li> </ul>  |
| 7.    | Redundancy and High Availability | <ul style="list-style-type: none"> <li>• 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</li> </ul>  |

|    |                     |  |
|----|---------------------|--|
| 8. | Management software | <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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, upto max capacity of the existing controller/units.</li> <li>• A single command console for entire storage system.</li> <li>• Should also include storage performance monitoring and management software</li> <li>• Should provide the functionality of proactive monitoring of Disk drive and Storage system for all possible disk failures</li> <li>• Should be able to take "snapshots" of the stored data to another logical drive for back up purposes</li> </ul> |
|----|---------------------|--|

### Workstation

| SI.No | Features     | Description:   |
|-------|--------------|--|
| 1     | Processor    | Intel Core I-7 Processor, latest generation                      |
| 2     | Memory       | Min.16GB, DDR-3 or better  |
| 3     | Graphic Card | Minimum 4GB on-board video memory                                |
| 4     | HDD          | 500GB or better; SATA @ Min. 7500 RPM – 8 MB Cache               |
| 5     | Ethernet     | Dual Port Gigabit Ethernet, Auto Negotiating Ethernet controller |
| 6     | OS           | Windows 10 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                  | 8Server   |
| 2.                                   | System Cable                         | Cat5/Cat6   |
| 3.                                   | Port Selection                       | Hotkeys, User Interface   |
| 4.                                   | Power Supply                         | 230 V AC  |
| 5.                                   | Mounting                             | Rack Mountable in server rack.  |
| 6.                                   | Keyboard,MouseSupport (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<br>Allowing/disallowing access of particular machines to a user profile. |
| 9                                    | UsertoSwitchDistance                 | 30Metersorless  |
| 10                                   | ServerstoSwitchDistance              | 15Metersorless  |
| <b>Computer connections(CPU End)</b> |                                      |   |
| 1                                    | VideoType                            | DVIorVGAasrequired  |
| 2                                    | KeyboardandMouseType                 | PS/2orUSBasrequired   |
| 3                                    | Mounting                             | Thedevicehallbefixedwithproperfixturesinthe serverrack.   |
| <b>Userconsoles</b>                  |                                      |   |
| 1                                    | VideoType                            | DVIorVGAasrequired  |
| 2                                    | KeyboardandMouseType                 | PS/2orUSBasrequired   |
| 3                                    | Mounting                             | Suitable mounting arrangement shall beprovided.   |

## Desktop PC

| Sl.No. | TechnicalFeatures   | Specification   |
|--------|---------------------|---|
| 1.     | Processor           | 10 <sup>th</sup> Generation Intelcore i5 (8MCache,upto 3.6GHz)or latest |
| 2.     | Chipset             | Intel latest chipset  |
| 3.     | Operating System    | Microsoft Windows 10 or latest  |
| 4.     | Memory              | Minimum16GBDDR4 expandable upto 32GB                                    |
| 5.     | Communication       | LAN Integrated 10/100/1000, GbE Network connection                      |
| 6.     | Ports(Minimum)      | USB 2 /3 –<br>4HDMI<br>RJ-45<br>DisplayPort                             |
| 7.     | Optical disc drives | CD/DVD + RW   |
| 8.     | Storage             | Minimum1TB@7200rpmSATAHDD or higher                                     |
| 9.     | Graphics            | Minimum1GB Dedicated Graphics Card                                      |
| 10.    | Power supply unit   | 180W upto 85%efficient  |
| 11.    | Peripherals         | Wireless keyboard, Wireless Mouse, 22” Monitor,DisplayCable             |

## Display

| SN  | ItemDescription    | Specifications  |
|-----|--------------------|-----------------|
| i   | ScreenSize         | 55"             |
| ii  | Video Resolution   | FullHD1920x1080 |
| iii | Brightness         | 500 Nits        |
| iv  | Contrast Ratio     | 4000:1          |
| v   | Viewing angle(H/V) | 178 Degree      |

|      |                                    |   |
|------|------------------------------------|---|
| vi   | ResponseTime                       | 6ms   |
| vii  | DigitalInput                       | HDMIx2, DVI-I,DP                                    |
| viii | Analog Input                       | throughDVI-I  |
| ix   | USBPort                            | 2   |
| x    | External Control                   | RJ45  |
| xi   | Display Control                    | Through remote                                      |
| xii  | RegulatoryApprovals/Certifications | UL/CE/IEC/BIS for safety, CE/FCC for EMC & Immunity |

## Passive Items

### 42 U rack

| SN | Parameter       | Specifications   |
|----|-----------------|--|
| 1  | Basic Structure | 19" floor standing rack. Width = Standard 19".Depth= 1200mm. 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.  |
|    |                 | Rackshallhaveproperventilation.  |
| 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.<br>Four heavy duty, casters wheels<br>With lock arrangement shall be provided, cable manager.       |
| 5  | PDU             | Rack shall have minimum two PDU with circuit breaker(220V1phase50Hzinput).Each PDU Shall at least10No'sof5A/15A sockets of Indian type vertical mount. |

## Junction Box

| SN | Technical Specifications   |
|----|--|
| 1  | IP65 Rating  |
| 2  | Width: 19"<br>Height: 9U<br>Depth: 600mm or better   |
| 3  | CRCA Steel with min 1.5mm gauge  |
| 4  | The Junction Box must have 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, MCB, SPD, earthing cable for body earthing to be provided.                              |

## 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<br>Mutual capacitance: 5.6nF/100m<br>Worst Case cable skew: 45ns/100m   |
| (c)    | Separator                         | The cable should have a Tape/Starfill separator to separate conductor pairs.   |

### Cat 6 Cable (Outdoor) Armored

| Sl. No. | Parameter                         | Technical specification  |
|---------|-----------------------------------|--|
| (a)     | Standard                          | As per ISO/IEC 11801 requirements  |
| (b)     | Insulation                        | HDPE insulation  |
| (c)     | Core                              | Deleted  |
| (d)     | Jacket                            | HDPE Jacket  |
| (e)     | Cable                             | 04-pair, Shielded twisted pair (STP), of 24 AWG solid conductors. armored    |
| (f)     | Electrical Characteristic at 20 C | Conductor DC resistance (Max): 9.38 Ω/100m                                   |
| (g)     | Separator                         | The cable should have a Tape/Starfill separator to separate conductor pairs. |

### OFC Cable

| SN | Specification  |
|----|--|
| 1  | 12 Core SM Armoured OFC Cable                                |
| 2  | Multiple tubes   |
| 3  | Compliant to ITU-TG.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 – 1500N                                     |
| 8  | Compatible to Coastal Environment                            |

### Fibre Patch Panel

| S N | Specifications                                   |
|-----|--|
| 1   | 12 Ports   |
| 2   | Fully Loaded with Adaptor/Coupler, Pigtailed etc |
| 3   | LC Duplex SM Adaptor                             |
| 4   | Material – Cold Rolled Steel                     |
| 5   | All 12 Port populated with LC Pigtailed          |

|   |   |
|---|---|
| 6 | Sliding TypeLIU/Adaptor Plate           |
| 7 | Support for1Gand 10G Speed              |
| 8 | All mounting Accessories to be provided |
| 9 | Compatible to Coastal Environment       |

### Cat6 Patch Panel

| <b>S<br/>N</b> | <b>Parameter</b>    | <b>Specifications</b>  |
|----------------|---------------------|--|
| 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              | Tem prange          | 0°C to+50°C  |

### Pole for Fixed camera

| <b>Sl.<br/>No</b> | <b>Parameter</b> | <b>MinimumSpecifications</b>  |
|-------------------|------------------|---|
| 1.                | Poletype         | Hot Dip Galvanized after Fabrication with Silver coating of 86 micron as per IS:2629; Fabrication in accordance withIS-2713(1980)                     |
| 2.                | Height           | 7 Meters(or higher),as -per-requirements for different types of cameras & Site conditions for stand alone system and 3 mtr for concrete boundary wall |
| 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 30x30x1.5cm   |
| 6. | Mounting facilities | To mount CCTV cameras, junction box, 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 30x30x1.5cm   |
| 6.     | Mounting facilities | To mount CCTV cameras, junction box, 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

- 3CORE,2.5SQMM,armored,FRLSHcable
- 4CORE,16 SQMM,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 includingMPEG4 and H.264.VMS shall have the capability of providing video processing for high resolutions; Including Full HD frames minimum frame 25FPS.  |
| 3  | It must be capable of integration with Video Analysis software &IP cameras   |
| 4  | VMS shall include full Settings Database back up 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, log out and Archiving functions integral reporting application with advanced sortingfilters.  |
| 6  | User data base 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 drag and drop functionality from and to the Operator main screen.  |
| 10 | VMS shall support multi monitor support.   |
| 11 | VMS shall support video export to AVI format - to beplayedwith Any Windows Media Player, with no software installation as a prerequisite.  |
| 12 | Views and layouts <ul style="list-style-type: none"> <li>• Different standard (Up to 50) pre-defined layouts for quick view starting from1x1,2x2,1+2upto10x10.</li> <li>• Support for Images, HTML pages, Maps,</li> <li>• Camera Drag and drop for easy viewing</li> <li>• Supports Public, Private and grouping of views.</li> <li>• Allows Full Screen View</li> <li>• View of Real Time alerts and events</li> <li>• live video and recorded video playback</li> <li>• Real time status display</li> <li>• PTZ Control, optional joystick control</li> </ul> |



|    |  |
|----|--|
| 14 | <p>Recording</p> <ul style="list-style-type: none"> <li>• 24x7 recording of Audio and Video up to Full HD(1080p)</li> <li>• Supports Manual, Continuous, on Event and Scheduled recording Modes per camera</li> <li>• pre-alarm and post-alarm recording with duration configured</li> <li>• Resolution and frame rate can be configured on a per camera basis</li> <li>• Proprietary water marked recordings</li> <li>• Streaming and recording server supported for rendering additional streams for recording and live viewing</li> <li>• Multi-monitor support</li> <li>• Video Archiving</li> </ul> |
| 15 | <p>Notifications</p> <ul style="list-style-type: none"> <li>• All events logged in the software</li> <li>• Filter for notifications and alerts</li> </ul>  |
| 16 | <p>Alarms</p> <ul style="list-style-type: none"> <li>• Alarm on any event or system failure.</li> </ul>  |

### Network Management System(NMS)

| SN | Specifications   |
|----|--|
| 1  | Automatic topology discovery and creation of network maps for Layer3 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 troubleshooting and Isolation  |
| 6  | Should have extensive centralized troubleshooting tools in built   |

## PIDS Software

| 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  | PIDS software must be based on open multiple client–server architecture with TCP/IP protocol.   |
| 4  | PIDS software has to be scalable for adding additional workstations and servers.  |
| 5  | PIDS software must provide a real time display and control of all the security systems  |
| 6  | 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.   |
| 7  | 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. |
| 17 |   |

### Earthing :

#### Separate earth pit for pole and lightning arrester.

| S<br>N | Items                                   |
|--------|---|
| 1      | Earthing rod                            |
| 2      | Earthing strip for LA and pole earthing |
| 3      | Chemical compound for earthing          |

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ENDOF DOCUMENT

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