

## SECTION 01 81 36.13 — O & M BUILDINGS AND FACILITIES — SPACE PROGRAMMING

### 1.01 <sup>A16</sup>SUMMARY:

- A. This Section specifies the basic requirements for all operational, maintenance, security, and personnel buildings and facilities that the Contractor shall provide for the Atlantic and Pacific lock complexes. It does not preclude the Contractor from providing other features to allow for fully operational lock complexes.
- B. The requirements of Section 01 10 00 (*General Performance Requirements*) and Section 01 81 36 (*O & M Buildings and Facilities — Program*) shall apply, but **not exclusively**.

### 1.02 REFERENCES:

- A. **American National Standards Institute (ANSI) Standard:**  
A117.1-2003                      Accessible and Useable Buildings and Facilities
- B. **American Society of Mechanical Engineers (ASME)/American National Standards Institute (ANSI) Standard:**  
A17.1-2007                      Safety Code for Elevators and Escalators (includes requirements for elevators, escalators, dumbwaiters, moving walkways, material lifts, and dumbwaiters with automatic transfer devices)
- C. **U.S. Department of Defense (DOD) Publication:**  
4-022-01-2005                      Unified Facilities Criteria: Design of Entry Control Facilities
- D. **International Code Council (ICC) Code:**  
IBC 2006                              ICC International Building Code
- E. **International Organization for Standardization (ISO) European Norm (EN) Standards:**  
  
6385-2004                              Ergonomic Principles in the Design of Work Systems  
  
9241-5-1999                              Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) — Part 5 — Workstation Layout and Postural Requirements  
  
11064-1-2000                              Ergonomic Design of Control Centers- Part 1 — Principles for the Design of Control Centers

**F. Junta Técnica de Ingeniería y Arquitectura (JTIA) Norm:**

REP 2004                                      Reglamento Estructural de la República de Panamá

**G. National Fire Protection Association (NFPA) Publications:**

13-2007	Installation of Sprinkler Systems
14-2007	Installation of Standpipes and Hose Systems
30-2003	Flammable and Combustible Liquids Code
70-2008	National Electrical Code
101-2006	Life Safety Code
820-2007	Fire Protection in Wastewater Treatment and Collection Facilities

**H. Panama Law and Regulations:**

Ley 42                                      “Por la cual se establece la equiparación de oportunidades para las personas con discapacidad” 27 de agosto de 1999 y Decreto Ejecutivo No. 88 del 11 de diciembre de 2002 por medio del cual se reglamenta la Ley 42 de 27 de agosto de 1999

**1.03 DESCRIPTION:** Buildings and facilities to be designed and constructed by the Contractor.

**A. BUILDING – 1: MAIN CONTROL BUILDING [CB]**

1. **Location:** The main control building [CB] shall be located on the C-side, at the downstream end of the upper level, on the wall opposite to the gate Recesses. The main control building shall be at least two floors high and shall be a landmark for the new locks. Aesthetic considerations are critical for this structure. The control room shall:
  - a. be above the ground floor level at a height of at least 10 meters and
  - b. allow direct observation of the entire new lock complex, unless such a view is obstructed by ships positioned in the lock chambers.
2. **Security:** The [CB] is classified as high-security zone.

### 3. Space Requirements:

[CB]	Activity/Space	Operational/Locational Needs	Notes
	<b>Lower Floor(s)</b>		
1 each	Telecommunications room	Provide equipment, air conditioning (A/C, precision type), and an independent main entry/exit door. Room shall not have windows nor suspended ceiling.	Provide telecommunications equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). Provide radiation protection in accordance with Section 13 49 00 ( <i>Radiation Protection</i> ). Provide precision type air conditioning according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Process control systems (PCS) room	Provide equipment, air conditioning (A/C, precision type), and independent main entry/exit door. Room shall not have windows nor suspended ceiling.	For lock machinery control system, see Section 40 95 13.13 ( <i>Process Control Hardware for Locks Machinery Control</i> ). Provide radiation protection according to Section 13 49 00 ( <i>Radiation Protection</i> ). Provide precision type air conditioning according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Telecommunications equipment battery room	Provide for telecommunications equipment. Provide air conditioning (A/C) and mechanical ventilation and independent main entry/exit door. Room shall not have windows nor suspended ceiling. Room shall be provided with containment wall for equipment leaks.	Provide equipment according to Section 26 33 00 ( <i>Direct Current Equipment</i> ). Provide air conditioning and mechanical ventilation systems according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

[CB]	Activity/Space	Operational/Locational Needs	Notes
1 each	Process control systems (PCS) battery room	Provide for process control systems equipment. Provide air conditioning (A/C) and mechanical ventilation and independent main entry/exit door. Room shall not have windows nor suspended ceiling. Room shall be provided with containment wall for equipment leaks.	Provide <a href="#">equipment</a> according to Section 26 33 00 ( <i>Direct Current Equipment</i> ). Provide air conditioning and mechanical ventilation systems according to Section 01 86 13 ( <i>Plant - Mechanical Systems and Equipment</i> ).
	Lockmaster office	Provide office area for one workstation, a meeting table and seats for four (4) persons, a kitchenette and <a href="#">unisex</a> toilet.  Include janitor and storage room.	Include outlets for <a href="#">computers</a> , <a href="#">LAN</a> , <a href="#">fax</a> , and telephone.  For kitchenette requirements, see Section 01 87 00 ( <i>Equipment and Furnishings</i> ).  For toilet, see Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ).
	<a href="#">Access control system</a>	<a href="#">At main entry/exit door.</a>	<a href="#">Provide according to Section 28 13 00 (Access Control Systems (ACSs)).</a>
	<a href="#">Intrusion detection system</a>	<a href="#">At wall openings.</a>	<a href="#">Provide according to Section 28 16 00 (Intrusion Detection Systems (IDSs)).</a>
	<a href="#">CCVS Camera</a>	<a href="#">Mount at exterior, to view the main entrance to telecommunications room and process control systems room.</a>	<a href="#">Provide according to Section 28 23 00 (Closed Circuit Video Systems).</a>
	Raised access floor	In telecommunications room and process control systems (PCS) room.	Provide according to Section 09 69 00 ( <i>Raised Access Floors</i> ).
	Air conditioning equipment room	Provide air conditioning (A/C) for the main control building.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ). Provide separate climate control units for the upper floor and for the lower floor equipment rooms.

[CB]	Activity/Space	Operational/Locational Needs	Notes
1 each	Emergency station	Exterior of building, adjacent to <b>doors of battery rooms.</b>	Provide an eyewash station and an emergency shower area with shower pan and drain on one side of the building. Provide fixtures according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Miscellaneous	Provide PASs and telephone outlets. Locate telephone outlets near entrance to the equipment rooms.	Provide according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).
	<b>Upper Floor</b>	<b>At least 10 m above ground floor level</b>	
	Control equipment and display area	Provide a centralized control system for the lock machinery required for lockage Operations. Include video equipment and monitoring displays. The operator display area shall have a <b>direct, unobstructed (almost 360°) view</b> of the lock chambers and approaches.	For the control operator interface, see Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ), Section 12 59 83 ( <i>Custom System Furniture</i> ), Section 40 00 00 ( <i>Process Integration</i> ), and Section 40 96 45.13 ( <i>Process Control Software for LMCS</i> ).
2 each	Control consoles	Provide two semi-circular control consoles, at different levels, located on top of a raised floor. The console located farther away from the video-wall display shall be located higher than the other console.	In accordance with Sections 12 59 83 ( <i>Custom System Furniture</i> ) and 09 69 00 ( <i>Raised Access Floors</i> ).
	Control terminal for the existing locks, for future Employer retrofit.	Provide space and connection outlets only.	The control terminal for the existing locks is to be used as backup in case of an emergency.

[CB]	Activity/Space	Operational/Locational Needs	Notes
	Video wall	Locate equipment at unobstructed of wall space for the video and data wall display.	The video and data wall display shall be visible from all operator workstations and shall provide an overview of the <a href="#">lock</a> complex. A video projection solution may be considered for the video and data wall display. See Section 11 52 23 ( <i>Video Walls</i> ).
	Time display	Locate time clock display on wall above video wall <a href="#">for visibility</a> from the entire room.	Provide according to Section 27 53 13 ( <i>Time Synchronization Systems</i> ).
	Administrative area	<p>Provide office area for two workstations, a conference room table and seats for eight (8) persons, a kitchenette, <a href="#">and male and female toilets</a>.</p> <p><a href="#">Include janitor and storage room according to program.</a></p> <p><a href="#">Include lobby and stairs according to program.</a></p>	<p><a href="#">Include outlets for computers, LAN, fax, and telephone.</a> Enclosure shall be <a href="#">of</a> transparent office partitions.</p> <p>The conference room shall be enclosed with standard office transparent partitions.</p> <p>For kitchenette requirements, see Section 01 87 00 (<i>Equipment and Furnishings</i>).</p> <p>For toilets, see Section 01 84 00 (<i>Facility Interior Performance Requirements</i>).</p>
	Access	Independent access to the control room.	Provide one main entrance, stairs and elevator, and an emergency exit with stairs, <a href="#">in</a> accordance with Section 28 13 00 ( <i>Access Control Systems</i> ) and Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Elevator	Lift personnel and/or visitors to upper floor(s)	Provide a passenger elevator in accordance with Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Ventilation	Overall space	Provide air conditioning (A/C) with climate control units and a backup system according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

[CB]	Activity/Space	Operational/Locational Needs	Notes
	Lighting and electrical power	Inside room	Provide electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Raised access floor	Locate underneath control equipment, consoles, and displays.	Provide according to Section 09 69 00 ( <i>Raised Access Floors</i> ).
	Intrusion detection system	At wall openings.	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	CCVS camera	Mount at exterior, to view the main entrance to the building.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	CCVS	The interior of the main Operations control room shall have at least two discrete CCVS security monitoring cameras.	In addition, a separate wall space shall be allocated for a bank of CCVS monitors, to support system-wide surveillance.
	Miscellaneous	Provide PASs and telephone outlets. Locate telephone outlets at operator workstations and as required.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).

4. **Design Criteria:**

- a. The Contractor's design and specification shall include, but not be limited to, the following:
  - 1) Ergonomics.
  - 2) Acoustics.
  - 3) Lighting.
  - 4) Finishes.
  - 5) Color scheme.
  - 6) Environmental control.
  - 7) Room layout and furniture.
  - 8) Workstation design.
  - 9) Overview video and data wall display and technology.
  - 10) Human machine interface (HMI) design.

11) Security.

- b. The control room layout shall be designed to ergonomic standards in accordance with Section 12 59 83 (*Custom System Furniture*). As a minimum, design shall comply with ISO EN 11064-1, ISO EN 9241-5, and ISO EN 6385. The layout shall consider [the operating desks, control equipment, overview video equipment](#), and data wall.
- c. The display systems and other peripherals within the control room shall be determined by the workload analysis and an appropriate work environment analysis undertaken by the Contractor.

5. **Additional Space and Operational Requirements:**

a. **Main Control Building — Lower Floor(s):**

- 1) **Telecommunication and Process Control System Rooms:** Provide an open corridor between the telecommunication and process control system rooms and electrical room [ELR] (if located under the proposed control room) to prevent electromagnetic interference from the medium-voltage room to the process control systems and communication equipment. In this room, the telecommunications area shall be separated from the process control system area by a wall, and each room provided with independent doors facing the outside of the building.
- 2) **Telecommunication and Process Control System Battery Rooms:** Provide a battery room for the telecommunication equipment and a battery room for the process control system equipment. The telecommunication equipment battery room shall be separated from the process control system battery room by a wall, and each room provided with independent doors facing the outside of the building.

b. **Main Control Building — Upper Floor:**

- 1) [Windows shall be impact resistant and provide natural light](#) glare control. The humidity control system and the type of windows provided shall be highly efficient to avoid condensation of water [on](#) the windows.
- 2) The control room shall be acoustically treated to reduce noise transmission. A suspended ceiling shall be provided with recessed anti-glare lighting suitable for use with VDUs.



**B. BUILDING – 2: ELECTRICAL ROOM [ELR] — TYPICAL**

1. **Location:** Locate the required medium-voltage electrical rooms near the equipment and machinery to be fed. Electrical rooms can be located next to or in a machinery room, if a fire-rated separation wall is provided.
2. **Security:** [ELRs] are buildings classified as secure zones.
3. **Design Criteria:**
  - a. Each electrical room shall be designed for uninterrupted service and shall operate 24 hours, 7 days a week. Rooms shall be provided with air conditioning (A/C) in accordance with Section 01 86 13 (*Plant — Mechanical Systems and Equipment*).
  - b. Each electrical room shall be provided with the required equipment to supply electrical power to specific areas of the complex. This includes the operation of the locks and the operation and maintenance of the buildings and facilities of the locks according these requirements.
4. **Structure Requirements:** Provide a sound, durable, waterproof and energy efficient building to protect and enclose critical power equipment.
5. **Space Requirements:** Provide for the following activity/spaces and/or equipment in each electrical room, in accordance with the conceptual one line diagram. Minimum equipment clearances shall be according to NFPA 70.

Qty	Activity/Space	Operational/Locational Needs	Notes
	Switchgear with incoming feeders, medium voltage	Provide code compliant clearances, ensuring ample back space and generous front space. Locate switchgear partially over the underground cable gallery with two entrance/exit manholes.	Provide dual entrance/exit door. Door shall allow effortless introduction of equipment.
	Distribution transformers	Locate outside and adjacent to the building.	Mount on concrete pad, strategically located to feed the load without interfering with vehicle or personnel movement.
	Low-voltage switchgear	Motor control center	Entry/exit door shall allow effortless introduction of equipment,
	Inverter / converter	Provide code compliant clearances.	

Qty	Activity/Space	Operational/Locational Needs	Notes
	Panelboards	Locate and mount in accordance with Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).	For power and lighting.
	Electronics equipment area / room	Provide equipment and air conditioning (A/C) with a backup unit.	Provide telecommunications equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). For A/C requirements, see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Overhead roll-up door	For entry / exit to allow <a href="#">direct access to the driveway for equipment installation and maintenance</a> .	For roll-up door requirements, see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Entry / exit door	Main entry/exit to the building. Opposite wall to the roll-up door.	Single door. Equip with exit door requirements to comply with code. Include panic bars.
2 each	Cable manholes	Floor mount in an area where <a href="#">they</a> can be easily accessed.	Provide oversized manhole covers, in accordance with <a href="#">Sections 33 81 26 (<i>Outside Plant Pathways for Underground Communications</i>)</a> and <a href="#">26 05 43 (<i>Underground Ducts and Raceways for Electrical Systems</i>)</a> .
1 each	Cable gallery	For location, check switchgear location	Provide according to Section 01 83 00 ( <i>Facility Shell Performance Requirements</i> ) and Section 26 13 00 ( <i>Medium Voltage Switchgear</i> ).
	<a href="#">Access control system</a>	<a href="#">At main entry/exit door</a>	<a href="#">Provide according to Section 28 13 00 (<i>Access Control Systems (ACSs)</i>)</a> .
	<a href="#">Intrusion detection system</a>	<a href="#">At wall openings.</a>	<a href="#">Provide according to Section 28 16 00 (<i>Intrusion Detection Systems (IDSs)</i>)</a> .
1 each	CCVS camera	<a href="#">Mount at exterior, to view the main entrance to the building.</a>	<a href="#">Provide according to Section 28 23 00 (<i>Closed Circuit Video Systems</i>)</a> .

Qty	Activity/Space	Operational/Locational Needs	Notes
	Telephone outlets	Provide one outlet at room entrance, as a minimum.	Provide according to Section 27 31 23 ( <i>IP Based Telephone Systems</i> ).
	Lighting and electrical power	Provide lighting inside the room. Provide electrical outlets in the interior and exterior walls of the building.	Provide light fixtures and convenience wall outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Voice paging system	Mount the paging system's amplifier (and or components) securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).

6. **Operational Requirements:** Supply power to buildings and equipment, in accordance with the locks one line diagram.

C. **BUILDING – 3: MACHINERY ROOMS [MR-G], [MR-V], [MR-WSB] — TYPICAL**

1. **Location:** Locate the machinery rooms for the operating equipment and local controls of gates and valves above ground and close to an electrical room.
2. **Security:** The [MR-G], [MR-V], [MR-WSB] buildings are classified as secure zones.
3. **Design Criteria:**
  - a. The machinery room for each gate [MR-G] shall service the rolling gates in each lock head. Each machinery room shall accommodate two (2) complete sets of the driving mechanisms for the respective rolling gates.
  - b. Each of the machinery rooms for the Water-Saving Basins [MR-WSB] shall accommodate the driving equipment for the required number of valves, motor control centers, electrical control panels, and power and lighting panelboards as described in Section 01 81 23 (*Culvert and Conduit Valves*) and in Section 26 20 00 (*Electrical Low Voltage Distribution Work*).
  - c. Each culvert valve machinery room [MR-V] shall accommodate the equipment for all the valves at that location, the motor control centers, electrical control panels, and power and lighting panelboards as

described in Section 01 81 23 (*Culvert and Conduit Valves*) and in Section 26 20 00 (*Electrical Low Voltage Distribution Work*).

- d. Electrical and fiber-optic control cables shall be in either cable trays or conduits embedded in the concrete floor.
  - e. If applicable, provide cable guards to protect maintenance personnel in case of a break in the steel wire ropes while a gate is in operation.
4. **Access:** Provide a road access to at least two sides of each machinery room.
5. **[MR-G] Space and Operational Requirements:**

[MR-G]	Activity/Space	Operational/Locational Needs	Notes
2 each	Driving mechanism	Shall occupy the main floor space. Provide adequate clearance for on-site repair, installation, or replacement of the driving-mechanism components.	See design criteria above. Access to all parts of the driving mechanism shall include the use of a forklift or crane.
	Overhead roll-up door	Main access door. Centered with respect to the operating machinery for each of the rolling gates. Provide adequate overhead clearance.	Shall be motorized according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ). Opening shall allow access for service equipment (i.e., a truck, table, crane, or forklift) to service or replace any of the drive-mechanism components.
	Exit door	Locate exit doors to comply with code. At least one opposite the main entrance wall	Single door as required by NFPA 101. Include panic-bar hardware. Provide lock and key.
	Electronics equipment area / room	Provide electronic equipment and air conditioning (A/C) with backup unit.	Provide telecommunications equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ).
	Access control system	At main entry/exit door.	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings.	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
1 each	CCVS camera	Mount at exterior. Directed toward the access door.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).

[MR-G]	Activity/Space	Operational/Locational Needs	Notes
	Miscellaneous	Provide compressed air outlets, PASs, and telephone outlets. Locate telephone outlets near room entrances.	Provide according to Sections 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ), 27 51 16 ( <i>Public Address Systems</i> ), and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).
	Ventilation	Overall space	Provide natural crossed ventilation supplemented with mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Voice paging system	Mount the paging-system speakers securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Lighting and electrical power	Lighting inside room and electrical outlets inside and on exterior walls of the building.	Provide electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
1 each	Emergency station	Exterior of building	Provide an eyewash station and an emergency shower area with shower pan and drain on one side of the building. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Parts and tools storage area	Locate the workshop area adjacent to machinery. Provide adequate space for emergency repair parts and tools inventory.	Requirements for supply of repair parts and tools are provided in Section 01 81 19 ( <i>Lock Gates</i> ).

6. [MR-WSB] Space and Operational Requirements:

[MR-WSB]	Activity/Space	Operational/Locational Needs	Notes
	Driving mechanisms	Provide adequate clearance for lifting components.	Shall be able to access each part of the driving mechanisms.
	Local control equipment	Provide air conditioning (A/C).	Includes oil tanks, sumps, hydraulic drive units, pumps, and clean air tanks.
	Stainless steel piping, if required	To the hydraulic cylinders	Install in trenches with metal covers outside the building.

<b>[MR-WSB]</b>	<b>Activity/Space</b>	<b>Operational/Locational Needs</b>	<b>Notes</b>
	Oil tanks and piping, if required.	Provide adequately sized containment for the sump pump. Provide drain trenches around the oil tanks to contain oil spills.	
	Electrical controls	Provide air conditioning (A/C).	See motor control centers, electrical control panel, and power and lighting panelboards.
	Electronics equipment area / room	Provide <b>electronic equipment and air conditioning (A/C)</b> with backup unit.	Provide telecommunication equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ).
	<b>Access control system</b>	<b>At main entry/exit door</b>	<b>Provide according to Section 28 13 00 (<i>Access Control Systems (ACSs)</i>).</b>
	<b>Intrusion detection system</b>	<b>At wall openings</b>	<b>Provide according to Section 28 16 00 (<i>Intrusion Detection Systems (IDSs)</i>).</b>
<b>1 each</b>	<b>CCVS camera</b>	<b>Mount at exterior. Directed toward the access door.</b>	<b>Provide according to Section 28 23 00 (<i>Closed Circuit Video Systems</i>).</b>
	Miscellaneous	Provide compressed air outlets, PASSs, and telephone outlets. Locate telephone outlets near room entrances.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ) for compressed air, Section 27 51 16 ( <i>Public Address Systems</i> ) for public access systems, and Section 27 31 23 ( <i>IP-Based Telephone Systems</i> ) for telephones.
	Ventilation	For overall space	Provide air conditioning (A/C) according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Storage space	Interior storage space.	Provide space for replacing hydraulic oil, for oil-handling equipment, and for emergency repair parts and tools inventory. <b>Provide equipment and repair parts and tools inventory as per Section 01 81 23 (<i>Culvert and Conduit Valves</i>).</b>

<b>[MR-WSB]</b>	<b>Activity/Space</b>	<b>Operational/Locational Needs</b>	<b>Notes</b>
	Exterior access	Exterior space and access shall be wide enough to allow safe operation of a mobile 40-ton crane (as a minimum).	For repairs, installation or replacement of the Water-Saving-Basin conduit valves or the bulkheads.
	Access	Provide two main entrance/exit doors, one rollup door facing the driveway, and one double door in the opposite wall. Provide lock and key access control for each door.	Door sizes shall allow for access and operation of a forklift or mobile crane for the removal or replacement of the drive-mechanism components.
	Voice paging system	Mount the paging-system speakers securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Lighting and electrical power	Lighting inside room and electrical outlets inside and on exterior walls of the building	Provide electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 01 81 29 ( <i>Electrical and Lighting Systems</i> ).

7. **[MR-Vs] Space and Operational Requirements:**

<b>[MR-V]</b>	<b>Activity/Space</b>	<b>Operational/Locational Needs</b>	<b>Notes</b>
	Driving mechanisms	Provide adequate clearance for lifting components.	Provide access to each part of driving mechanisms.
	Local control equipment		Includes oil tanks, sumps, hydraulic drive units, pumps, and clean air tanks.
	Stainless steel piping, if required.	To connect to the hydraulic cylinders	Install outside the building in trenches with metal covers.
	Oil tanks and piping, if required.	Provide adequately sized containment with sump and drainage facilities for collection and disposal in the event of spills.	
	Controls		For motor control centers, electrical control panel, and power and lighting panelboards.



[MR-V]	Activity/Space	Operational/Locational Needs	Notes
	Electronics equipment area / room	Provide electronic equipment and air conditioning (A/C) with backup unit.	Provide telecommunication equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ).
	Access control system	At main entry/exit door	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
1 each	CCVS camera	Mount at exterior. Directed toward the access door.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Ventilation	For overall space	Provide air conditioning (A/C) according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Miscellaneous	Provide compressed air outlets, PASs, and telephone outlets. Locate telephone outlets near room entrances.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ) for compressed air, Section 27 51 16 ( <i>Public Address Systems</i> ) for public access systems, and Section 27 31 23 ( <i>IP-Based Telephone Systems</i> ) for telephones.
	Lighting and electrical power	Lighting inside room and electrical outlets inside and on exterior walls of the building.	Provide electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Voice paging system	Mount the paging-system speakers securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Storage space	Interior storage space	Provide space for replacing hydraulic oil, for oil handling equipment, and for emergency repair parts and tools inventory. Requirements for repair parts and tools are provided in Section 01 81 23 ( <i>Culvert and Conduit Valves</i> ).



[MR-V]	Activity/Space	Operational/Locational Needs	Notes
	Exterior access	Exterior space	Exterior space and access shall be wide enough to allow safe operation of a mobile 40-ton crane (as a minimum) for repairs, installation, or replacement of the Water-Saving-Basin conduit valves or the bulkheads.
	Access	Provide two main entrance/exit doors, one rollup door facing the driveway, and one double door in the opposite wall. Provide key lock for access control for each door.	Doors shall allow the entrance of a forklift or mobile crane for the removal or replacement of the drive-mechanism components.

**D. BUILDING – 4: FIRE-FIGHTING EQUIPMENT ROOM [FER] AND MONITOR (NOZZLE) TOWERS (FFES)**

**1. Location:**

- a. At each lock complex, provide the required fire-fighting equipment rooms [FERs] and monitor towers (FFEs) to house the lock foam concentrate/water fire-protection systems described in Section 01 86 13 (*Plant — Mechanical Systems and Equipment*), located at the upper and lower levels of the locks, at each side of the lake entrance and of the sea entrance.
- b. Each equipment rooms shall be above ground, close to its corresponding monitor nozzle tower, but at a safe distance from the lock wall. In addition, the rooms at the upper level also shall be close to their corresponding fresh water intake.

2. **Security:** [FERs] are buildings classified as secure zones. [FFEs] are facilities classified as secure zones.

### 3. Space and Operational Requirements:

[FERs]	Activity/Space	Operational/Locational Needs	Notes
	Equipment room	Each equipment room shall accommodate the water and foam pumps, foam concentrate tanks, piping, valves, electrical controls, and other related components.	Equipment for mixing water with concentrate before sending the foam solution to the monitored nozzle tower. For equipment requirements, see Section 01 86 13 ( <i>Plant - Mechanical Systems and Equipment</i> ).
	Containment area	Provide each area with adequate sump and drainage facilities to collect and dispose of any accidental foam spill inside the room.	
	Monitor (nozzle) tower	Locate one on the end of each lock wall at both the lake and sea entrances.	Provide local control panels and also remote control from [CB].
	Access	Each room shall have one entry/exit door for personnel and a roll-up door from the driveway.	Shall allow for removal or replacement of equipment or piping, using a forklift or crane.
	Ventilation	For overall space	Provide air conditioning (A/C) according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Access control system	At main entry/exit door	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
1 each	CCVS camera	Mount at exterior. Directed toward the access door.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Lighting and electrical power	Inside room and exterior walls of the building	Provide electric light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Voice paging system	Mount the paging-system speakers securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).

[FERs]	Activity/Space	Operational/Locational Needs	Notes
1 each	Emergency station	Exterior of building	Provide an eyewash station and an emergency shower area with shower pan and drain on one side of the building. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Miscellaneous	Provide compressed air outlets, PASSs, and telephone outlets. Locate telephone outlets near room entrances.	Provide according to Section 01 86 13 ( <i>Plant - Mechanical Systems and Equipment</i> ) for Compressed Air, Section 27 51 16 ( <i>Public Address Systems</i> ) and Section 27 31 23 ( <i>IP Based Telephone Systems</i> ) for telephones.

4. **Other Operational Requirements:**

- a. The fire protection equipment rooms shall have redundancy in the electrical feed.
- b. Foam solution piping shall be provided with means of flushing with fresh water and complete drainage.

**E. BUILDING – 5: CROSSUNDER ELEVATOR ROOMS - [CER-1 to CER-6]**

1. **Location:** A Crossunder personnel elevator access room shall be located at top-of-lock-wall elevation at each required Crossunder entrance. There shall be three Crossunders (including horizontal and vertical shafts) at each lock complex. Each Crossunder shall have two access rooms. Each room shall be on top of the Crossunder vertical shaft. Three (3) rooms (one for each Crossunder) shall be provided on the continental side, each with an elevator at each complex. Three (3) rooms (one for each Crossunder) shall be provided on the island side, each with an elevator at each complex. The design and construction of the rooms shall facilitate the installation, removal, and maintenance of all equipment by the Employer. For the special purpose personnel elevators, refer to Section 01 86 13 (*Plant — Mechanical Systems and Equipment*).
2. **Security:** [CERs] are buildings classified as high-security zones.
3. **Access:** The Crossunder elevator access rooms shall have a controlled-access security door leading to an aisle in front of the elevator doors. Access to the elevator machinery room and elevator entrance landings shall be in accordance with ASME / ANSI A17.1.

4. **Crossunder and [CER] Space and Operational Requirements:**

<b>[CER-1 to CER-6]</b>	<b>Activity/Space</b>	<b>Operational/Locational Needs</b>	<b>Notes</b>
	Elevator machinery room	Above Crossunder elevator	For operating equipment and the electrical power and controls.
6 each	Crossunder elevators	In the vertical shaft that connects to the Crossunder under the lock chamber floor.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Utility shaft	Locate adjacent to the elevator shaft. Size to allow use of a 2-person man basket for inspection and maintenance of utilities. Provide emergency rung ladder with safety rail and security cage that exits directly to top-of-lock-wall elevation and space for utilities, with 100% spare capacity. Provide concrete encased ducts for medium-voltage cables.	Provide recesses for electrical, telecommunications, and control cables; water pipes; compressed air lines; fire protection system; and sump pump pipes, as required. Emergency ladder, security cage, and utilities shall not interfere with the man-basket. Man basket shall comply with safety requirements of Section 01 35 23 ( <i>Health and Safety Requirements</i> ).
	Air conditioning	Provide mechanical ventilation (A/C) at elevator machinery room	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Ventilation	Provide ventilation for entire Crossunder, elevator shaft, and both vertical utility shafts.	Provide mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Safeguards against water entrance	Utility shafts, next to Crossunder elevators vertical shafts, if not already covered by [CERs].	Provide watertight covers and doors at utility shafts. Provide means of preventing the entrance of water into the utility and elevator shafts in the event of rain or flooding.
	Lighting and electrical power	For overall space and task areas	Provide electric light fixtures and electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> )
	Access control system	At main entry/exit door	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).

<b>[CER-1 to CER-6]</b>	<b>Activity/Space</b>	<b>Operational/Locational Needs</b>	<b>Notes</b>
	Elevator machinery room	Above Crossunder elevator	For operating equipment and the electrical power and controls.
6 each	Crossunder elevators	In the vertical shaft that connects to the Crossunder under the lock chamber floor.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Intrusion detection system	At wall openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
1 each	CCVS camera	Mount at exterior. Directed toward the access door.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Voice paging system	Mount the paging-system speakers securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Miscellaneous	Provide PASs, telephone outlets, and emergency audiovisual signaling devices. Locate telephone outlets and PAS speakers inside elevator, aisle space, and in Crossunder. Locate emergency audiovisual devices on an outside wall.	Provide according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ). For audiovisual devices, see Section 28 50 00 ( <i>Evacuation Systems</i> ).

**F. BUILDING – 6: WASTEWATER TREATMENT PLANT BUILDINGS [WWTP-1] and [WWTP-2]**

- Location:** At each lock complex (Atlantic and Pacific), provide two (2) wastewater treatment plant buildings in accordance with Section 01 89 19 (*Sanitary Sewer / Wastewater*). Locate both at the lower level, one at each lock wall.
- Security:** [WWTPs] are classified as Operations zones.

### 3. Space Requirements:

[WWTP-1] [WWTP-2]	Activity/Space	Operational/Locational Needs	Notes
1 each	Equipment room	Provide one for each treatment plant to accommodate all the wastewater treatment equipment, tanks, and spaces required by the type of plant designed.	Provide equipment according to the requirements of Section 01 89 19 ( <i>Sanitary Sewer/ Wastewater</i> ). Crowding of equipment is not allowed.
	Access	Provide one entry/exit door for authorized personnel and one roll-up door that is accessed from a driveway.	Shall allow for removal or replacement of equipment or piping, using a forklift or crane. Shall allow the safe handling and transportation of process materials, sludge disposal, spare parts, and maintenance equipment.
	Location	Locate at a remote area at a distance of 30 m from occupied buildings.	Apply odor-reduction measures.
	Access control system	At building entrance	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	Storage area	For chemicals needed by treatment process	Shall be physically separated from the rest of the operating equipment space, depending on the chemicals to be stored and handled.
	Ventilation	For overall space	Provide natural and/or mechanical ventilation as required by NFPA 820 and Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Lighting	For overall space	Provide electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).

[WWTP-1] [WWTP-2]	Activity/Space	Operational/Locational Needs	Notes
	Miscellaneous	Provide PA and telephone outlets. Locate telephone outlets by entry/exit door.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ) and Section 27 31 23 ( <i>IP- Based Telephone Systems</i> ).
	Signage	Hazardous areas and non-potable water taps.	Signs designating hazardous areas and non-potable water taps shall be provided in English and Spanish.
1 each	Toilet and lavatory	At enclosed area.	Provide one for a single user. For toilet requirements, see Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ). Provide mechanical ventilation; see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Emergency station	Exterior of building, close to chemicals storage area	Provide an eyewash station and an emergency shower area with shower pan and drain on one side of the building. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

**G. BUILDING – 7: MAINTENANCE BUILDING [MB]**

1. **Location:** At each lock complex, locate the maintenance building [MB] on the upper-level lock wall on the I-side.
2. **Security:** [MB] is classified as an Operations zone.
3. **Design Criteria:**
  - a. The [MB]'s main workshop shall be equipped to provide the maintenance and repair of major pieces of equipment as itemized below.
    - 1) Culverts and conduit valves.
    - 2) Bulkheads.
    - 3) Rolling gates support wagon.
    - 4) Conduit and culvert valves hydraulic pistons.
    - 5) Other miscellaneous equipment.

- b. Regular service hours are between 0700 and 1500 hours. Provide the contingency for when a major overhaul of equipment can run into extensive repair work, 24 hours a day.
- c. The facility shall be designed to accommodate the temporary storage of and/or the simultaneous maintenance and repair of the following major equipment.
  - 1) Four valve leafs and/or bulkheads.
  - 2) Hydraulic cylinders and pistons for a pair of culvert or conduit valves.
  - 3) A set of each type of rolling gate support wagons.

4. **Space and Operational Requirements:** Provide for the following activity/spaces and/or equipment.

MB	Activity/Space	Operational/Locational Needs	Notes
	<b>A. Workshop</b>	Main work area; open space	Provide space in accordance with design criteria. Provide requirements in NFPA code for the occupied space.
1 each	Overhead traveling crane	Locate to safely lift and move the heaviest loads that are to be serviced in the workshop area.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ). Provide service ladder with safety rails.
2 each	Overhead roll-up doors	Provide adequate clearance. Locate in opposite walls. Shall allow for the entrance/exit of a 40-ton mobile crane to handle serviced lock parts.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Exit doors	Locate exit doors to comply with code.	Include panic bars.
2 each	Eyewash station	Locate near to the entrances of the workshop area.	Supply appropriate hook-ups, such as water pressure. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
2 each	Water fountain	Locate close to the workshop area — one close to the toilets, the other at the opposite end.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).



MB	Activity/Space	Operational/Locational Needs	Notes
1 each	Emergency shower	Locate close to the toilets in the workshop area.	Provide a shower stall with a 900mm wall on three (3) sides and floor drain according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
2 each	Sink	Locate close to the toilets in the workshop area.	Provide cold water, soap dispenser, and paper towel dispenser.
	Ventilation	Locate mechanical ventilation for optimum efficiency in the workshop area.	In addition, consider natural cross ventilation.
8 each	Water faucets	Locate strategically around the workshop area.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Water/oil separator	Locate underground outside the building; connect to floor drains.	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
8 each	Air compressor outlets only Compressors to be provided by the Employer.	Locate strategically in the workshop area	Provide according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ). Should reach all work benches.
1 each	Electrical distribution panel	Assign a wall space for all electrical panels. Provide code compliant clearances.	For 3-phase, 480V. Provide according to Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
1 each	Electrical distribution panel	Assign a wall space for all electrical panels. Provide code-compliant clearances.	For 3- Phase, 240V. Provide according to Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
1 each	Electrical distribution panel	Assign a wall space for all electrical panels. Provide code-compliant clearances.	For single-phase outlets. Provide according to Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	General lighting and controls	All rooms and areas in the building	Provide adequate lighting and controls to all areas according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).

MB	Activity/Space	Operational/Locational Needs	Notes
	Convenience electrical outlets	All rooms and areas in the building. Locate to provide power to each work area without crossing workspace.	Provide outlets according to NFPA 70. Provide the required outlets at the workshop area according to Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
2 each	Data and voice connection outlets.	Locate one voice outlet at each end of the workshop area.	Each workstation/office shall have a data and voice connection according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 21 00 ( <i>Data Communications Equipment</i> ).
	Voice paging system	Locate in the workshop area. Route cable so that the paging-system amplifier or components can be mounted securely and strategically to be effectively audible from any point in the building.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
1 each	Electronics equipment room	Provide electronic equipment and air conditioning (A/C) with backup unit.	Provide telecommunications equipment according to Sections 01 81 26 ( <i>Communications, Control, Safety and Security Systems</i> ) and 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Access control system	Only for office SP2 space and special tool room.	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	Only for office SP2 space and special tool room.	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
1 each	CCVS camera	Mount at exterior. Directed toward the main access door.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Telephone outlets	Provide at least two outlets; one at each end of workshop.	Provide according to Section 27 31 23 ( <i>IP Based Telephone Systems</i> ).
2 each	Toilets, SR	For single users: 1 male and 1 female. Locate close to the lunchroom area.	Provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
1 each	Kitchenette, SR	Locate close to or in the lunchroom area.	Provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ). For kitchenette requirements, see Section 01 87 00 ( <i>Equipment and Furnishings</i> ).

MB	Activity/Space	Operational/Locational Needs	Notes
1 each	Lunchroom, SR	Locate near kitchenette.	Provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
1 each	Janitor's closet, SU1	Locate close to the toilets.	Provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
	<b>B. Administrative Area</b> SP2	Partitioned office space	Provide office partitioned from the workshop area. Provide NFPA code requirements for all occupied spaces.
	Office, SP2	Locate within the maintenance building.	Provide air conditioning (A/C). Provide 2 workstations. Provide power outlets, telephone outlets, voice and data outlets, and LAN outlets.
2 each	Toilets, SR	For single users: 1 male and 1 female. Locate in the administration area.	Provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
	<b>C. General SS</b>	A holding area of at least 300 m <sup>2</sup> for big items to be serviced	Open to the workshop area; provide according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
	SS for flammable products	Provide heavy-duty metal racks in a separate secured area to store flammable products (paints, solvents, oils, grease, etc.) Minimum floor space 30 m <sup>2</sup> .	In accordance with NFPA 30.
	Miscellaneous	Provide PASs and telephone outlets.	Provide according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).
	Exterior acetylene and oxygen tank storage	Enclose in a wire mesh partition with gates. Provide space for 6 tanks and locate outside the building behind the general storage area.	For welding work to be performed inside the [MB]. Storage requires a concrete wall between each type of tank.
	<b>D. Special Tool Room SS</b>	Locate off, and with door access to, the workshop area. Minimum 80 m <sup>2</sup> to store sensitive parts and Materials.	Provide air conditioning (A/C). Provide workstation with LAN outlet, electrical convenience outlet, and telephone outlet. See Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).

## H. BUILDING – 8: PERSONNEL BUILDING [PB]

### 1. Location:

- a. The building shall be located at a distance not greater than 100 m from employee parking area and with vehicular and pedestrian access from the existing main road system. Location shall be as follows:
- b. **Pacific Side Complex:** At the upper level of the west (C-side) of the new locks.
- c. **Atlantic-Side Complex:** At the lower level of the east (C-side) of the new locks.

### 2. Security: [PB] is classified as an Operations zone.

### 3. Access: Provide direct access from the guardhouse.

### 4. Space Requirements:

PB	Activity/Space	Operational/Locational Needs	Notes
	Lobby	Access to all the rooms	Provide, close to the time control clock area, one wall for posting information.
1 each	Time control clock	At lobby	Provide space for employee to punch in card.
	Telephone	At lobby	Provide pay telephone outlets.
	Lockmaster's office	Direct access from the lobby	Provide card access control. Provide air conditioning (A/C).
	Pay room	Direct access from the lobby. Access to lockmaster's office.	Provide for secure window transaction. Provide access control in accordance with Section 28 13 00 ( <i>Access Control Systems</i> ). Provide air conditioning (A/C).
1 each	Automatic-teller machine (ATM)	Direct access from the lobby	Provide side barriers for security and privacy.
1 each	Meeting and instruction room	Direct access to lockmaster's office and the lobby	SP6 No. 2. Provide air conditioning (A/C). Provide area for an erasable whiteboard, 3 m <sup>2</sup> minimum, white.

PB	Activity/Space	Operational/Locational Needs	Notes
2 each	Locker rooms	1 room for men, 1 room for women. Mechanical ventilation is required.	Provide lockers according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ) and Section 01 84 00 ( <i>Interior Performance Requirements</i> ).
2 each	Toilet rooms	1 room for men, 1 room for women. Mechanical ventilation is required.	Provide fixtures according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
2 each	Showers	Locate next to toilets. 1 room for men and 1 room for women. Mechanical ventilation is required.	Provide fixtures according to Section 01 81 36 ( <i>O &amp; M Buildings and Facilities — Program</i> ).
2 each	Changing rooms	Locate next to shower rooms and locker room; 1 room for men and 1 room for women. Mechanical ventilation is required.	SR No. 5, SR No. 6.
1 each	Janitor's closet	Locate close to locker rooms.	Provide storage shelves for cleaning supplies and equipment.
1 each	Janitor's lunchroom	Locate close to janitor's closet. Mechanical ventilation is required.	Provide table and chairs for 4.
6 each	Lockers	Locate inside janitor's lunchroom.	Provide six (6) lockers for clothes and personal items.
1 each	Electric water-heater room	Close to showers	Provide hot water to the showers and sink.
	Access control system	At lockmasters office, pay room, and meeting and instruction room.	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At lockmasters office, pay room and meeting and instruction room openings.	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	CCVS camera	Mount at exterior to monitor the ATM and inside the pay room.	See Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
1 each	Electronics equipment area/room	Provide electronic equipment and air conditioning (A/C) with backup unit.	Provide telecommunication equipment according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ).

PB	Activity/Space	Operational/Locational Needs	Notes
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Voice paging system	Locate in all areas. The paging-system speakers shall be mounted securely and strategically to be effectively audible from any point in the building.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Miscellaneous	Provide PASs and telephone outlets at all rooms. Locate telephone outlets near room entrances.	Provide according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).

5. **Operational Requirements:** The personnel building shall provide for administrative support and personnel lockers, toilets, showers and changing facilities for lock employees. Total workforce is estimated at 120; initial workforce distribution is estimated to be 100 men and 20 women, working three shifts, 40 employees per shift.

#### I. **BUILDING – 9: OPERATIONS PERSONNEL BREAK ROOM - [PBR-x]**

1. **Location:** A personnel facility shall be located at each lock wall level and approach wall on each side of the locks to provide eating and toilet facilities for the workforce. A minimum of eight (8) facilities shall be provided at each lock complex.
2. **Security:** [PBRs] are buildings classified as Operations zones.
3. **Access:** [PBRs] shall be accessible for workers along the lock walls.
4. **Design Criteria:** Shall be available 24 hours a day to provide a rest area for lock employees, a few amenities, and an exterior storage area for the acetylene and oxygen tanks located in the building. Shall be conveniently located along the lock walls.

## 5. Space Requirements:

[PBRs]	Activity/Space	Operational/Locational Needs	Notes
1 each	Kitchenette	Locate on one side of the building.	SR No. 13. For kitchenette requirements, see Section 01 87 00 ( <i>Equipment and Furnishings</i> ).
1 each	Lunch area	Provide a table for 8 with chairs at the center of the room	SR No. 14.
1 each	Miscellaneous	Provide PASs and telephone outlets. Locate telephone outlets near room entrances.	Provide according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).
2 each	Toilet	Locate near the kitchenette; 1 male, 1 female.	SR No. 10. See Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ).
	Ventilation	For lunch area, kitchenette, and toilets	Provide natural cross ventilation and mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Voice paging system	Locate in the lunch area. The paging-system speakers shall be mounted securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
1 each	Storage	Locate inside the building, but separate from lunch/dinning area.	SS No. 6. Provide shelves for small parts and hooks for ropes and lifesavers. Storage located in this building for convenience.
	Exterior acetylene and oxygen tank storage	Locate outside the building, under roof.	Provide wire mesh partitions for two (2) tanks required for welding / cutting work. Provide a concrete wall between each type of tank.
1 each	Janitor's closet	Locate near the toilet	SUI No. 2.

## J. BUILDING – 10: SPARES STORAGE BUILDING [SS]

### 1. Location:

- a. The building shall be located between the existing locks and the new locks (island side), but close enough to the new locks and the navigation channel to have the spares available for emergency repairs. The design shall enable the spares or components to be delivered by a crane, if so required by their size.
- b. At the Pacific complex, locate the [SS] at the upper level.
- c. At the Atlantic complex, locate the [SS] at the lower level, so that it can be accessed from a road leading to the existing locks.

### 2. Security: [SS] is classified as an Operations zone.

### 3. Space Requirements:

SS	Activity/Space	Operational/Locational Needs	Notes
	Storage area	For spare parts, (valve bodies, bulkheads, hydraulic cylinders, rolling gate above-water and underwater carriage wagons)	For parts required in Sections 01 81 19 ( <i>Lock Gates</i> ), 01 81 23 ( <i>Culvert and Conduit Valves</i> ), 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ), 01 81 29 ( <i>Electrical and Lighting System</i> ) and others as required.
1 each	Overhead traveling crane	Locate to safely lift and move the heaviest loads that are to be stored or removed from the storage area.	Include overhead traveling crane in accordance with Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Exterior paved area	Provide a concrete paved area designed to support heavy equipment and lock components adjacent to the [SS].	Required for recess closure parts and other locks parts. For pavement, see Section 01 89 16 ( <i>Site Construction</i> ).
	Access to building	Provide vehicle access for trucks, forklifts, and mobile cranes from the lock road system. Provide a man door at each end of the building.	Provide vehicular opening for stake body trucks and mobile cranes.
	Ventilation	For overall space	Provide natural cross ventilation to all areas in addition to mechanical ventilation. Fans may be ceiling-or wall-mounted.



SS	Activity/Space	Operational/Locational Needs	Notes
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric high-pressure sodium (HPS) light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
1 each	Electrical and electronics equipment area / room	Provide electronic equipment and air conditioning (A/C) with backup unit.	For telecommunication equipment, see Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). For electrical equipment, see Section 01 81 29 ( <i>Electrical and Lighting System</i> ).
	CCVS camera	Mount at exterior, to view the main entrance to the building.	See Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Voice paging system	The paging-system speakers shall be mounted securely and strategically to be effectively audible from any point in the building.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Miscellaneous	Provide compressed air outlets, PASSs, and telephone outlets.	Locate telephone outlets near room entrances. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ) for compressed air, Section 27 51 16 ( <i>Public Address Systems</i> ) for public access systems, and Section 27 31 23 ( <i>IP-Based Telephone Systems</i> ) for telephones.

#### K. BUILDING – 11: GUARDHOUSE [GH]

- Location:** Locate the guardhouse [GH] at the main entrance to each lock complex. The [GH] shall be located on the upper-level west (or continental) side of the Pacific locks and on the lower-level east or continental side of the Atlantic locks, each within walking distance of the lock personnel building [PB].
- Security:** [GH] is classified as a high-security zone. Building exterior is classified as an Operations zone.
- Access:** Provide new roads connecting to the existing main roads.

4. **Design Criteria:**

- a. The [GH] at the complex entrance shall be planned, designed, and constructed with vehicular and pedestrian access controls and access zones identified in 4-022-01, Design of Entry Control Facilities, Unified Facilities Criteria (UFC).
- b. Provide glazing at guardhouse [GH], in accordance with bullet-proof glazing requirements stated in Section 01 83 00 (*Facility Shell Performance Requirements*), 1.04 E.4.
- c. The inspection area, access, and exit lane shall be completely roofed. Roof height shall allow for service trucks and equipment circulation.

5. **Space Requirements:**

[GH]	Activity/Space	Operational/Locational Needs	Notes
1 each	Guardhouse	Provide occupant space for two permanently stationed guards.	The [GH] shall be the reporting station for the lock’s security guards crew.
	Access barrier / sliding gate	At site entrance/exit	Automated and controlled from the guardhouse. Provide according to Section 28 16 46 ( <i>Vehicular Control Systems</i> ), Section 01 89 16 ( <i>Site Construction</i> ) and Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ) for entrance gate / access barrier.
	Road blockers	At site entrance/exit	Automated and controlled from the guardhouse. Provide according to Section 28 16 46 ( <i>Vehicular Control Systems</i> ) and Section 01 89 16 ( <i>Site Construction</i> ).
	Pull out inspection lane	At site entrance	Shall allow for one vehicle to pull out of the entry lane and allow other vehicles to pass.
2 each	Pedestrian access	At site entrance/exit, include turnstile and one (1) security metal detector.	Provide turnstile control devices: one for entry, one for exit. See Section 01 87 00 ( <i>Equipment and Furnishings</i> ). Provide a security metal detector in accordance with Section 28 13 53 ( <i>Security Metal Detectors</i> ).

[GH]	Activity/Space	Operational/Locational Needs	Notes
1 each	Checking counter	At the site entrance/exit	Provide area for inspecting bags carried by pedestrians. Provide control to the sliding gate and to the road blocker.
	Access to building		Exterior doors shall be heavy-duty hollow metal, with impact-proof fixed glass.
1 each	Lead guard office	At enclosed area. Provide 270-degree visibility covering entry/exit roads.	Enclosed area with air conditioning (A/C). Provide phone, LAN, and fax outlets. See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Access control system	At main building entrance	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	CCVS	At enclosed area and viewing the main entrance	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Monitoring board, surveillance console	At enclosed area. To monitor the main complex entrance, associated areas and entrances, the [PLE] and [PLV], the perimeter security fence, and access to the buildings.	Provide according to Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). Provide phone and fax, control to the entry/exit sliding gate, and access to the alarm system.
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Low Voltage Electrical Distribution Work</i> ).
2 each	Toilet	At enclosed area	Provide one room for men and one room for women. For toilet requirements, see Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ). Provide mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

[GH]	Activity/Space	Operational/Locational Needs	Notes
1 each	Kitchenette	At enclosed area	Provide hot and cold water fountain. Provide mechanical ventilation; see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ). Kitchenette furnishings and equipment according to Section 01 87 00 ( <i>Equipment and Furnishings</i> ).
1 each	Electronic equipment area / room	At enclosed area. Provide independent access for maintenance personnel.	Provide telecommunication equipment according to requirements of Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). Enclosed area with air conditioning (A/C). See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Server room	At enclosed area. Provide independent access for maintenance personnel.	For computer equipment requirements, see Section 01 81 26 ( <i>Communications, Control, Safety, and Security Systems</i> ). Enclosed area with air conditioning (A/C). See Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
1 each	Lunch room	Lunch table for four persons.	Provide mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Lockers	For eight persons	Provide lockers according to Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ). Provide mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

[GH]	Activity/Space	Operational/Locational Needs	Notes
1 each	Storage	At enclosed area. For firearms, ammunition, and portable communication equipment.	SS No. 1. For lockers, see Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ). Provide enclosed area with air conditioning (A/C), according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Voice paging system	The paging- system speakers shall be mounted securely and strategically to be effectively audible from any point in the room.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ).
	Miscellaneous	Provide PASs, telephone, and LAN outlets IN each enclosed area and at checking counter.	Provide telephone outlets according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ).

**L. BUILDING – 12: GUARD BOOTHS [GBs]**

1. **Location:** Locate guard booths [GBs] at the maintenance access at the lower level of each lock complex and at an access point located between the existing and the new locks.
2. **Security:** [GBs] are classified as Operations zone.
3. **Access:** Provide new roads connecting to the existing main roads.
4. **Design Criteria:**
  - a. The pedestrian access and exit shall be through a turnstile as required in Section 01 87 00 (*Equipments and Furnishings*). The turnstile area shall be completely roofed.
  - b. The [GBs] shall include an enclosed area for a guard and a toilet.
5. **Space Requirements:**

[GBs]	Activity/Space	Operational/Locational Needs	Notes
As required	Guard booth	At secondary entrances	As noted above.

[GBs]	Activity/Space	Operational/Locational Needs	Notes
	Access control system	At entrance to enclosed area	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At building openings	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	CCVS	Viewing the perimeter fence entrance	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> ).
	Occupant space	At enclosed area. Provide 270-degrees vision.	Provide PASs and telephone and LAN outlets according to Sections 27 51 16 ( <i>Public Address Systems</i> ) and 27 31 23 ( <i>IP-Based Telephone Systems</i> ). Provide natural ventilation and mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
2 each	Pedestrian access	At site entrance/exit	Provide turnstile control devices: one for entry, one for exit. Provide according to Section 01 87 00 ( <i>Equipment and Furnishings</i> ).
1 each	Toilet	At enclosed area	Provide one. Provide toilets as required by Section 01 84 00 ( <i>Facility Interior Performance Requirements</i> ). Provide mechanical ventilation according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

## 6. Operational Requirements:

- a. The guard booths [GBs] shall provide access control to the respective locks for both vehicular and pedestrian entry. Details of access coverage will be determined and coordinated by the Employer’s Representative once the conceptual design of spaces is proposed.

- b. Provide protection for access and surveillance of the lock complex using accepted principles of crime prevention through environmental design (CPTED) and state-of-the-art entry-control design features. Security devices shall be mounted in discreet locations.

**M. FACILITY - 13 & 14: PARKING LOTS [PLE] AND [PLV]**

**1. Location:**

- a. Locate the employee parking lot [PLEs] for each of the lock complexes at a walking distance of no greater than 100 m from the main entrance gate to the locks.
- b. Parking lots for employees and for visitors at the Pacific lock complex shall be constructed on the upper level of the west side (or C-side).
- c. Parking lots at the Atlantic lock complex shall be constructed on the east side (or C-side), on the lower level for employees and on the middle level for visitors.

2. **Security:** [PLV] is a facility classified as a public access zone. [PLEs] are facilities classified as Operations zones and include staff parking. Provide CCVS camera at each parking lot — [PLV] and [PLE].

**3. Access:**

- a. Access will be provided from the main existing road to the complex entrance/exit and from the existing locks (Miraflores locks on the Pacific side and Gatun Locks on the Atlantic side).
- b. For access roads, see Section 01 89 16 (*Site Construction*).
- c. Provide pedestrian access from each existing main road to the parking areas and to the main entrance/exit to the locks complex.

**4. Design Criteria:**

- a. Parking areas shall be delimited with pavement stripping. Handicap parking shall be provided at [PLV] and [PLE] as required by “Ley 42”.
- b. The pavement shall be slip-resistant and finished for vehicle traffic. Pavement shall be broom finished and free of porous spots, irregularities, depressions, and pockets or rough spots.
- c. The parking surface shall be concrete pavement, designed and constructed for the required vehicular loads in accordance with Section 01 89 16 (*Site Construction*). The drainage system shall direct

water away from paved parking areas. See Section 01 86 36 (*Drainage Systems*) for site drainage.

- d. Include landscaping requirements according to Section 01 89 16 (*Site Construction*) and signage for instructions and directions.
- e. The surveillance system shall include monitoring of the parking lots and shall comply with Section 28 23 00 (*Closed Circuit Video Systems*).
- f. Provide for future expansion of [PLV] parking area.
- g. Provide security lighting at all parking lots. Provide lighting for employees entering or leaving the buildings at night and walking to the parking lots.
- h. Provide access control for [PLE] as per Section 28 16 46 (*Vehicular Control Systems (VCSs)*).

5. **Space Requirements:**

- a. **Parking Lots Are Required for:**
  - 1) **Employee Parking:** Provide parking for 60 employees at each lock complex.
  - 2) **Visitor Parking:** Provide parking for 60 visitors and for at least ten (10) tourist buses at each lock complex.
- b. **Staff Parking:** Minimum paved parking slots to be provided in accordance with Section 01 89 16 (*Site Construction*).
  - 1) Four (4) at the [CB].
  - 2) Six (6) for the [MB].
  - 3) Four (4) for each [MR-WSB] building.
  - 4) Four (4) for each [MR-G] building.
  - 5) Six (6) for the [SS].
  - 6) Two (2) for each of the other buildings not mentioned above.

**1.04 DESCRIPTION: BUILDINGS AND FACILITIES TO BE DESIGNED AND CONSTRUCTED BY THE EMPLOYER**

**A. BUILDING – 1: OIL-SPILL CONTROL (EQUIPMENT) ROOMS - [OSC-1] AND [OSC-2]**



1. **Location:** At each lock complex, two (2) oil-spill control room [OSC] facilities are required. One building will be located at the upper level, close or adjacent to the spares storage building [SS], and the other at the end of the wall on the lower level. Minimum size shall be 10 m by 12 m. Two (2) ramps are required; one ramp shall access the lake and the other the sea entrance to the locks.
2. **Security:** [OSCs] are buildings classified as Operations zone.
3. **Access:** Provide direct access from the main road to the OSC equipment rooms.
4. **Space Requirements:**

[OSC1] [OSC2]	Activity/Space	Operational/Locational Needs	Notes
2 each	Storage area	For oil spill control equipment. Locate at each end of the locks with access to the Canal waters.	The Employer will provide permanent oil spill control equipment and boats.
2 each	Ceiling rail or beam with pulley or winch	Provide a longitudinal rail or beam in the room ceiling at least 5 m high, capable of supporting at least a 2-ton pulley or winch.	Required to store, handle, and maintain the oil-spill containment and recovery equipment inside the room.
2 each	Boat ramp	Minimum 6 m wide, length as required to access water and launch boats at all tidal and impoundment elevations.	To allow launching and removal of boats into or from the navigational channel.
	Ventilation	For overall space	Provide natural cross ventilation to all areas in addition to mechanical ventilation. Fans may be ceiling- or wall-mounted.
	Lighting and electrical power	For overall space and task areas	Provide daylighting and electric light fixtures and convenience electrical outlets in accordance with Section 26 50 00 ( <i>Lighting Systems</i> ) and Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ).
	Miscellaneous	Provide PASs and telephone outlets.	Locate telephone outlets near room entrances. See Section 27 51 16 ( <i>Public Address Systems</i> ) for public access systems and Section 27 31 23 ( <i>IP-Based Telephone Systems</i> ) for telephones.

## B. BUILDING – 2: GENERATOR ROOM [GR]

1. **Location:** Locate the generator room near the electrical room at the upper level, to reduce the possibility of flooding. Identical for the Atlantic and the Pacific lock complexes.
2. **Security:** [GRs] are buildings classified as secure zones.
3. **Space and Operational Requirements:**

GR	Activity/Space	Operational/Locational Needs	Notes
2 each	Equipment room	Shall accommodate the diesel engine generator set to be provided by the Employer. Space shall be provided for a future second generator.	The Employer will provide diesel engine generator, according to Section 26 32 13.13 ( <i>Diesel Engine Driven Generator Sets</i> ).
2 each	Containment area	Provide containment with adequate sump and drainage facilities to collect and dispose of diesel spills inside the room.	
	Exterior diesel storage tank area	Located alongside the driveway outside the generator room. Requires lightning protection in accordance with Section 26 41 16 ( <i>Lighting Prevention and Dissipation Systems</i> ).	Provide above-ground type, mounted on concrete cradles on a concrete containment floor and wall, with floor drainage to a sump to allow rainwater drainage and oil retrieval. For storage tanks, see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Access	Each room shall have one main entry/exit door with panic bar for personnel and a roll-up door, facing the driveway.	Shall allow for removal or replacement of equipment or piping, using a forklift or crane. For roll up doors, see Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).
	Ventilation	For overall space. Smoke shall exhaust to the building exterior.	Provide natural cross ventilation (may use concrete masonry unit ventilation blocks) in addition to mechanical ventilation systems according to Section 01 86 13 ( <i>Plant — Mechanical Systems and Equipment</i> ).

GR	Activity/Space	Operational/Locational Needs	Notes
	Lighting and electrical power	For overall space	Provide light fixtures and convenience electrical outlets according to Section 26 50 00 ( <i>Lighting Systems</i> ), Section 26 20 00 ( <i>Electrical Low Voltage Distribution Work</i> ), and NFPA 70.
	Access control system	At main entry/exit door	Provide according to Section 28 13 00 ( <i>Access Control Systems (ACSs)</i> ).
	Intrusion detection system	At wall openings.	Provide according to Section 28 16 00 ( <i>Intrusion Detection Systems (IDSs)</i> ).
	CCVS camera	Mount at exterior to view the main entrance to the building.	Provide according to Section 28 23 00 ( <i>Closed Circuit Video Systems</i> )
	Miscellaneous	Provide PASs and telephone outlets. Provide electrical and fiber-optic cables in cable trays or conduits embedded in the concrete floor. Locate telephone outlets near room entrances.	Provide according to Section 27 51 16 ( <i>Public Address Systems</i> ) and Section 27 31 23 ( <i>IP-Based Telephone Systems</i> ).

**END OF SECTION**

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