Technical Specification of Supply, installation, testing and commissioning Of CCTV surveillance system at ERL

Scope of Work

Supply, installation, testing and commissioning of CCTV surveillance system at ERL is required to maintain proper vigilance and monitoring of the areas including but not limited to such as ERL periphery and Installation area.

1. Supply of Cameras, Network switch, including HDD, Decoders, Network video recorders (NVR), Keyboard & mouse, Video walls, Optical network units (ONU), Optical Line Terminal (OLT), Router, Junction boxes (weather protected), Distribution boxes, Server rack, TJ Boxes, required Power Adapters, all connectors (Ethernet, patch cord etc.), fiber splitters, Circuit breakers, etc. shall be under the scope of supplier. Construction of mounting pole and any additional item/ job required for CCTV surveillance system shall also be under the scope of supplier
2. All cameras shall be PoE powered. Supplier shall not use separate adapters to power up individual cameras.
3. Position of cameras shall be adjusted in such a way that it can cover maximum vigilance area.
4. The existing camera system at Installation area, Power House, Canteen, Admin building, ABP drum plant shall be incorporated with this new system. There shall be a provision for future expansion.
5. All required licenses shall be provided for proper operation of the system. Validity of all types of licenses shall be lifetime.
6. The Main Surveillance display (video walls) shall be installed at Main Gate Security building. There shall be 02 video walls, each of which shall be able to display 36 cameras. Accessories such as frame, wall mounting brackets, etc. for video walls, etc. shall be supplied. The surveillance system shall be connected to existing LAN system of ERL. With proper ID and Password anyone can access and monitor the cameras. The system shall be connected to ERL internet through router for viewing cameras from mobile device. All signal and power cables for Video walls shall be well organized and proper channeling of the cables shall be in the scope of supplier.
7. Out of 41 nos. outdoor cameras, 13 nos. cameras are situated at installation area. Beyond showing all the cameras in the Main Surveillance display (video walls) at the Main Gate Security building, these 13 nos. cameras are to be shown in the existing CCTV monitor at the installation control room. It is to be noted that, 08 nos. cameras that exist in the installation area are already displaying in the existing CCTV monitor.
8. The server rack shall be installed in a separate room. Server rack contains NVR, OLT, Network Switch, HDD bay, etc. The cable entry into the room and inside the server rack shall be well organized.
9. The usage of fiber splitter and subsequent branching of fiber optic cable shall be designed in such a way that the GPON network shall have minimum level of signal loss. Supplier shall follow network ring topology to avoid discontinuity in signal during accidental damage of fiber optic cable. For power cable, the supplier shall follow cable layout attached to the specification.
10. ERL will provide all required optical fiber, Ethernet and power cable. Also ERL will do the required earth excavation and backfilling. But all other installation and commissioning including the cable laying, fiber and Ethernet splicing, etc. shall be under the scope of supplier.
    For Cable laying, termination, wiring, management of rack, junction box and DB box, supplier must follow the instructions mentioned in **P. Cable and Device Management** clause of Technical Specification.
    The power source of the system shall be from generator bus of ERL.
11. Bidder may offer Camera, Decoder, Switch, Video Wall, Router etc. with equivalent quality to the brands/ manufacturing country for each item mentioned below.

Technical Specification:

A. Cameras

1. Outdoor Camera

Quantity: 41 Nos.
Security: 28 Nos.
Installation: 13 Nos.

Camera	Camera Type	:	Bullet
	Resolution	:	min. 4 MP
	Min. Illumination	:	Color: max. 0.001 Lux @ (F1.2, AGC ON)
	Day & Night	:	IR cut filter
Lens	Lens Type	:	2.8 mm to 12 mm Motorized Varifocal
	Aperture	:	max. F1.2
Illuminator	Supplement Light Type & Range	:	IR; min. 60 m
	IR Wavelength	:	850 nm
Video	Main Stream (Min.)	:	50 Hz: 25 fps (2688 × 1520, 1920 × 1080, 1280 × 720) 60 Hz: 30 fps (2688 × 1520, 1920 × 1080, 1280 × 720)
	Sub Stream (Min.)	:	50 Hz: 25 fps (1280 × 720, 640 × 480, 640 × 360) 60 Hz: 30 fps (1280 × 720. 640 × 480, 640 × 360)
	Video Compression	:	H.264, H.264+, H.265, H.265+
Image	Wide Dynamic Range	:	min. 130 dB
	SNR	:	min. 52 dB
	Image Settings	:	Rotate mode, saturation, brightness, contrast, sharpness, AGC, white balance adjustable by client software
Network	Protocols	:	TCP/IP, HTTP, HTTPS, DHCP, DNS, DDNS
Storage	On-Board Storage	:	Built-in Micro SD slot.
	Capacity	:	min.128 GB
Interface	Ethernet Interface	:	1 RJ45 10 M/100 M self-adaptive Ethernet port,

Event	Basic & Smart Event	:	Motion detection, Line crossing/ intrusion detection etc.
General	Power	:	12 V DC
	PoE	:	PoE: 802.3at, max. 18 W
Protection	Ingress Protection	:	min. IP67
Brand		:	Honeywell/ Panasonic/ Pelco/ Bosch/ Axis/ IDIS/ Hikvision

2. PTZ Outdoor Camera **Quantity: 12 Nos.**

Camera	Camera Type	:	2 Channel 01 Bullet and 01 PTZ
	Resolution	:	min.4 MP
	Optical Zoom	:	min.25x
Lens	Lens Type	:	4.8 mm to 120 mm Focal Length (Min.)
	Focus	:	Auto, semi-auto, manual
Illuminator	Supplement Light Type& Range	:	IR for Bullet and White Light for PTZ Range: Up to 30 meter for Bullet Channel and up to 200 meter for PTZ Channel.
Video	Main Stream	:	50 Hz: 25 fps (2560 x 1440, 1920 x 1080, 1280 x 960, 1280 x 720 etc.) Min.
	Video Compression	:	H.265/H.264/H.264+/H.265+
PTZ	Movement Range (Pan)	:	0° to 360°
	Movement Range (Tilt)	:	-15° to 90° (min.)
	PTZ Status Display	:	Yes
Network	Protocols	:	TCP/IP, HTTP, HTTPS, DHCP, DNS, DDNS
Storage	On-Board Storage	:	Built-in MicroSD/SDHC/SDXC slot.
	Capacity	:	min.256 GB
Image	Image Settings	:	Rotate mode, saturation, brightness, contrast, sharpness, AGC, white balance adjustable by client software
Interface	Ethernet Interface	:	1 RJ45 10 M/100 M self-adaptive Ethernet port,
Event	Basic & Smart Event	:	Motion detection, Line crossing/ intrusion detection etc.
General	Power	:	Hi-PoE
	Dimension	:	10″ x 8″ x 7″ (Bullet)/ Ø 9″ x 15″ (Dome) (Max.)
Protection	Ingress Protection	:	Min. IP66
Brand		:	Honeywell/ Panasonic/ Pelco/ Bosch/ Axis/ IDIS/ Hikvision

3. Indoor Camera **Quantity: 12 Nos.**

Camera	Camera Type	:	Dome/ Turret Type
	Resolution	:	min.4 MP
	3-Axis Adjustment	:	Pan: 0° to 360°, Tilt: 0° to 75°, Rotate: 0° to 360°
Lens	Lens Type	:	Fixed; 2.8 mm Focal Length
Illuminator	Supplement Light Type & Range	:	White light; up to 60 m
	Day/ Night View	:	Color (Auto); True Day/Night (IR cut filter)
Video	Main Stream	:	50 Hz: 25 fps (2560 x 1440, 1920 x 1080, 1280 x 960, 1280 x 720 etc.) Min.
	Video Compression	:	H.265/H.264/H.264+/H.265+
Network	Protocols	:	TCP/IP, HTTP, HTTPS, DHCP, DNS, DDNS
Storage	On-Board Storage	:	Built-in MicroSD/SDHC/SDXC slot.
	Capacity	:	min.128 GB
Image	Image Settings	:	Rotate mode, saturation, brightness, contrast, sharpness, AGC, white balance adjustable by client software
Interface	Ethernet Interface	:	1 RJ45 10 M/100 M self-adaptive Ethernet port,
Event	Basic & Smart Event	:	Motion detection, Line crossing/ intrusion detection etc.
General	Power	:	PoE: 802.3at, 42.5 V to 57 V, 0.56 A to 0.42 A, max. 23.6 W
Protection	Ingress Protection	:	Min. IP67
Brand		:	Honeywell/ Panasonic/ Pelco/ Bosch/ Axis/ IDIS/ Hikvision

4. Memory Card **Quantity: 65 Nos.**

Type	:	Surveillance Grade MicroSD/SDHC/SDXC card
Speed Class	:	Class X, U3, V30

Storage Capacity	:	128 GB
Access Time Read (Mbps)	:	100Mbps
Access Time Write (Mbps)	:	20Mbps
Brands	:	Transcend/ SanDisk/ A-Data/ Twinmos/ Hikvision
Additional Requirements	:	The memory card shall be installed to product during manufacturing.

B. Hard Disk Drive **Quantity: 24 nos.**

1. Storage Capacity	:	10 TB
2. Series	:	Enterprise
3. Form Factor	:	3.5"
4. Interface	:	SATA III 6 Gb/s; 256MB Cache
5. RPM Class	:	7200 rpm
6. Data Transfer Speeds	:	up to 245 MB/s
7. MTBF (Mean time between failures)	:	2,500,000 Hours
8. Power-On Hours per Year	:	8760
9. Annualized Failure Rate (AFR)	:	Max. 0.35%
10. Certification	:	OEM/ Manufacturer Authorization certification (must be enclosed with the tender)
11. Brand	:	Western Digital/ Seagate/ Toshiba/ Barracuda/ Twinmos/ Transcend/ Apacer
12. Storage Period	:	Bidder shall ensure recording storage of minimum 06 months at minimum 2MP resolution. Additional HDD and Bay shall be supplied to meet the requirement.

C. Managed Network Switch **Quantity: 01 no.**

1. Brand	:	Cisco/ Netgear/ Juniper/ Ubiquiti
2. Ports	:	Min..20 x 10G copper ports; Min. 04 x combo 10G copper/SFP+; Min 01 x 1G management port
3. Features	:	L2+, L3 Features
4. Enclosure Type	:	Rack Mountable
5. Switching Capacity	:	Min. 400 Gbps
6. Packet Forwarding Rate	:	Min. 200 Mpps
7. CPU	:	Min 02 core (one of which minimum 1.3 GHz) Min 512 MB CPU Memory
8. Packet buffer	:	Min 2MB
9. Cooling Fan	:	Min. 02
10 Application	:	NVR, Decoder, etc. shall be connected to 10 G Copper ports and OLT shall be connected to 10G copper/ SFP+ combo port through single mode fiber.
11 Certifications	:	OEM/ Manufacturer Authorization certification (must be enclosed with the tender)
12 Available Power Supply	:	220 ± 10%V AC, 50 Hz

D. Display Unit

46" Video Wall **Quantity: 02 nos.**

a. Resolution	:	Min. 1920 × 1080
b. Display technology	:	LCD
c. Backlight	:	Direct-lit LED backlight
d. Dimensions	:	Diagonal ≈ 46" (Min.)
e. Screen brightness	:	Min. 500 cd/m² or nits
f. Contrast Ratio (Typ.)	:	1200:1
g. Pixel Pitch (mm)	:	≈ 0.56 mm
h. Viewing Angle (H/V)	:	178/178
i. Color Gamut	:	72% NTSC (Min.)
j. Connectivity (min.)	:	HDMI × 1, DVI × 1, VGA × 1, DP× 1, USB × 1
k. Available Power Supply	:	220±10%V AC, 50 Hz
l. Brand	:	Planar/ BARCO/ LG/ Samsung/ Panasonic/ Christie/ Hikvision

m. Accessories		:	All accessories such as Frame, Wall mounting brackets, etc. shall be supplied.

E. Decoder (128-ch) **Quantity: 01 Nos.**

1. Input/ Output	Input	:	VGA, DVI-I
	Input Resolution	:	Min. 1080p: 1920 × 1080
	Output	:	HDMI × 16 Min.
	Output Resolution	:	HDMI: 4K: 3840 × 2160@30 Hz, 1080p: 1920 × 1080@50/60 Hz, 720p: 1280 × 720@50 Hz/60 Hz
2. Decoding	Decoding Resolution	:	Up to 24MP
	Decoding Channel	:	128-ch
	Decoding Capability	:	Min. 24MP@30fps: 8-ch; 12MP@20fps:16-ch; 8MP@30fps: 32-ch, 5MP@30fps: 48-ch etc.; 3MP@30fps: 80-ch; 1080p@30fps: 128-ch
	Split Screen	:	1/4/6/8/9/12/16/25/36
3. Interface	Network Interface	:	RJ45 interface × 2, 10/100/1000 Mbps adaptive Optic interface × 2, 100 base-FX/1000 base-X 1 × combo Serial Interface RS-232 (RJ45) × 1, RS-485×1
4. Available Power Supply		:	220 ± 10%V AC, 50 Hz
5. Brand			Same brand of offered Camera.

F. NVR (Network Video Recorder) **Quantity: 01 Nos.**

1. IP video input		:	128
2. Incoming/outgoing bandwidth		:	576 Mbps/512 Mbps (Min.)
3. Video Output		:	2 nos. HDMI outputs; Resolution (Min.): 4K, 2K, 1080p, 720p, XGA
4. Video Decoding	Decoding format	:	H.264, H.264+, H.265, H.265+
	Synchronous playback	:	Up to 16 channels
	Video resolution	:	Min. 12 MP, 8 MP, 4 MP, 3MP, 1080p, 720p, VGA etc.
5. HDD	Interface	:	The NVR shall have capability to be connected with bay chassis of 24 HDD.
	Capacity	:	Up to 10 TB for each HDD
6. RAID	RAID Type	:	RAID0, RAID1, RAID5, RAID6, and RAID10
7. Network	Protocol	:	TCP/IP, DHCP, IPv4, DNS, DDNS, RTSP, HTTP, HTTPS
	Network interface	:	RJ45 10M/100M/1000M self-adaptive Ethernet interface
	NIC Card	:	At least 04
8. External interface		:	Min. 2nos USB interface
9. Available Power supply		:	220 ± 10%V AC, 50 Hz
10. Brand		:	Same brand of offered Camera.

G. Optical Network Unit (ONU) **Quantity: 60 Nos.**

1. User interface	Port	:	min. 4 x 10/100/1000MRJ45
	Lightning Protection	:	min. 6KV CM
2. PON	Port	:	1 XPON adaptive interface (Single Mode Fiber)
	Uplink/ Downlink Speed	:	1.25 gbps/2.5gbps
	Sensitivity	:	min. - 28dBm
3. PoE/ PoE+/ Hi-PoE	Interface	:	min. 04 PoE Interface
	Compatibility	:	Power capacity of each port of ONU shall be higher than the maximum power requirement of the camera connected to the individual port. The ONU for PTZ camera shall be compatible with the requirement of PTZ camera.
	Wattage	:	min. 30W each port min. 60W whole machine
4. Available Power Supply		:	220 ± 10%V AC, 50 Hz
5. Maximum Operating temperature		:	Min. 80 °C

H. Optical Line Terminal (OLT) **Quantity: 01 Nos.**

1.	Minimum Service Port	: 16 x GPON port, 04 x GE COMBO port, 02 x 10GE SFP+ port 01 x Console Port
2.	Switching Capacity	: 108 Gbps
3.	Forwarding Capacity	: 95.23Mpps
4.	SFP Module	: At least 02 SFP modules compatible with the service port shall be supplied.
5.	Size	: 1 U, 19 inch
6.	Mounting	: Rack Mounted. (All required accessories shall be supplied for mounting inside the server rack.)
7.	Available Power Supply	: 220 ± 10%V AC, 50 Hz

I. Ethernet Router **Quantity: 01 Nos.**

1.	Brand	: Cisco/ Mikrotik
2.	CPU	: Min. 09 cores, 1.2 GHz per core
3.	RAM	: Min. 2 GB
4.	Storage	: Min. 128 MB
5.	No. of Ports	: Min.08 (Gigabit Ethernet ports)
6.	Serial port	: RJ45
7.	Operating system	: RouterOS, License level 6
8.	Data transfer Rate	: 1000 Mbps
9.	Available Power Supply	220 ± 10%V AC, 50 Hz

J. Server Rack **Quantity: 01 no.**

a.	Capacity	: 32U
b.	Color	: Black (Powder coated)
c.	Cooling Type	: min. 4 Fan Cooling
d.	Door	: Front Glass Door Back Mesh Door
e.	Castors	: Steel Iron Wheel for Movement
f.	Thickness	: min. 1.2 mm
g.	Material	: SPCC
h.	Power Distribution Unit (PDU)	: 13A main and at least 12 port
i.	Illumination	: Back side of the rack shall be illuminated properly by LED light for working in the back end of server rack.
j.	Mounting	: All mounting accessories required for mounting servers, NVR, OLT, Core Network Switch, HDD bay, etc. All of these items shall be rack mounted. Network and power cable inside the rack shall be well organized with proper tagging. Main power cable of the rack shall be through circuit breaker.

K. Accessories

1. Camera Terminal Box **Quantity: 53 Nos.**

a.	Description	: The camera terminal box shall be installed at each camera to protect the Ethernet cable end connection.
b.	Material	: Aluminum Alloy or standard equivalent
c.	Dimension	: Dimension shall be such that there will be minimum 10% spare space inside the box after connecting and housing one coil (1 feet) of camera cable.
d.	Type	: Weather-Proof (min. IP67) for Item A.1 and A.2 Regular for Item A.3

2. TJ Box **Quantity: 65 Nos.**

a. Material	:	High Quality PVC
b. Philosophy	:	The TJ box shall be such that it is well protected from corrosion and rust, entry of water inside the box. All optical splitter and other optical joint shall be inside the box. TJ box shall be inside of junction box. There shall be spare space inside each of the TJ box.

3. Fiber Splitter **Quantity: 65 Nos.**

a. Technology	:	Planar Waveguide Circuit (PLC)
b. Style	:	Steel Tube
c. Mode	:	Single Mode
d. Input/ Output Fiber Diameter	:	250µm
e. Operating Temperature	:	-40 to 85°C
f. Operating Bandwidth	:	1260~1650nm
g. Configuration Type	:	The optical fiber network shall be designed in such a way to keep the signal loss at minimum level. Splitter branching and positioning shall be designed accordingly.

4. Circuit Breaker

a. No of Pole	:	02
b. Rated Current	:	02 A **Quantity: 50 nos.**
	:	10 A **Quantity: 05 nos.**
	:	20 A **Quantity: 03 nos.**
c. Breaking capacity	:	The capacity of circuit breaker shall be selected for full protection of the load as per IEC standard.
d. Location	:	Circuit breaker shall be installed at each junction box, DB box for protecting camera, ONU, etc. Circuit breaker shall be used for server rack to protect NVR, Servers, etc.
e. Brand	:	Siemens (Germany)/ Schneider Electric (France)/ ABB (Sweden)/ Mitsubishi (Japan)/ GE (USA) / Fuji (Japan)

5. HDMI Cable **Quantity: 02 Nos.**

a. Resolution	:	4K
b. Length	:	10 meter for main server to Video Wall Regular for others.
c. HDMI Version	:	2.0
d. Connector	:	Male to Male gold plated.
e. Delay	:	No Delay. Cable with higher quality shall be supplied for display compatibility with video wall, etc.

6. SFP+ Module **Quantity: 02 nos.**

a. Media	:	Single Mode Fiber
b. Platform Support	:	Compatible with Network Switch and OLT.
c. Port	:	10G Base SFP+
d. Transmit Power	:	-8.2 to 0.5 dBm
e. Received Power	:	-14.4 to 0.5 dBm
f. Transmit and Receive Wavelength	:	1260 to 1355 nm
g. Brand	:	Same brand of offered Network Switch

7. Bay Chassis **Quantity: 01 no.**

a. Chassis Type	:	Rack Mount (required accessories shall be supplied)
b. Form Factor	:	4 U
c. Cooling	:	Min. 04 Fans
d. HDD	:	Each chassis shall have 24 HDD port which will be connected to NVR. The HDD shall be hot swappable. Supplier shall confirm the compatibility of the bay chassis to NVR and HDD.

8. Adapters **Quantity: As Required**

All required adapters for PoE type ONU, OLT, Core Network Switch, NVR, Video Wall, etc. shall be supplied. Inside junction box the adapters shall be fixed-mounted.

9. Other accessories **Quantity: As Required**

Fiber Patch Panel, Single mode Fiber Patch Cord with connector, cable gland, Fiber splicing, Ethernet splicing work with good quality splicing machine, BN Terminal (with end connector), cable lugs, Mouse & Keyboard, etc.

L. Pipe

1. ¾ inch HDPE pipe	:	Thickness:2.5–2.8 mm (Minimum) Inclusive of fittings & others.	**Quantity: 7500 meter**
2. PVC Casing	:	Size: 01 inch.; Thickness: 25 mm	**Quantity: 1000 meter**
3. GI Pipe	:	Diameter: 1.5 inch; Schedule: 40	**Quantity: 500 meter**

M. Distribution Box **Quantity: 03 nos.**

1. Material	:	Stainless Steel
2. Ingress protection	:	IP67(Min.)
3. No. of Hubs (conduit entry)	:	Min. 06 nos.
4. Hub sizes	:	½ inch/ ¾ inch NPT
5. Cable Gland	:	Brass nickel type
6. Cable and Device Management	:	Power cable shall be well organized inside the DB box using din rail and BN terminal. Proper cable lugs shall be used. Inside the DB box cable shall enter the box through cable gland. The HDPE pipe containing cable shall run to the DB box. No tapping of power cable except BN connection shall be allowed.
7. Circuit Breaker	:	Two pole Circuit breaker of proper rating shall be used for incoming and outgoing power cable in each of the DB box
8. Dimensions	:	18″ x 12″ x 8″ (L x W x H) min.

N. Weather-Proof Junction box

a. Material	:	Stainless Steel	
b. Ingress protection	:	IP67(Min.)	
c. Dimensions	:	18″ x 12″ x 8″ (L x W x H) min.	**Quantity: 15 nos.**
	:	12″ x 8″ x 6″ (L x W x H) min.	**Quantity: 40 nos.**
d. No. of Hubs(conduit entry)	:	min. 6nos.	
e. Hub sizes	:	½″/¾″ NPT	
f. Cable Gland	:	Brass nickel type	
g. Cable entry for Pole side installation	:	There shall be hole at backside of the junction box for cable (power, fiber optic and Ethernet) entry and out instead of hubs.	

O. Mounting Pole

1. 20 Feet Mounting Pole **Quantity: 32 nos.**

a. Length	:	Min. 20 ft.
b. Material	:	6 mm G.I. Sheet
c. Base Diameter	:	Min. 10 inch
d. Top Diameter	:	Min. 6 inch
e. Cross Sectional Shape	:	Cylindrical
f. Civil Foundation		
i. Type of foundation	:	RCC(Reinforced Cement Concrete)
ii. Dimension of column	:	L x W x H = 22 inch x 22 inch x 42 inch (12 inch depth will be above surface; rest will be underground
iii. Dimension of base	:	L x W x H = 34 inch x 34 inch x 12 inch
g. Pole to Foundation Connection	:	The bottom of cylindrical pole shall be welded heavily to an 18 inch x 18 inch plate (6 mm thickness). This plate shall be connected to the civil foundation by bolt.
h. Load Calculation	:	The above mentioned dimension of civil foundation and bottom plate are minimum requirement. Upon load calculation, dimension of civil foundation and bottom plate shall be increased.
i. Camera Mounting, Painting & Fittings	:	

All Camera mounting accessories shall be provided with each pole for proper camera installation. At the top of the pole there shall be arm for installation of at least 04 cameras (max. 02 (two) of which may be PTZ type) at different direction. Each arm shall have provision for mounting camera terminal box. Junction box shall be mounted on each pole above man height which will contain ONU, TJ box, din rail and BN connector.
All poles shall be epoxy coated for ensuring surface protection from corrosion/rust.
All other necessary fittings shall be supplied.

2. 30 Feet Mounting Pole **Quantity: 10 nos.**

a. Length	:	Min. 30 ft.
b. Material	:	6 mm G.I. Sheet
c. Base Diameter	:	Min. 12 inch
d. Top Diameter	:	Min. 08 inch
e. Cross Sectional Shape	:	Cylindrical
f. Civil Foundation		
i. Type of foundation	:	RCC(Reinforced Cement Concrete)
Dimension of column	:	L x W x H = 24 inch x 24 inch x 48 inch (12 inch depth will be above surface; rest will be underground
ii. Dimension of base	:	L x W x H = 36 inch x 36 inch x 12 inch
g. Pole to Foundation Connection	:	The bottom of cylindrical pole shall be welded heavily to a 20 inch x 20 inch plate (6 mm thickness). This plate shall be connected to the civil foundation by bolt
h. Load Calculation	:	The above mentioned dimension of civil foundation and bottom plate are minimum requirement. Upon load calculation, dimension of civil foundation and bottom plate shall be increased.

i. Camera Mounting, Painting & Fittings :

All Camera mounting accessories shall be provided with each pole for proper camera installation. At the top of the pole there shall be arm for installation of at least 06 cameras (max. 03 (three) of which may be PTZ type) at different direction. Each arm shall have provision for mounting camera terminal box. Junction box shall be mounted on each pole above man height which will contain ONU, TJ box, din rail and BN connector.
All poles shall be epoxy coated for ensuring surface protection from corrosion/rust.
All other necessary fittings shall be supplied.

P. Cable and Device Management

1. Cable Laying

ERL will provide all required optical fiber, Ethernet and power cable. Also ERL will do the required earth excavation and backfilling. But all other installation and commissioning including the cable laying, fiber and Ethernet splicing, etc. shall be under the scope of supplier.
All outdoor cables (Fiber Optic/ Power) shall be undergrounded. Where undergrounding is not possible (specially in the unit area), high quality cable tray shall be used for cable tracing. Fiber optic cable shall run through a 3/4 inch HDPE pipe for undergrounding. All fiber optic cable core between OLT-Splitter and Splitter-ONU shall be single run (without splicing/ TJ Box).
GI pipe shall be used for road crossing of the cable with the HDPE pipe.
Future expansion: The network shall be facilitated to expand its capacity and shall have scope to insert Junction Boxes for future camera installation as indicated in the layout drawing. So, all cables (Fiber Optic/ CAT 6/ Power) and HDPE pipes shall be laid such that the network can be expanded at any time.

2. Wiring and Termination

All the wiring of Fiber optic cable, CAT 6 cable, and Power cable is to be done carefully with proper cable tracing. Fiber optic cable, Ethernet cable, adapter, ONU, etc. shall be well organized and properly mounted at a fixed position inside the junction box (explosion-proof and weather-protected). Power cable, 02 pole circuit breaker, etc. inside the DB box &junction box (explosion-proof and weather-protected) shall be properly organized using din rail and BN terminal. No plug-socket system, multi-plug shall be allowed inside junction box and DB box. All necessary connection such as power the ONUs shall be through BN terminal inside junction box. Proper cable lugs shall be used. The HDPE pipe containing cable shall enter to the junction box and DB box through cable gland. No tapping of power cable except BN connection inside junction box and DB box shall be allowed. All optical splitters must be inside high-quality type TJ box. All TJ box shall be inside of junction box.
Each pole shall have a hollow inside for cable run. All cable entry with pipe from ground to pole, and pole junction box to camera arm shall not be visible from outside of the pole. All the junction box mounted on pole shall be above man height.

3. **Management of Rack, DB Box and Junction Box**
   NVR, HDD Bay, OLT, network switch, etc. inside the server rack shall be rack mounted. Necessary mounting accessories shall be supplied by the supplier. Proper weather-proof tagging of the device, cable, etc. inside the rack, Junction Box and DB box shall be used for identification. Inside of the Junction Box shall be cleaned and organized.

Q. Delivery & Installation time

1. Delivery time : 90 days from the date of work order issue
2. Installation time : 90 days from the date of delivery of all products

Qualification Criteria of the Bidder

1. The minimum period of general experience of the Bidder in Supply, Installation and Commissioning of CCTV system in KPI installation shall be 05 (five) years. All relevant documents (Completion certificate) must be submitted along with the technical offer.
2. The minimum specific experience as Supplier in Supply, Installation and Commissioning of CCTV systems of at least 02 (two) contracts to be successfully completed in KPI installation within the last 05 (five) years each with of a value of at least BDT 90,00,000.00 (Ninety Lakhs). All relevant documents (Completion certificate mentioning contract price) must be submitted along with the technical offer.
3. Any items with short End of Life or discontinued items shall not be offered.
5. Bidder shall confirm the compatibility of the offered items for proper system operation. Supply of all the required additional items for system compatibility and proper operation are in the scope of supplier.
6. Catalogue/ brochure/ datasheet, operational and maintenance manual (in English) should be submitted by the successful bidder.
7. Manufacturing Country/ Brand certificate is to be submitted with the technical offer.
8. Bidder must provide min. 01 (One) year Warranty with replacement of any parts without charge.