CONSTRUCTION OF RESIDENTIAL FLATS, SBILD & OTHER COMMERCIAL OUTFITS AT HINJEWADI, PUNE, MAHARSHTRA, IN EPC MODE

PART E: CHAPTER C (SECURITY)

SBI

MURALAGE

1.1 Standard Minimum Specifications of IP Cameras (Fixed & Varifocal, Dome & Bullet: 2MP, 4MP & 5MP)

Feature	Parameters
Alarm Interface	1Ch Alarm In, 1Ch Alarm Out
ANR	Supported
Audio Compression	G.711µ and G.711A (Support mic in/line in)
Audio Interface	1 In or Built in Mic & 1 Out both (Full Duplex)
Back Light Compensation	WDR, BLC, HLC
Cover	Dome: PC Glass Dome Cover / Bullet: Front Lens Cover PC Glass
Digital Noise Reduction	3D DNR
Digital Zoom	16X
Display Overlay (OSD)	Title, Time and Date
Event Actions	Enable Alarm Out, Send Email, Start Recording, Snapshot
Focus Control	Auto & Manual (Varifocal Cameras)
Frame Rate	1~ 25fps
Gain Control	Automatic
Image Sensor	Progressive Scan CMOS Sensor
Ingress Protection	IP67 Compliant
Intrusion Detection	Supported
IR Distance	Fixed (Dome & Bullet): 30 Mtrs, Varifocal Dome: 30 Mtrs, Varifocal Bullet: 50 Mtrs
IR LED Control	Auto, Manual, OFF
Lens Type	Fixed Lens: 2.8mm, 3.6mm, 4mm. Motorized Varifocal Lens: 2.7~13.5mm, 2.8~12mm
Line Crossing Detection	Supported
Local Storage	512 GB SD Card Supported

Material Housing	Casing: Aluminum / Metal
Min. Illumination	Colour .005 Lux with AGC on
Motion Detection	Supported with Human Detection
Network Port	1 x RJ45 10M/100M Network Self Adaptive
Operating Conditions	-20°C ~ 60°C, Humidity ≤ 95% (non-condensing)
Power Supply	DC 12V ± 10% and PoE (802.3af)
Privacy Masking	3 area privacy masks supported
Product Certification	BIS Registered, Cyber Security: ER (Essential Requirement) Certified by STQC
Protocol	Approved by STQC (ER)
Resolution / Effective Pixels	2MP: 1920(H)X1080(V), 4MP: 2560(H)x1440(V), 5MP: 2560(H)x1920(V)
ROI	Supporting at least 1 region
RTC (Real-Time Clock)	Supported
Signal/Noise Ratio	≥50dB
Streaming Capability	Triple Stream
Streams Resolution (@H.265 / H.264)	2MP: Mainstream:1080P@ 25fps; Sub Stream: VGA@25fps. 4MP: Mainstream:1440P@ 25fps; Sub Stream: 720P@25fps. 5MP: Mainstream:1920P@ 25fps; Sub Stream: 720P@25fps
Switching of Day/Night Mode	Auto (ICR)/Color/B/W
System Compatibility	ONVIF Profile G, S & T
Tamper Detection	Alerts when the camera is blocked or tampered
Vandal Protection	IK10 Compliant
Video Bit Rate	Constant bit rate, variable bit rate (16kbps-6Mbps)
Video Compression	H.265 and H.264
Wide Dynamic Range	120dB True WDR

1.2 Standard Minimum Specifications of PTZ Cameras (4MP and 5MP)

Feature	Parameters
Audio/Alarm Interface	Alarm: 1Ch In, 1Ch Out / Audio: 1 In or built in mic, 1 Out (Full Duplex)
Audio Compression	G.711U and G.711A (Support mic in/line in)
Auto flip / Auto Tracking	Mechanical Flip / Supported
Backlight Compensation	Off, BLC, HLC, WDR
Certification / Protocol	ER by STQC / STQC MANDATED
Continuous Scan / Tour	Supported / 8 groups
Day/Night Mode	ICR switch, Auto, Color, B&W, External Trigger
Defog / Digital Zoom	Supported / 16X
Display Overlay (OSD)	Title, time and date overlay, multi-line OSD, OSD Color Selection
Event Actions	Enable Alarm Out, Send Email, Start Recording, Snapshot
Frame Rate	1~ 25fps
Front Lens Cover / Material	PC Glass / Metal Housing
General Security Feature	User Authentication, Watermark, IP address filtering
Image Sensor	Progressive SCAN CMOS Sensor
Ingress / Vandalism Protection	IP67 Compliant / IK10 Compliant
IR Distance / LED Control	250m / Auto, Manual, OFF
Video Analytics	Intrusion Detection, Loitering Detection, Line Crossing, Missing Object or Human Counting of humans (bidirectional) & Crowd gathering, Face Detection
Lens / Optical Zoom	≤4.5mm~ ≥135mm / 30X Optical Zoom
Manual Control Speed	Pan: 0.1° ~350° /s; Tilt: 0.1° ~200° /s
Min. Illumination	Color: 0.005Lux (AGC ON)

Network Port	1 x RJ45 10M/100M Network Self Adaptive
Noise Reduction	3D NR
Operating Conditions	-30°C ~ 70°C / 10 ~ 90% RH (condensing)
Pan/Tilt Range	Pan: 0° ~ 360°; Tilt: 5° ~ 180°
Power Supply	DC24V/1.5A（±10%） PoE+ (802.3at)
Preset / Preset Speed	300 / 300°/s
Privacy Masking	Support 8 area privacy mask
Resolution / Streams	5MP,4MP,2MP,720P, VGA / Triple Streams (Unicast & Multicast)
Local Storage Facility	512 GB
Streaming Resolution	Mainstream: 5MP (2560X1920)@25fps; 4MP(2560x1440)@25fps / Sub Stream: D1@25fps
Surge Protection	Lightning Protection, Surge Protection & Voltage Transient Protection
System Compatibility	ONVIF Profile S, G, M & T
Tamper Detection	Alerts when the camera is blocked or tampered
Video Bit Rate / Compression	Constant bit rate, variable bit rate (16kbps-8Mbps) / H.265 and H.264
WDR	Up to 120 dB, TWDR

1.3 Standard Minimum Specifications of Network Video Recorder (NVR: 8, 16, 32, 64 & 128 Ch)

Feature	**Parameters**
Alarm Input / Output	Supported Alarm 1 Ch Input, 1 Ch Out
Audio Compression / Output	G.711µ and G.711A / 1 Ch RCA Bidirectional
Backup Location & Method	Local, network / USB Device, network backup
Certification	IS:13252 (Part 1): 2010, BIS Registered

Control Options	Keyboard, Mouse through USB and IP Network
Event Actions	Send email, audio warning (buzzer), alarm on monitor, upload to Centre/ control room, record, snapshot, preview, PTZ linkage
Face Recognition Function	1 Channel for capture, store, compare and retrieve face images, with 12 Face Libraries each having 20K Images
HDD Capacity	10 TB (Single) each SATA port Cumulative: 10TBx No. of Trays in NVR
Interface Protocol / Network	ONVIF, RTSP / TCP/IP, IPv4, HTTP, DHCP, DNS, DDNS, RTSP, NTP, UPnP, SMTP
Mobile Surveillance	Support iOS, Android
Motion Detection	Supported with Human Identification
Network Access Bandwidth	Incoming: 60 MBPS (4ch.& 8Ch.), 120MBPS (16Ch.), 256 (32 Ch.), 512 (64 Ch. & 128 Ch.). Outgoing: 120 (4,8,16 & 32Ch.), 320 (64 Ch.), 512 (128 Ch.)
Network Interface	X RJ45 10M/100M/1000M self-adaptive Ethernet port (4 Ch., 8 Ch., 16 Ch. & 32Ch.)
On Screen Display	Date, Time, Camera Title, Alerts, camera tampering/masking
Operating System	Embedded Linux
Operation Conditions	-10°C ~ 55°C/10%-90% Humidity
Power Supply	AC100-240 V
Record Mode	Manual, Continuous, Scheduled, Motion Detection, Timing, Alarm, FIFO and Overwrite
Recording Resolution	5 MP real time recording@25 FPS per channel in all Channels simultaneously with selectable fps
Security Features	Authorized username and password, HTTPS with password, RTSP Validation
Storage Interface	2SATA (04 Ch.), 4SATA (08Ch.), 8SATA + 1

	e SATA (16 Ch. & 32 Ch.)
USB Interface	2 USB2.0 in 4 Ch.NVR, 3 USB (1x 3.0 USB & 2x 2.0 USB) in 8Ch., 16Ch. & 32Ch. NVRs
Video Bit Rate / Compression	16Kbps-16Mbps (CBR, VBR) / H.265, H.264
Video Output	CH HDMI & VGA output
Video Resolution Support	8MP, 5MP, 3MP, 1080P, 720P, D1, VGA, CIF, QCIF

1.4 Balance of System (BoS) Components

Feature	**Parameters**
Hard Disk Drive (SATA II/III)	Video Surveillance Series (Rated for 24/7 operation). 32~64 MB Cache, 3Mb ~ 6Mb per second data transfer rate, Spindle Speed 7200 RPM or more. Capacity: 4TB, 8TB, 10TB, 16TB.
Surveillance Monitor	Anti-glare Surveillance grade 24X7 working LED with TCO 03 or higher certification. Screen size: 22" to 55" diagonal LED. Video: PAL. Resolution (Min): Full HD (FHD) (matching the resolution of video stream of NVR). Power: 100-230 V AC. Viewing Angle: 140o H, 130o V.
Video Cable	Category: Category – 6 and 6a (Armoured optional). Mutual Capacitance @300 MHz: 5.60 nF/100 mtrs max. DC resistance @300 MHz: 9.38Ω /100 mtrs max at 20o C. Impedance: 100 +/- 15 Ω. Insulation: High Density Polyethylene. Sheath: Fire Retardant PVC Compound (FRPVC). Standards: IS 14493 Part 5.
PVC Conduits (Cabling)	Specifications: IS-9537-1983; Internal Dia 20 mm, Wall Thickness- 4.2~5 mm. Acceptable Quality: ISI Marked. Grade: Medium.
Wall Mount Rack (Housing)	Dimension: Suiting the size of Video Recorders / PoE Switches. Powder coated steel box with standard lock and key. Provision of Slot below for cable routing.

	Transparent front door with Lock, Fan tray with 2 Fans (Preferred).
Network PoE Switch	Type: Unmanaged (Plug and Play type) with PoE Ports, 10 /100 Mbps input and 10/100/1000 uplink. Input PoE ports: 4/8/16/ 24 RJ 45 (10 /100 Mbps). Uplink Ports: 2 ports, RJ 45 (10/100/ 1000 Mbps). Protocol Compliant: IEEE 802.3i, IEEE 802.3u, IEEE 802.3x, IEEE 802.3af, IEEE 802.3at, IEEE 802.3az. Power Input: 100-230 V AC. Surge Protection: 2 KV for Ports and 6 KV for Power supply. Operating Temp: -20o Centigrade to 40o Centigrade. Power transmission: 328 Ft with compatibility for PoE extender.

2.0 SCOPE OF WORK

The intent of this specification is to define the minimum technical requirements for the engineering, supply, installation, testing, and commissioning of a Smart Video Doorbell System. The Contractor shall ensure that the offered equipment meets or exceeds the parameters outlined in this Design Basis Report. All components must seamlessly integrate to provide secure, high-definition video surveillance and two-way audio communication.

3.0 DESIGN BASIS & ENGINEERING CRITERIA

- **Environmental Suitability:** The outdoor unit must be engineered to withstand exterior environmental conditions, conforming to an **IP65** ingress protection rating.
- **Power Redundancy:** The system is designed around a low-voltage battery architecture (5200 mAh) with provisions for continuous trickle charging via an optional OEM-approved solar panel.
- **Cybersecurity:** All wireless network communications shall be encrypted utilizing industry-standard **128-bit AES encryption** with SSL/TLS protocols to ensure data integrity and prevent unauthorized interception.

4.0 STANDARD MINIMUM TECHNICAL SPECIFICATIONS

The Contractor shall submit compliance against the following minimum technical specifications. Any deviations must be explicitly documented in the technical bid.

S.No.	Sub-System / Feature	Minimum Required Specification (Tender Parameter)	Engineering Remarks / EPC Directives
1.0	**CAMERA OPTICS & SENSOR**		

1.1	Image Sensor	1/3" Progressive Scan CMOS Sensor	Must ensure low-light sensitivity.
1.2	Lens Architecture	Focal Length: 1.18 mm; Aperture: F1.8	Fixed iris, wide-angle application.
1.3	Field of View (FOV)	160° (Diagonal), 135° (Horizontal), 109° (Vertical)	Contractor to verify no blind spots at entry.
1.4	Night Vision Capability	850 nm IR LED (Range: 25 ft / 7.6 m)	Must support Full-Colour Night Vision.
1.5	Auxiliary Lighting	Built-in Spotlights	Configurable trigger via PIR.
1.6	Interface & Controls	Reset button; Doorbell & Anti-Theft Buttons	Anti-theft mechanism must trigger instant alerts.
2.0	**VIDEO & AUDIO PROCESSING**		
2.1	Native Resolution	2K 3MP (2304 × 1296 px)	High Definition output required.
2.2	Frame Rate	Minimum 15 fps	Constant bit-rate optimization preferred.
2.3	Digital Zoom	10x	Lossless interpolation algorithm preferred.
2.4	Video Compression	H.264	Standardized for bandwidth efficiency.
2.5	Live Stream / View	Supported (Yes)	Must feature ultra-low latency bridging.
2.6	Image Enhancement	3DNR (Digital Noise Reduction), WDR	Wide Dynamic Range essential for backlit doorways.
2.7	Audio Hardware	Built-in Microphone and Speaker	IP-rated weatherized membranes

			required.
2.8	Audio Communication	Two-Way Audio with Noise Cancellation	Half/Full-duplex configurable via application.
3.0	**DATA STORAGE**		
3.1	Edge / Local Storage	MicroSD Card Slot on Camera (Up to 512 GB)	High-endurance cards (Class 10/U3) recommended.
3.2	Cloud Storage	Preferred / Supported	Subscription provisioning by end-user.
4.0	**DETECTION & ALARM NOTIFICATIONS**		
4.1	Primary Sensor	PIR Motion Sensor (Detection Range: 25 ft)	Adjustable sensitivity required to reduce false alarms.
4.2	Analytics / AI	Person Detection	On-edge processing preferred to reduce latency.
4.3	Zone Masking	Activity Zones (Preferred)	User-definable polygonal masking.
4.4	Output Notification	System Notification with Snapshot	Push notification via secured mobile application.
5.0	**NETWORK COMMUNICATION**		
5.1	Network Connectivity	Connect via Ethernet and/or Wi-Fi	Dual-mode connectivity for installation flexibility.
5.2	Wireless Standards	IEEE 802.11b/g/n, 2.4 GHz Wi-Fi	Contractor to ensure adequate RSSI (-65dBm or better) at mounting location.

6.0	**CYBERSECURITY**		
6.1	Threat Mitigation	On-Device Machine Learning	Edge-based processing to isolate raw data.
6.2	Data Encryption	128-bit AES Encryption with SSL/TLS	End-to-end payload encryption.
6.3	Wireless Authentication	WPA/WPA2-PSK	Must not support legacy/vulnerable WEP protocols.
7.0	**POWER MANAGEMENT**		
7.1	Primary Power Source	5200 mAh Built-in Rechargeable Lithium-ion Battery	Integrated BMS (Battery Management System).
7.2	Auxiliary Power	Optional Solar Panel compatible (e.g., Tapo A201)	Sold separately; contractor to rough-in cabling if specified.
7.3	Input Voltage	Doorbell Battery Pack Adapter Input: 100-240 V, 50/60 Hz	Universal SMPS standard.
7.4	Output Voltage	Doorbell Battery Pack Adapter Output: 5.0 V, 1.0 A	Standard USB/DC barrel termination.
8.0	**GENERAL SPECIFICATIONS**		
8.1	Weather Resistance	IP65	Fully protected against dust and low-pressure water jets.
8.2	System Requirements	App-based, compatible with iOS or Android	Must support latest OS build iterations.
8.3	Mounting Options	Wall / Door Mount	Tamper-proof security screws to

			be utilized.
8.4	Operating Temperature	5°C to 45°C	Thermal cycling tested.
8.5	Operating Humidity	10% to 90% RH (Non-condensing)	Conformal coating on internal PCB preferred.
8.6	Storage Humidity	0% to 90% RH (Non-condensing)	Proper warehouse storage conditions required prior to installation.
9.0	**COMPLIANCE & CERTIFICATIONS**		
9.1	Regulatory Approvals	CE, RoHS, RCM, R-NZ, FCC, EAC, Triman, UKCA	Contractor must provide OEM Declaration of Conformity upon request.

5.0 General Instructions and Scope of Work

This section outlines the general installation guidelines and scope for the deployment of the Under Vehicle Scanner System (UVSS).

- Mandatory Deployment: It is mandatory to install an Under Vehicle Scanner in every Branch, Office, Residential Complexes, Guest Houses, and any other premises & establishments of the Bank.
- Purpose: This installation is required to maintain the security of the premises round the clock.
- Installation Location: The Under Vehicle Scanner may be installed at the entrance of the Bank's Administrative/Commercial Complex.
- Contractor Responsibility (EPC): The EPC contractor shall be responsible for the end-to-end design, supply, installation, testing, and commissioning of the UVSS and ANPR systems in strict accordance with the technical specifications outlined in Part II.

6.0 Standard Minimum Specifications of UVSS & ANPR System

The proposed G-Scan UVSS and ANPR system must strictly adhere to the minimum technical specifications listed below.

6.1 Main Scanning Camera

S. No.	Parameter	Minimum Feature Requirements

a.	Camera Type	GigE Area Scan camera
b.	Sensor	CMOS
c.	Interface Type	GigE
d.	Resolution	1920 × 1200 pixels
e.	Field of View	180 Degree
f.	Power Supply	12–24 V

6.2 Processing Unit

S. No.	Parameter	Minimum Feature Requirements
a.	Processor	Intel Core i7 or Latest
b.	Memory	16 GB RAM
c.	Storage Capacity	2 TB
d.	Display	22-inch Monitor
e.	Connectivity	GigE LAN Interface
f.	Operating System	Windows 10 Pro or Latest

6.3 Driver Imaging Camera

S. No.	Parameter	Minimum Feature Requirements
a.	Camera Type	IP Camera with IR LED illumination
b.	Resolution	2 MP
c.	Camera Range	8–10 meters
d.	Video Format	NTSC / PAL
e.	Power Supply	PoE

6.4 ANPR Camera

S. No.	Parameter	Minimum Feature Requirements

a.	Camera Type	CMOS camera with motorized lens
b.	Resolution	2 MP
c.	Frame Rate	30 fps
d.	Camera Range	15 meters
e.	IR Range	60 meters
f.	Power Supply	PoE

6.5 Electromechanical Assembly

S. No.	Parameter	Minimum Feature Requirements
a.	Overall Dimensions	1800 × 1200 × 600*
b.	Construction Material	Structural steel foundation finished with a checkered stainless-steel plate on the upper surface
c.	Lighting System	LED Array (synchronized with active camera shutter)
d.	Vehicle Detection	Inductive Vehicle Detection Loop Sensor

(Note: Dimensions are assumed to be in millimeters (mm) as per standard engineering practices, unless otherwise specified by site conditions.)

7.0 Execution, Testing, and Commissioning (Supplementary EPC Requirements)

- Site Preparation: The contractor shall perform all necessary civil and electrical works required for the installation of the structural steel foundation and inductive loops.
- Integration: The UVSS must seamlessly integrate with the ANPR system to provide a unified user interface on the 22-inch display monitor.
- Testing: Prior to handover, the contractor must conduct Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) to ensure the 180-degree field of view and automatic synchronization of the LED array with the camera shutter operate flawlessly under all lighting conditions.
- Warranty & Maintenance: The contractor shall provide a comprehensive defect liability period (DLP) covering all cameras, processing units, and electromechanical assemblies for a standard minimum of 12 months from the date of commissioning, with optional Annual Maintenance Contract (AMC) terms to support round-the-clock security operations.

EPC Tender Specification: Electro-Mechanical Boom Barrier System

8.0 General Scope and Application

- The system shall comprise a heavy-duty electro-mechanical boom barrier designed for continuous use and the management of high traffic volumes.
- The barrier shall restrict passage to create a secure environment.
- The equipment shall be suitable for both indoor and outdoor applications.
- Expected applications include toll plazas, administrative buildings, manufacturing hubs, amusement parks, business parks, hotels, corporate offices, shopping malls, and residential societies.
- The system shall be capable of millions of trouble-free operations with minimal maintenance.

9.0 Certifications and Quality Standards

- The equipment shall carry CE certification.
- The manufacturer shall hold certifications for ISO 9001:2005 and ISO 14001:2015.

10.0Technical Specifications

Parameter	Specification Requirement
Mechanism Type	Electro-Mechanical
Barrier Dimensions	930H x 335W x 285D mm
Total Weight	60 Kg's
Motor Type	DC Brushless
Motor Rotation	1400 r/min
Motor Power Supply	24 VDC
Power Supply to SMPS	110~220VAC 50Hz
Maximum Power Consumption	140 W
Operating Temperature	-20~+55
Protection Level	Housing IP-55, PCB IP-68
Acoustic Noise Limit	<70 dB

11.0 Mechanical Construction

- The barrier housing shall be robust, constructed from high-grade MS sheet with a powder-coated finish.
- The housing shall be MS galvanized and incorporate air ventilators.
- Internal mechanism parts shall be made of heavy-duty cast iron to ensure a rigid and long-lasting assembly.
- The system shall utilize lubricated deep groove ball bearings to ensure smooth, noise-free operation.

- The boom shall be constructed of aluminum and feature a telescopic design capable of securing passage widths up to 6 meters.
- The housing shall include a key lock to provide secure access to internal electronics and connections.
- The barrier mechanism shall be fully left/right interchangeable.

12.0 Operational Performance

- The barrier shall support a tested 10 million duty cycle.
- Boom operation shall be smooth, completely jerk-free, and bounce-free.
- The opening and closing speed shall be fully adjustable between 1.5 seconds and 8 seconds.
- Specific operation speeds shall be 1.5 seconds for boom lengths of 1 to 3 meters, and
  5.0 seconds for boom lengths up to 6 meters.
- The system shall incorporate a "reverse on contact" safety feature.
- The system shall incorporate a "boom fly away on contact" safety feature.
- The unit shall feature a unique manual control system to provide a fail-safety solution during power failures or emergencies.
- The manual operation shall allow for safe egress during crisis evacuations.

13.0 Controller and Electronics

- The system shall be equipped with a multi-function controller utilizing high-reliability MOSFET technology.
- The controller shall feature an inbuilt programmable button with a digital display for parameter setting.
- The brushless DC motor shall be equipped with gear support.
- The communication interface shall utilize a dry contact relay with a 12-volt pulse.

14.0 Integration and Accessories

- The multi-function controller shall provide relay output and allow seamless integration with third-party access controls.
- The system shall be capable of integration with remote receivers.
- The barrier must support integration with safety devices including loop detectors, photocells, and warning flash lights.
- The system shall support an optional 24V battery backup configuration.
- Available and supported accessories shall include wireless remote controls, control push buttons, IR sensors, and boom rests.
- The system shall offer optional TCP/IP integration capabilities.

BOOM BARRIER
Boom Barrier Specification

1. General

The boom barrier shall be an electromechanical system designed for regulating vehicle entry and exit. It shall be suitable for outdoor installation and function reliably under Indian environmental conditions (temperature, humidity, dust).

2. Technical Specifications

Parameter	Specification
Type	Electromechanical Boom Barrier
Boom Length	4 to 6 meters (as per site requirement)
Boom Arm Type	Octagonal / Rectangular Aluminium with Reflective Stickers
Duty Cycle	100% Continuous Operation (Heavy Duty)
Operating Voltage	230V ±10%, 50Hz Single Phase AC
Motor Type	DC Brushless Motor / AC Induction Motor
Opening/Closing Time	Adjustable, typically 1.5 to 6 seconds
Cabinet Material	Powder-coated Mild Steel or Stainless Steel (SS 316 optional)
Control Panel	Microprocessor-based controller with inbuilt logic
Manual Operation	Manual override in case of power failure
Operating Temperature	-10°C to +60°C
IP Protection	IP54 or higher
Safety Sensors	Optical/Infrared loop detectors and anti-crush safety sensors
Remote Operation	Wired push button, Remote control, RFID/Access card optional
Boom Arm Reflectors	Retro-reflective stickers or LED light strip
Mounting Base	Bolted to RCC pedestal (RCC base to be constructed by vendor)

Compliance Standards

IS 9000 (Basic Environmental Testing Procedures for Electronic Components) IS 13947 (Low-voltage switchgear and control gear)

IP Rating as per IS/IEC 60529 (Minimum IP54)

Electrical components shall conform to IS 732 (Code of Practice for Electrical Wiring) Safety compliance: CE / UL / equivalent preferred

Installation & Commissioning

Vendor shall supply, install, test, and commission the boom barrier system at the designated location.

Civil foundation works shall be carried out as per approved shop drawings.