



PDHonline Course C798 (2 PDH)

An Introduction to Air Traffic Control Facilities

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An Introduction to Air Traffic Control Facilities

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CONTENTS

- 1. TERMINAL RADAR APPROACH CONTROL FACILITY (TRACON)**
- 2. AREA CONTROL AND SURVEILLANCE FACILITY (ACSFAC)**
- 3. JOINT CONTROL FACILITY (JCF)**
- 4. AIR TRAFFIC CONTROL TOWER**
- 5. AIR TRAFFIC CONTROL TOWER BASE BUILDING**

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1 TERMINAL RADAR APPROACH CONTROL FACILITY (TRACON)

1.1 FUNCTION. The TRACON building contains equipment used for controlling air traffic and is staffed by air traffic controllers and air operations, administrative, and maintenance support personnel. The ASR, PAR, PALS, transmitting and receiving sites, and navigation aids (NAVAIDS), which are remotely located, are monitored and controlled in the TRACON. The TRACON contains an IFR control room which includes the radar display consoles and communications control equipment. An adjacent terminal equipment room houses automation central (or terminal) equipment, maintenance positions and audio/video tape recorders. An office for the FAA liaison officer may be required at terminal radar approach control facilities.

1.2 LOCATION. Locate the TRACON building adjacent to the air traffic control tower and aircraft operations building where siting requirements permit.

1.3 ARCHITECTURAL AND STRUCTURAL REQUIREMENTS. Provide the following:

- a) Removable, modular, access flooring in the IFR and terminal equipment rooms with 18 inches of clearance provided between the floor panels and subfloor to accommodate wiring and insulated piping.
- b) A 9-foot clear ceiling height above accessible flooring.
- c) Built-in workbenches and shelving in the terminal equipment room.
- d) Facility and restroom areas readily accessible by the physically handicapped.
- e) Interior and exterior acoustical treatment to attain the room criteria. Soft textured acoustical wall panels in the IFR control room.

f) Cable troughs or conduits between the air traffic control tower and the TRACON for intrafacility cabling. The exact dimensions of the cable trough or size and number of conduits are specified by the Owner.

1.3.1 WINDOWS. Do not provide windows in IFR or terminal equipment rooms. Provide insulated glazing for noise reduction in administrative areas.

1.4 ELECTRICAL REQUIREMENTS

1.4.1 UNINTERRUPTED POWER SUPPLY (UPS). Provide non-redundant UPS. Use the anticipated load to determine the size of the UPS.

1.4.2 EMERGENCY ELECTRICAL POWER. Provide an emergency generator with automatic starting and switching capability. Provide emergency power to the following:

- a) Loads as required by NFPA-101.
- b) Electronic equipment in the IFR and terminal equipment rooms.
- c) Mechanical systems supporting electronic equipment.
- d) Exterior security lighting and security systems.

1.4.3 400-HZ POWER. Provide 400-Hz power when required by the Owner.

1.5 LIGHTING. Design lighting in accordance with Owner requirements. Provide dimmer adjustable red lights in the IFR room.

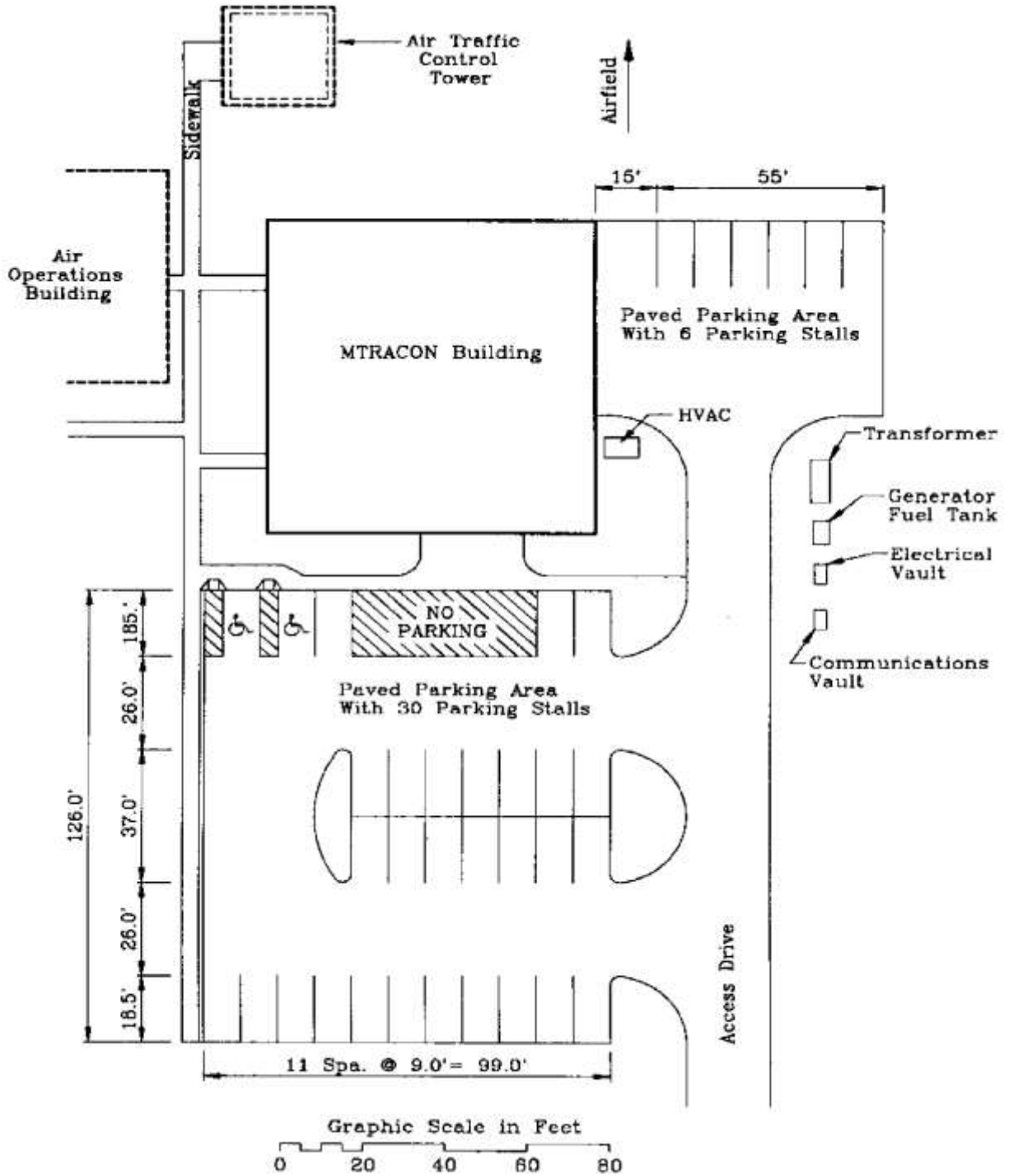


Figure 1
Typical TRACON Facility Site Plan

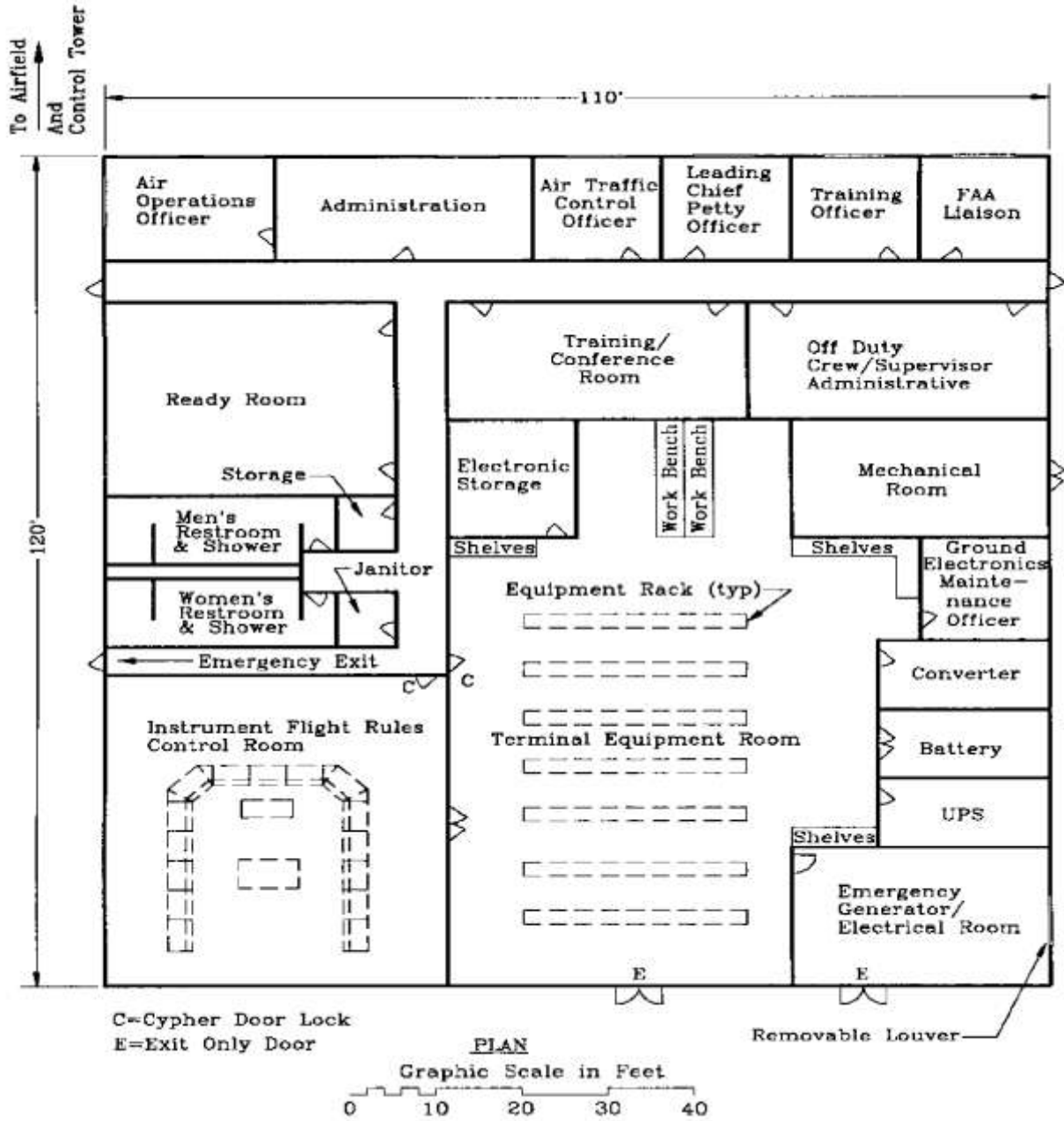


Figure 2
Typical TRACON Building Layout

Plumbing Requirements (GPM) :		
Water;		
Cold		65
Hot		
Recovery Rate (100 Deg. Rise)		30
Storage (Gal.)		40
Fire Protection Requirements		
Not Included		
Heating Requirements (BTU/HR x 1000) :		
(Inside Design Temperature = 72 Degs. F)		
Outside Design Temperature	-5 Degs. F	110
	+5 Degs. F	100
	+15 Degs. F	80
	+25 Degs. F	65
Air Conditioning Requirements (BTU/HR x 1000) :		
Based on 91 Degs. D.B. 76 Degs. W.B. Outside Design		
Conditions; Cooling Load		
		523
Heat rejected to conditioned spaces by energized test.		
Equipment & parts under repair not included.		
Electrical Requirements (KVA) :		
Lights;		
Connected Load		44.0
Estimated Demand		31.0
Power;		
Connected Load		116.0
Estimated Demand		81.0
Air Conditioning;		
Connected Load		124.0
Estimated Demand		87.0
Total;		
Connected Load		284.0
Estimated Demand		199.0
Emergency Generator (KW)		150.0
Areas (SF) :		
Gross area including mechanical		
equipment room		
		13,200
General Notes:		

Figure 3
Typical TRACON Design Notes

1.6 SECURITY. The TRACON is normally located within restricted areas which typically meet the minimum security measures for external security. If the facility is located within a restricted area of a lower level of security or is located remote and outside of an established restricted area, provide additional measures to meet the minimum security requirements for the level of security assigned to the facility. Security at the main building entrance usually requires a single entry point with visitor control. Remote locks, video cameras, card readers, and/or key pads may be required by the Owner as components of the IDS. The level of security and the designer's responsibility for particular security elements will be designated in the Owner. Provide the following:

- a) Electronic cipher door locks at interior entrance doors to IFR and terminal equipment rooms.
- b) Exterior doors in emergency generator/electrical and terminal equipment rooms with no access hardware on the outside.

1.7 ADDITIONAL DESIGN CRITERIA. Refer to Owner for facility design requirements not addressed above.

2. AREA CONTROL AND SURVEILLANCE FACILITY (ACSFAC)

2.1 FUNCTION. The ACSFAC building houses equipment and personnel to provide a variety of services to air, surface, and subsurface units. These services are provided to both users and include radar surveillance and various forms of air traffic control in warning and other special airspace areas. Other services may include surface operating area management, ground controlled intercept, operating area scheduling, and range control. The ACSFAC normally operates continuously.

2.2 LOCATION. Locate the ACSFAC building as a stand-alone facility.

2.3 ARCHITECTURAL AND STRUCTURAL REQUIREMENTS. Provide the following:

- a) Removable, modular, access flooring in the operations, system, and the equipment/maintenance rooms with 18 inches of clearance provided between the floor panels and subfloor to accommodate wiring and insulated piping.
- b) Interior and exterior acoustical treatment to attain the room criteria required. Soft textured acoustical wall panels and movable sound absorbent partitions in the operations room.
- c) A clear ceiling height of 14 feet (finished floor to ceiling) in the operations area.
- d) A tiered seating area in projection auditorium.
- e) RF shielding throughout the crypto room.
- f) Facility and restroom areas readily accessible by the physically handicapped.

2.3.1 WINDOWS. Do not provide windows in operations, designated system, and equipment/maintenance rooms. Provide insulated glazing for noise reduction in administrative areas.

2.4 MECHANICAL REQUIREMENTS. Design the mechanical system to meet the criteria required. Provide the following:

- a) Automatic thermostatic control.
- b) A four-pipe chilled/hot water distribution system with separate air handlers for each zone or dehumidifying system to work in conjunction with the air conditioning system.
- c) Capability for future expansion of the HVAC system. Use piping designed for low friction and velocity losses at the maximum flows expected.
- d) Chilled water system in accordance with Owner requirements.

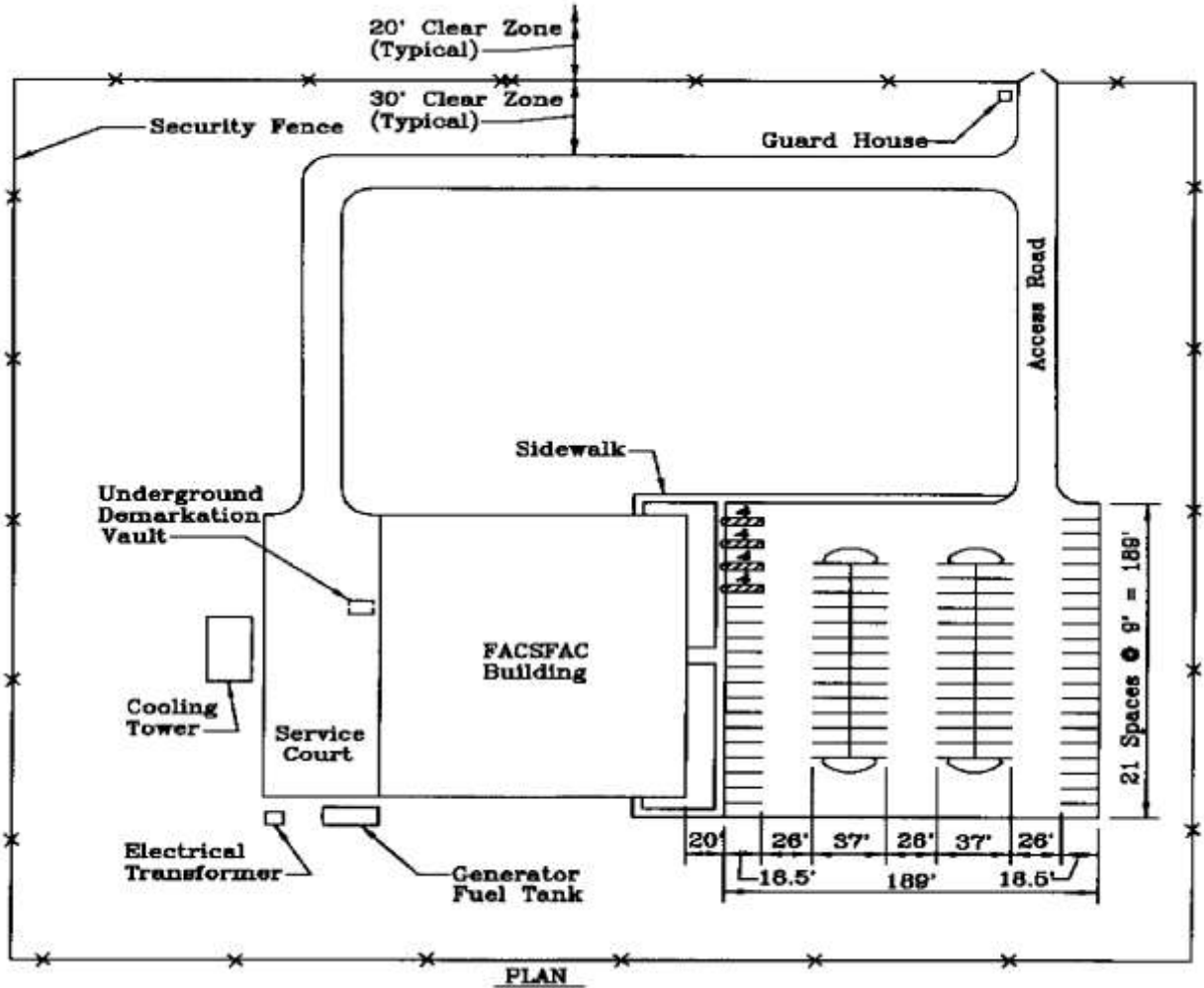


Figure 4
Typical ACSFAC Facility Site Plan

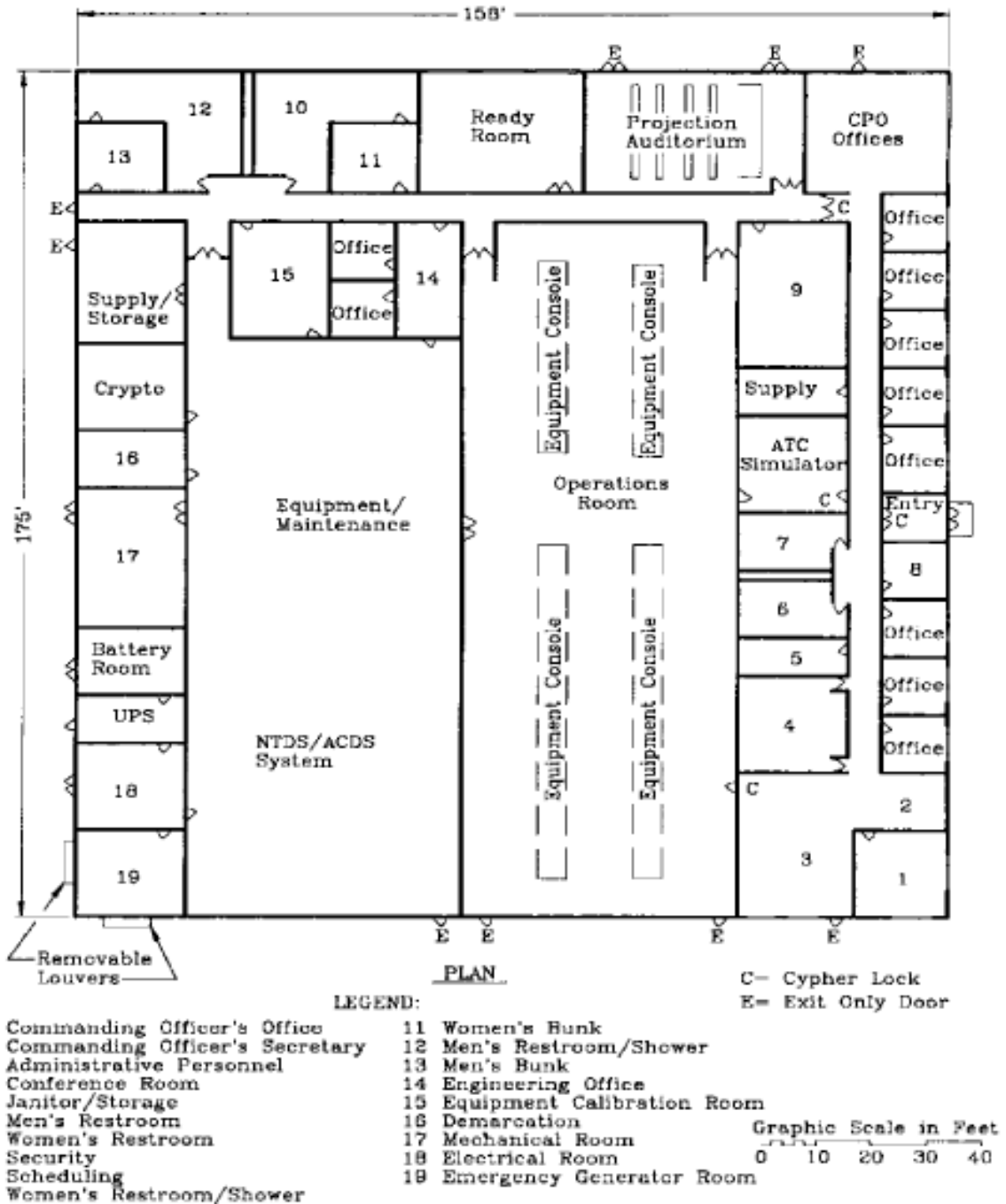


Figure 5
Typical ACSFAC Building Layout

Plumbing Requirements (GPM) :		
Water;		
Cold		56
Hot		
Recovery Rate (100 Degs. Rise)		75
Storage Gal		160
Fire Protection Requirements		
Not Included		
Heating Requirements (BTU/HR x 1000) :		
(Inside Design Temperature = 72 Degs. F)		
Outside Design Temperature	-5 Degs. F	380
	+5 Degs. F	330
	+15 Degs. F	300
	+25 Degs. F	230
Air Conditioning Requirements (BTU/HR x 1000) :		
Based on 91 Degs. D.B. 76 Degs. W.B. Outside Design		
Conditions; Cooling Load		1095
Heat rejected to conditioned spaces by energized test.		
Equipment & parts under repair not included.		
Electrical Requirements (KVA) :		
Lights;		
Connected Load		90
Estimated Demand		63
Power;		
Connected Load		418
Estimated Demand		293
Air Conditioning;		
Connected Load		377
Estimated Demand		264
Total;		
Connected Load		885
Estimated Demand		620
Emergency Generator (KW)		400
Areas (SF) :		
Gross area including mechanical		
equipment room		27,650
General Notes:		

Figure 6
Typical ACSFAC Design Notes

2.4.1 AIR CONDITIONING. Provide the following:

a) Two parallel piped air cooled chillers, each designed for 60 percent of the total building cooling load. Alternate operation of chillers automatically on a regular basis when load is less than 60 percent. Consider cold storage to minimize power peaks.

b) One chilled water circulation pump for each chiller plus a manifold spare pump. Design chiller circuitry so that the pump shall operate and water flow before the chiller is energized. The spare pump may be manually operated. Provide secondary chilled water loops with three-way valves at coils in each circuit to result in constant flow through chiller.

c) Divide the building into three cooling zones: administrative areas, operations areas, and the equipment areas. Provide separate air handlers and ducting systems for each zone. Provide sound attenuaters for supply duct work. Consider more than one air handler for large zones.

d) Provide two air handlers for the operations, the NTDS/ACDS, and terminal distribution rooms. Design air handler controls to regulate the units as primary and secondary with each unit alternating as the primary. Provide air handlers capable of controlling humidity, equipped with electric heat, and specifically designed for computer room applications.

2.4.2 HEATING. Provide fuel oil or gas operated boiler heating system designed to accommodate the largest heating load anticipated. Provide two circulation pumps, each designed for 100 percent of the total building heating load. Design the pump controls to regulate the pumps as primary and secondary with each pump alternating as the primary.

2.5 ELECTRICAL REQUIREMENTS.

2.5.1 UNINTERRUPTED POWER SUPPLY (UPS). Provide non-redundant UPS in accordance with Owner requirements. Use anticipated load to determine the size of UPS.

2.5.2 EMERGENCY ELECTRICAL POWER. Provide an emergency generator with automatic starting and switching capability. Provide emergency power to the following:

- a) Loads as required by NFPA-101.
- b) Electronic equipment in operations, the NTDS/ACDS, and equipment rooms.
- c) Building mechanical systems supporting electronic equipment.
- d) Exterior security lighting and security systems.

2.5.3 400-HZ POWER. Provide 400-Hz power in accordance with Owner requirements.

2.6 SECURITY. The facility is normally located within restricted areas which meet the minimum security measures for external security. When the facility is located within a restricted area of a lower level of security or is located remote and outside of an established restricted area. Provide additional measures to meet the minimum security requirements for the level of security assigned to the facility. Security at the main entrance usually requires a single entry point with visitor control. Remote locks, video cameras, card readers, and/or key pads may be required by Owner as components of the IDS. The level of security and the designer's responsibility for particular security elements will be designated by the Owner. Provide the following:

- a) Electronic cipher door locks at access points to operations room.
- b) Exterior doors in the operations, the Owner-designated areas, equipment/maintenance, and mechanical/electrical rooms with no access hardware on the outside.
- c) CCTV.

- d) Security fencing and guard post for facilities located outside the secure area of the installation.
- e) Personnel identification, visitor check-in, and control system to control ingress and egress.

2.7 ADDITIONAL DESIGN CRITERIA. Refer to Owner requirements for facility design requirements not addressed above.

3. JOINT CONTROL FACILITY (JCF)

3.1 FUNCTION. The JCF is a high density (air traffic) facility which collocates approach control responsibilities for two or more air airfields or a combination of an approach control facility and a ACSFAC or Range Operations Center (ROC) under one roof. The JCF normally operates continuously.

3.2 LOCATION. Locate the JCF adjacent to the air operations building when siting criteria permits. An air traffic control tower may be sited with the JCF.

3.3 ARCHITECTURAL AND STRUCTURAL REQUIREMENTS. Provide the following:

- a) Removable, modular, access flooring in the operations, the areas designated by the Owner, and the equipment/maintenance rooms with 18 inches of clearance provided between the floor panels and subfloor to accommodate wiring and insulated piping.
- b) Interior and exterior acoustical treatment to attain the room criteria required by the Owner. Soft textured acoustical wall panels and movable sound absorbent partitioning in the operations room.
- c) A clear ceiling height of 14 feet (finished floor to ceiling) in the operations area.
- d) A tiered seating area in projection auditorium.
- e) RF shielding throughout the crypto room.
- f) Facility and restroom areas readily accessible by the physically handicapped.
- g) Cable troughs or conduits between the air traffic control tower and the JCF for intrafacility cabling.

3.3.1 WINDOWS. Do not use windows in operations, Owner-designated areas, and equipment/maintenance rooms. Provide insulated glazing for noise reduction in administrative areas.

3.4 MECHANICAL REQUIREMENTS. Provide the following:

- a) Automatic thermostatic control.
- b) A four-pipe chilled/hot water distribution system with separate air handlers for each zone or dehumidifying system to work in conjunction with the air conditioning system.
- c) Capability for future expansion of the HVAC system. Use piping designed for low friction and velocity losses at the maximum flows expected.
- d) Chilled water for designated areas in accordance with Owner requirements.

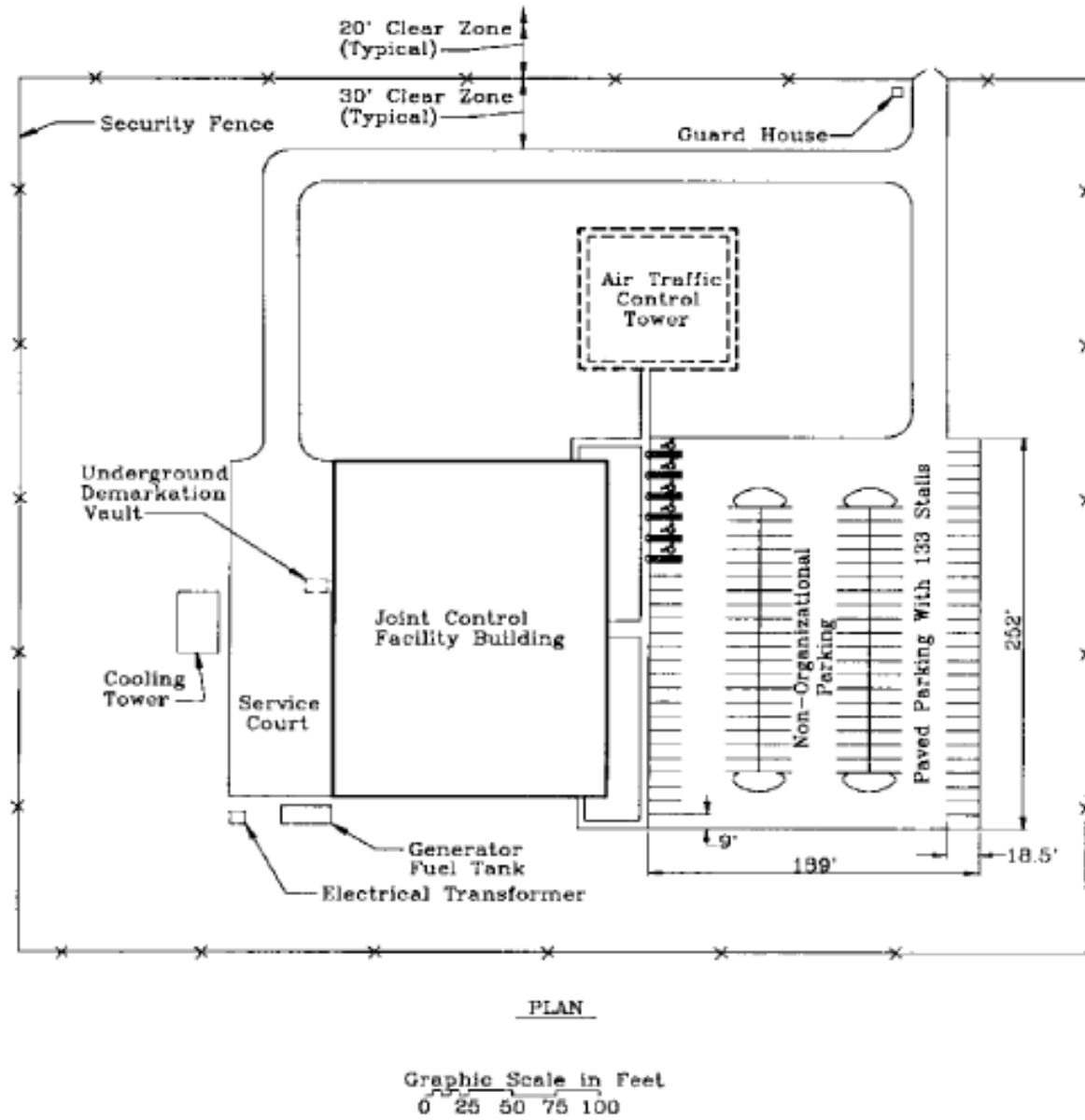
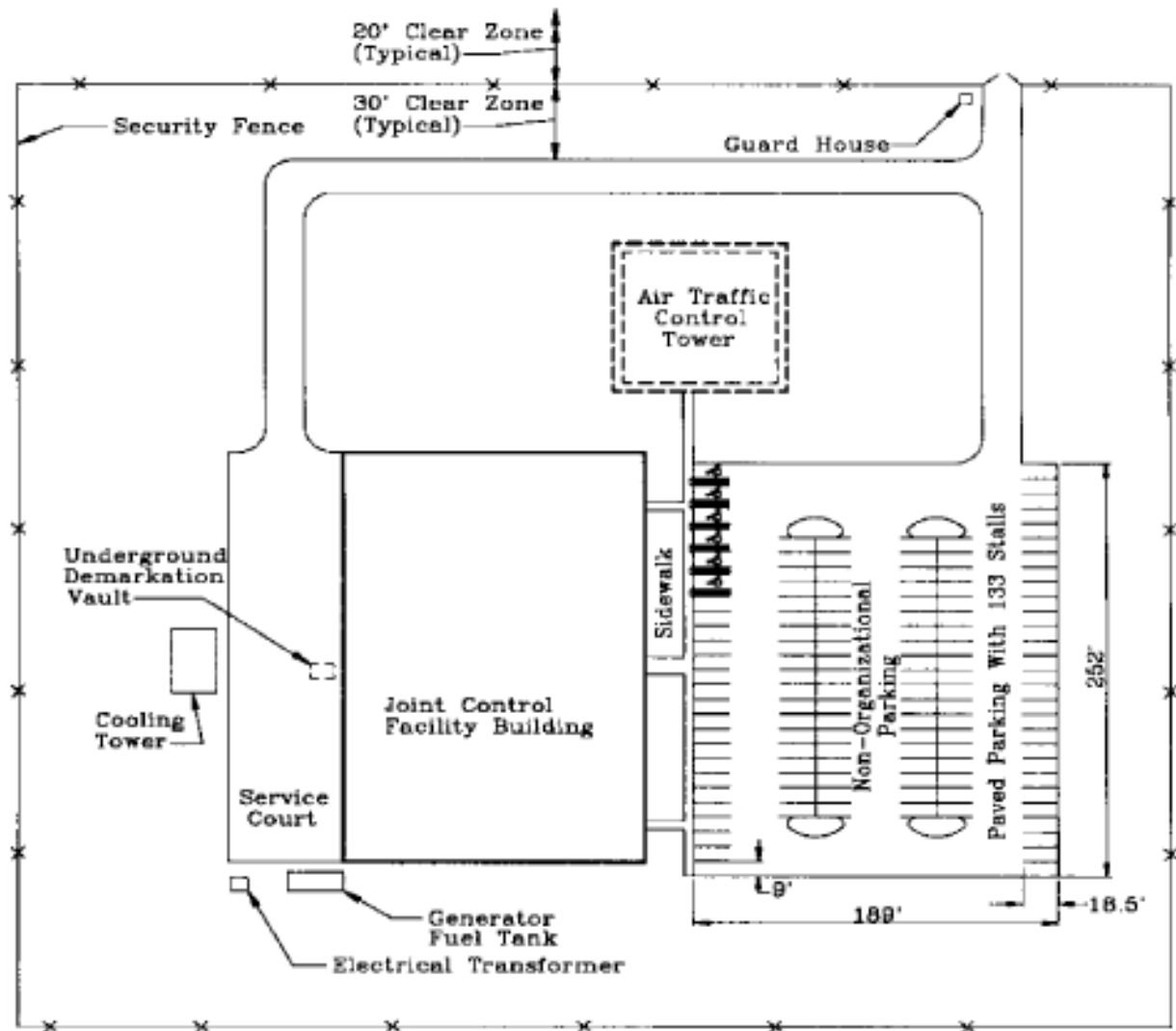


Figure 7
Typical Joint Control Facility (Medium Density) Site Plan



PLAN

Graphic Scale in Feet
0 25 50 75 100

Figure 8
Typical Joint Control Facility (High Density) Site Plan

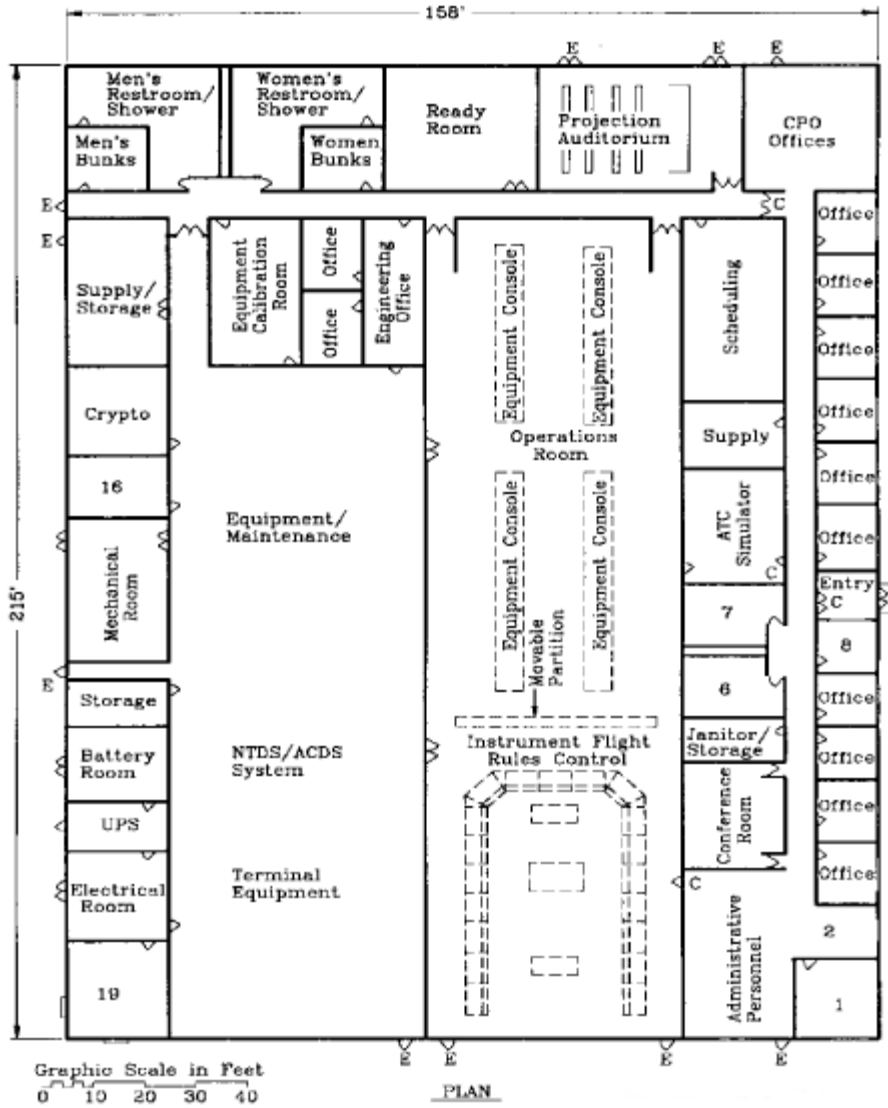
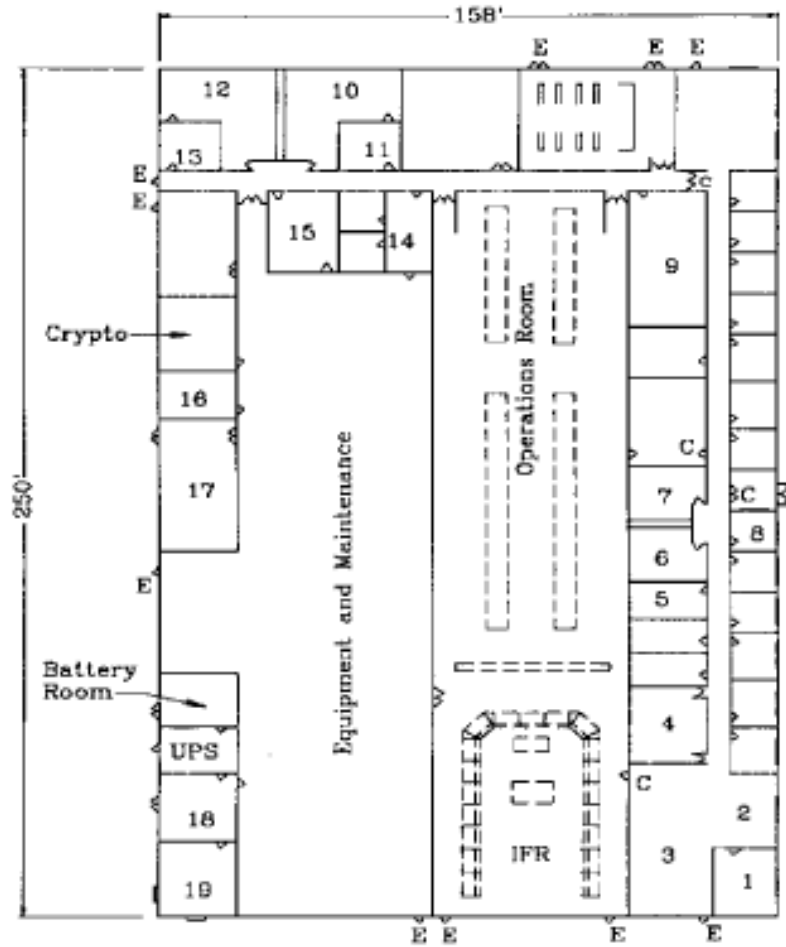


Figure 9

Typical Joint Control Facility (Medium Density) Building Layout



PLAN

LEGEND:

- | | |
|----------------------------------|-------------------------------|
| 1 Commanding Officer's Office | 11 Women's Bunk |
| 2 Commanding Officer's Secretary | 12 Men's Restroom/Shower |
| 3 Administrative Personnel | 13 Men's Bunk |
| 4 Conference Room | 14 Engineering Office |
| 5 Janitor/Storage | 15 Equipment Calibration Room |
| 6 Men's Restroom | 16 Demarcation |
| 7 Women's Restroom | 17 Mechanical Room |
| 8 Security | 18 Electrical Room |
| 9 Scheduling | 19 Emergency Generator Room |
| 10 Women's Restroom/Shower | |

C= Cypher Lock
E= Exit Only Door

Graphic Scale in Feet



Figure 10

Typical Joint Control Facility (High Density) Building Layout

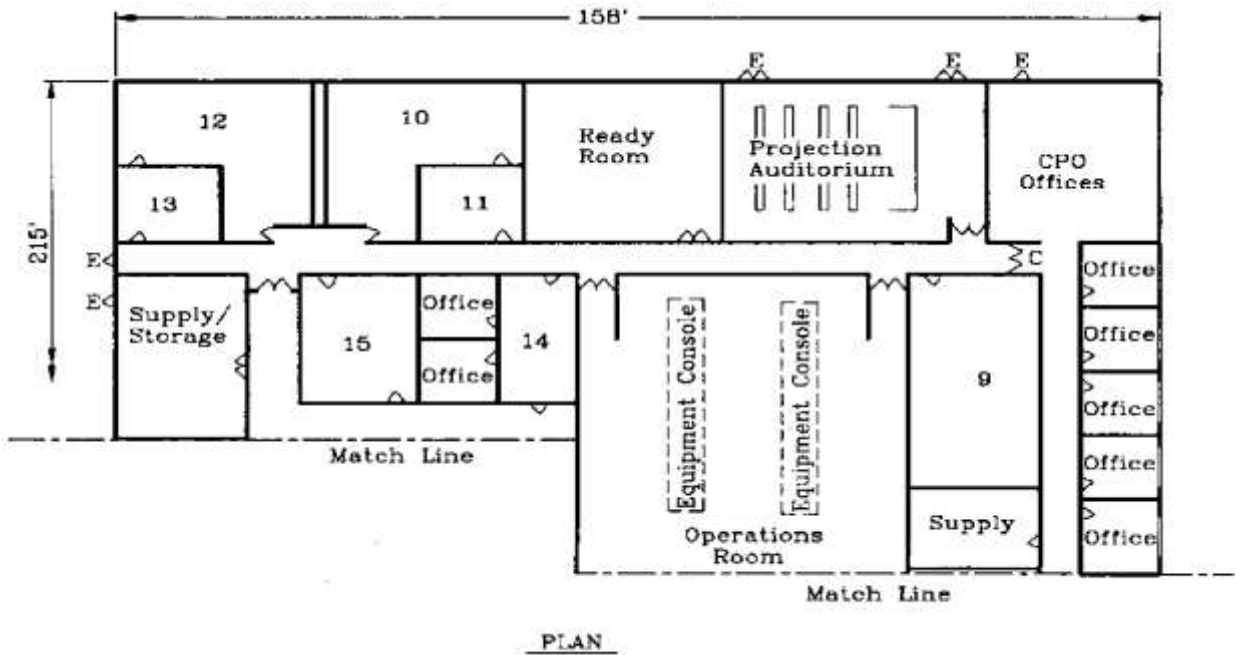


Figure 11
Typical Joint Control Facility (High Density) Building Layout – Part !

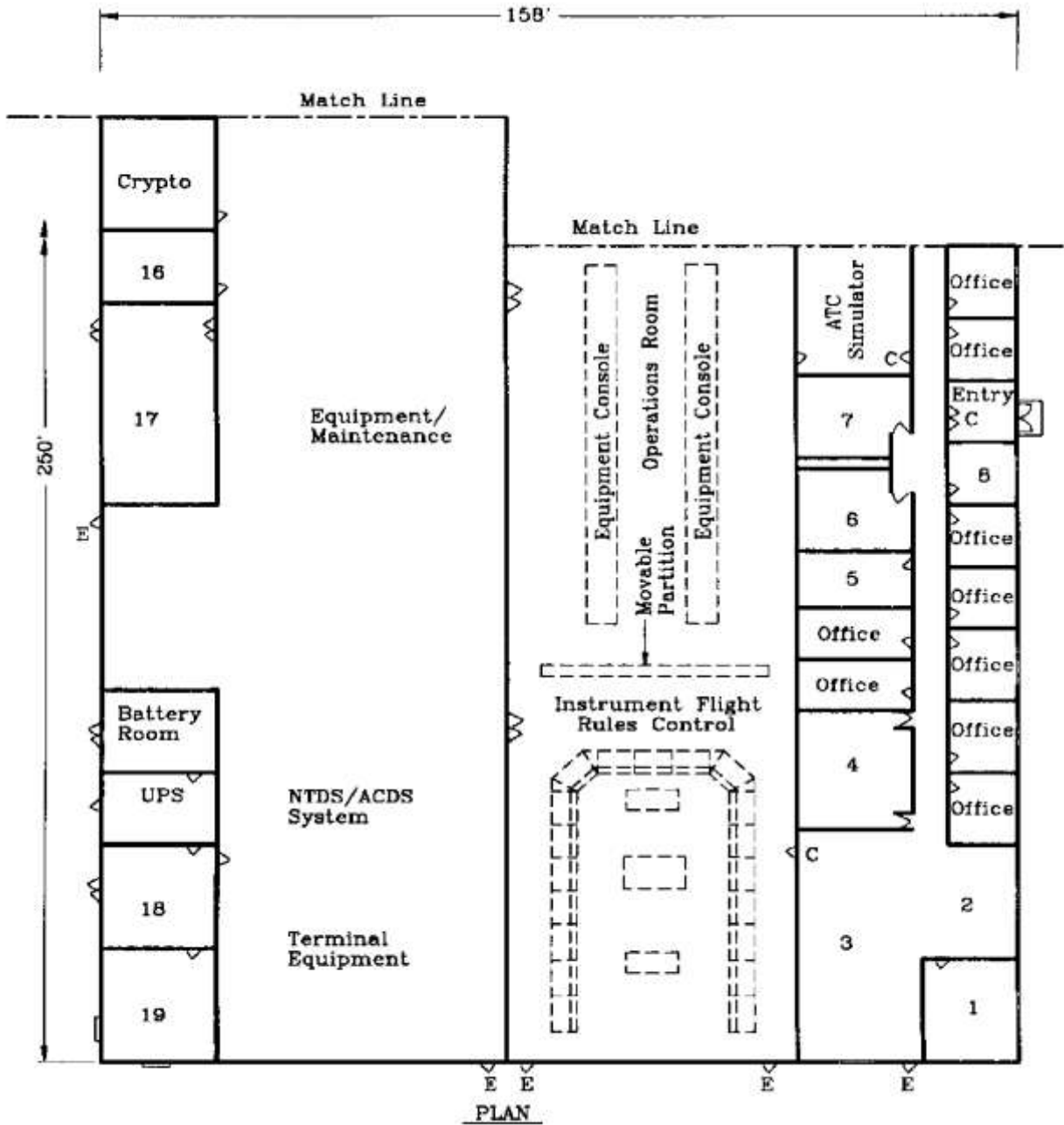


Figure 11
Typical Joint Control Facility (High Density) Building Layout – Part 2

Joint Control Facility			
Plumbing Requirements (GPM):	Medium	High	
Water;	<u>Density</u>	<u>Density</u>	
Cold	74	74	
Hot			
Recovery Rate (100 Degs. Rise)	100	100	
Storage (Gal.)	160	160	
Fire Protection Requirements			
Not Included			
Heating Requirements (BTU/HR x 1000):			
(Inside Design Temperature = 72 Degs. F)			
Outside Design Temperature			
-5 Degs. F	490	600	
+5 Degs. F	430	530	
-15 Degs. F	380	460	
-25 Degs. F	295	360	
Air Conditioning Requirements (BTU/HR x 1000):			
Based on 91 Degs. D.B. 76 Degs. W.B. Outside Design Conditions;			
Cooling Load	1620	2140	
Heat rejected to conditioned spaces by energized test. Equipment & parts under repair not included.			
Electrical Requirements (KVA):			
Lights;			
Connected Load	90	90	
Estimated Demand	63	63	
Power;			
Connected Load	514	610	
Estimated Demand	360	427	
Air Conditioning;			
Connected Load	377	784	
Estimated Demand	264	550	
Total;			
Connected Load	981	1484	
Estimated Demand	687	1040	
Emergency Generator (KW)	400	600	
Areas (SF):			
Gross area including mechanical equipment room	33,970	39,500	

Figure 12
Typical Joint Control Facility Design Notes

3.4.1 AIR CONDITIONING. Provide the following:

a) Two parallel piped air cooled chillers, each designed for 60 percent of the total building cooling load. Alternate operation of chillers automatically on a regular basis when load is less than 60 percent. Consider cold storage to minimize power peaks.

b) One chilled water circulation pump for each chiller plus a manifold spare pump. Design chiller circuitry so that the pump shall operate and water flow before the chiller is energized. The spare pump may be manually operated. Provide secondary chilled water loops with three-way valves at coils in each circuit to result in constant flow through chiller.

c) Divide the building into three cooling zones: administrative areas, operations areas, and the equipment areas. Provide separate air handlers and ducting systems for each zone. Provide sound attenuaters for supply duct work. Consider more than one air handler for large zones.

d) Provide two air handlers for the operations and other Owner-designated spaces, and terminal distribution rooms. Design the air handler controls to regulate the units as primary and secondary with each unit alternating as the primary. Provide air handlers capable of controlling humidity, equipped with electric heat, and specifically designed for computer room applications.

3.4.2 HEATING. Provide fuel oil or gas operated boiler heating system designed to accommodate the largest heating load anticipated. Provide two circulation pumps, each designed for 100 percent of the total building heating load. Design the pump controls to regulate the pumps as primary and secondary with each pump alternating as the primary.

3.5 ELECTRICAL REQUIREMENTS

3.5.1 UNINTERRUPTED POWER SUPPLY (UPS). Provide non-redundant UPS. Use anticipated load to determine the size of UPS.

3.5.2 EMERGENCY ELECTRICAL POWER. Provide an emergency generator with automatic starting and switching capability. Provide emergency power to the following:

- a) Loads as required by NFPA-101.
- b) Electronic equipment in operations, the other Owner-designated spaces, and equipment rooms.
- c) Building mechanical systems supporting electronic equipment.
- d) Exterior security lighting and security systems.

3.5.3 400-HZ POWER. Provide 400-Hz power for the Owner-designated spaces.

3.6 LIGHTING. Provide dimmer adjustable red lighting in the IFR room.

3.7 SECURITY. The JCF is normally located within restricted areas which meet the minimum security measures for external security. If the facility is located within a restricted area of a lower level of security or is located remote and outside of an established restricted area, provide additional measures to meet the minimum security requirements for the level of security assigned to the facility. Security at the main building entrance usually requires a single entry point with visitor control. Remote locks, video cameras, card readers, and/or key pads may be required by the Owner as components of the IDS. The level of security and the designer's responsibility for particular security elements will be designated in the Owner. Provide the following:

- a) Electronic cipher door locks at access points to operations room.
- b) Exterior doors in operations and other Owner-designated spaces, equipment/maintenance, and mechanical/electrical rooms with no access hardware on the outside.

- c) CCTV.
- d) Security fencing and guard post for facilities located outside of the secure area of the installation.
- e) Personnel identification, visitor check-in, and control system to control ingress and egress.

3.8 ADDITIONAL DESIGN CRITERIA. Refer to Owner for facility design requirements not addressed above.

4. AIR TRAFFIC CONTROL TOWER

4.1 FUNCTION. The air traffic control tower building houses equipment and personnel for visual flight rules (VFR) control of aircraft approaching and departing the terminal area or airport and aircraft and vehicular movement on the runways, taxiways, and other operation areas.

4.2 TOWER LOCATION AND HEIGHT. Locate the air traffic control tower building on the edge of the airfield, situated to have an unobstructed line-of-sight to the aircraft approach areas, runways, taxiways, aircraft parking areas, and other operational areas over which aircraft movements are to be controlled. Provide a tower location and height to result in the tower cab eye level line of site intersecting airport traffic surfaces at a vertical angle of 35 minutes or greater. Refer to FAA Order 6480.4, Airport Traffic Control Tower Siting Criteria.

4.3 ARCHITECTURAL AND STRUCTURAL REQUIREMENTS. The air traffic control tower is categorized as low or high density based on air traffic volume. Refer to FAA Order 6480.7, Airport Traffic Control Tower and Terminal Radar Approach Control Facility Design. Consider the use of prefabricated modular construction for tower and tower cab. Provide the following:

- a) Removable, modular, access flooring in the tower cab with 18 inches of clearance provided between the floor panels and subfloor to accommodate wiring and insulated piping.
- b) Interior and exterior acoustical treatment to attain the Owner's room criteria.
- c) Clear span roof structure (no interior columns) in tower cab.
- d) Roof hatch to provide access to the roof from the cab floor.
- e) Floor hatch to allow moving equipment between the cab and the top elevator landing.

- f) Walkway around the exterior of the control cab to facilitate washing cab windows.
- g) Traction type elevator.
- h) Pressure relief system to equalize interior and exterior atmospheric pressures during high wind conditions.
- i) Electrically operated, retractable covers for cab windows at sites prone to hurricane and typhoon conditions.
- j) A 2,000-pound capacity, remote controlled, electric hoist in the tower cab. Suspend hoist from tower cab roof framing.
- k) A cable raceway to cab roof through tubular cab roof columns.

4.3.1 INTERIOR WALLS. Provide fire-rated walls for stair enclosure, plumbing and electrical chases.

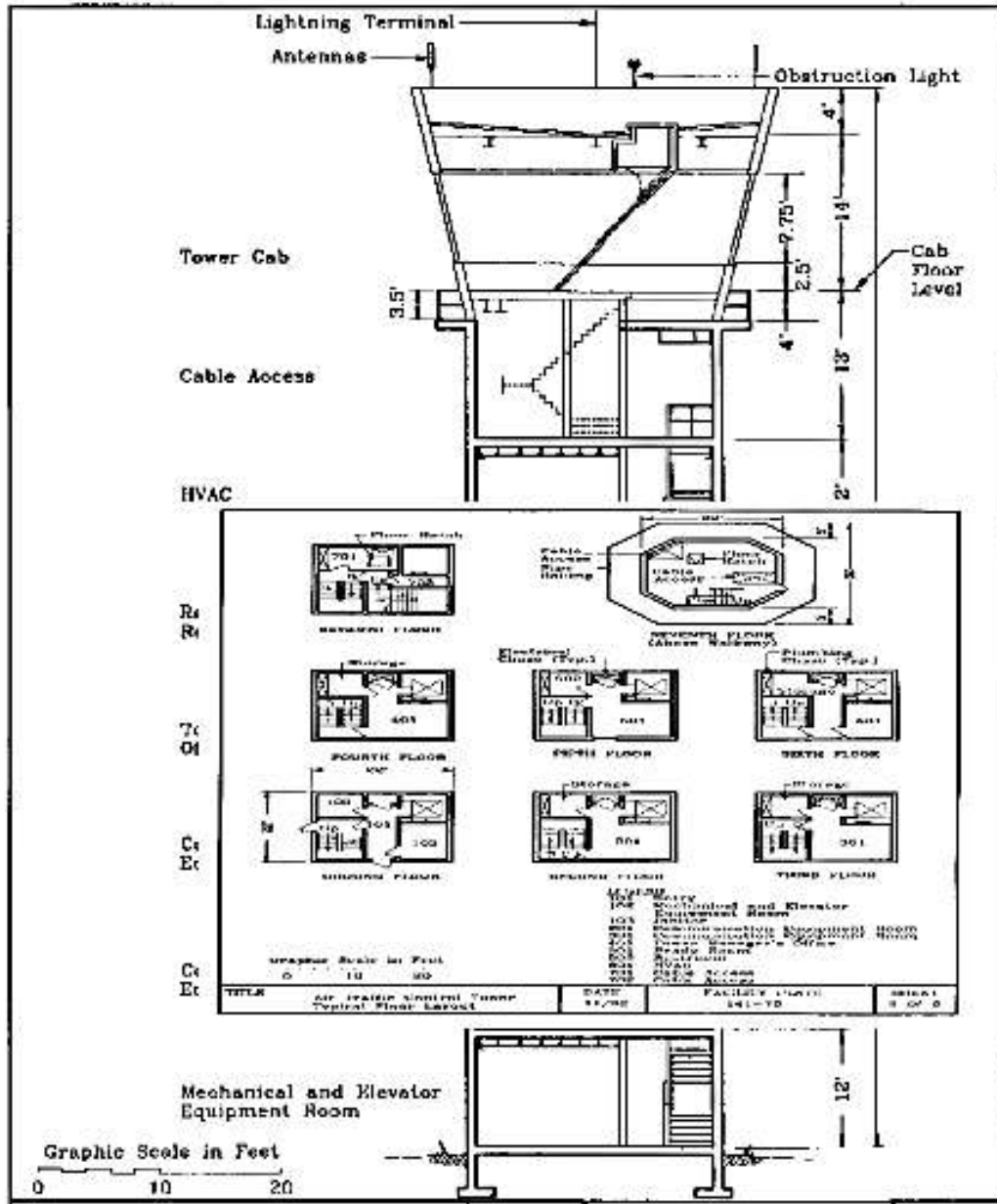


Figure 13
Air Traffic Control Tower Section

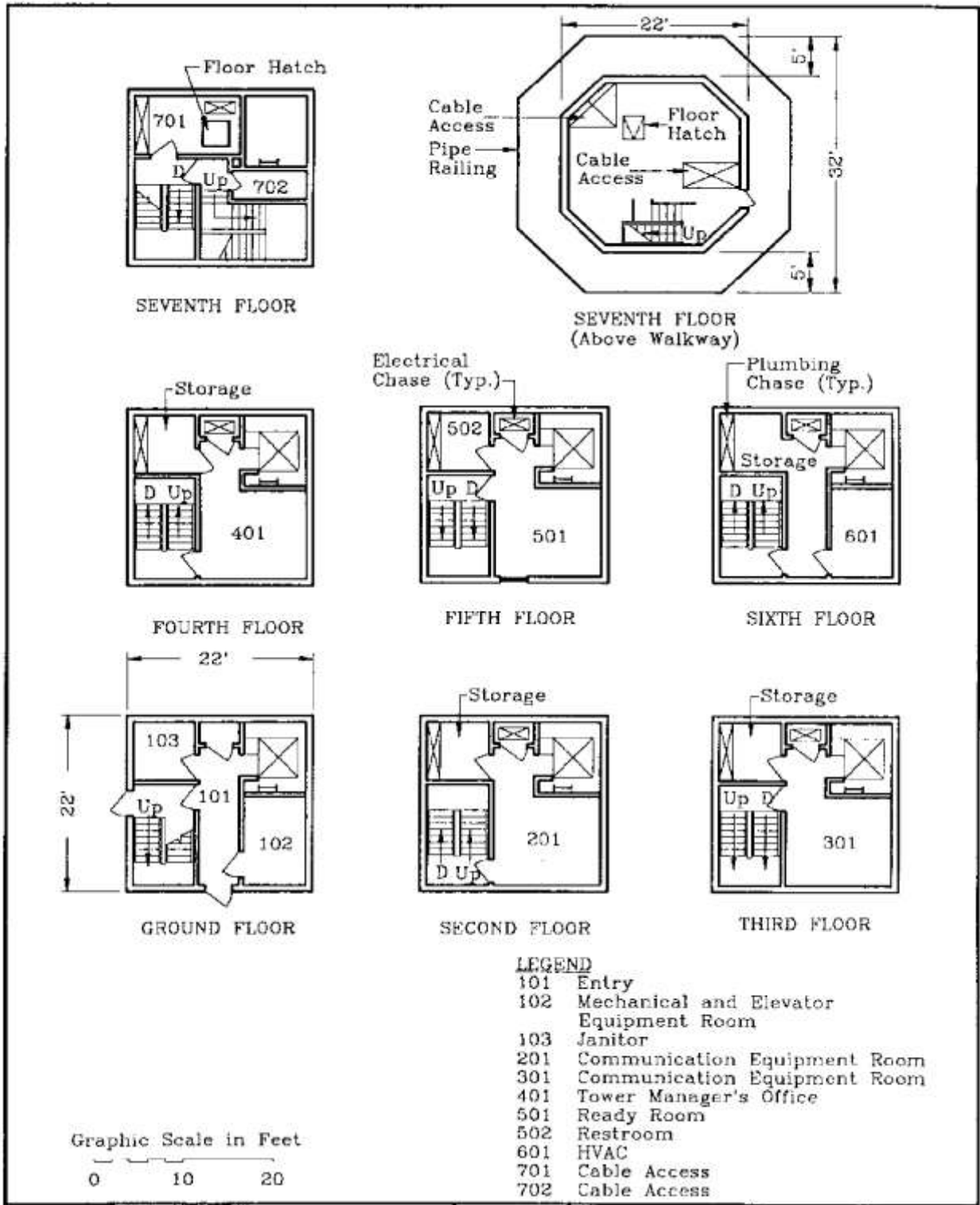


Figure 14

Air Traffic Control Tower Typical Floor Layout

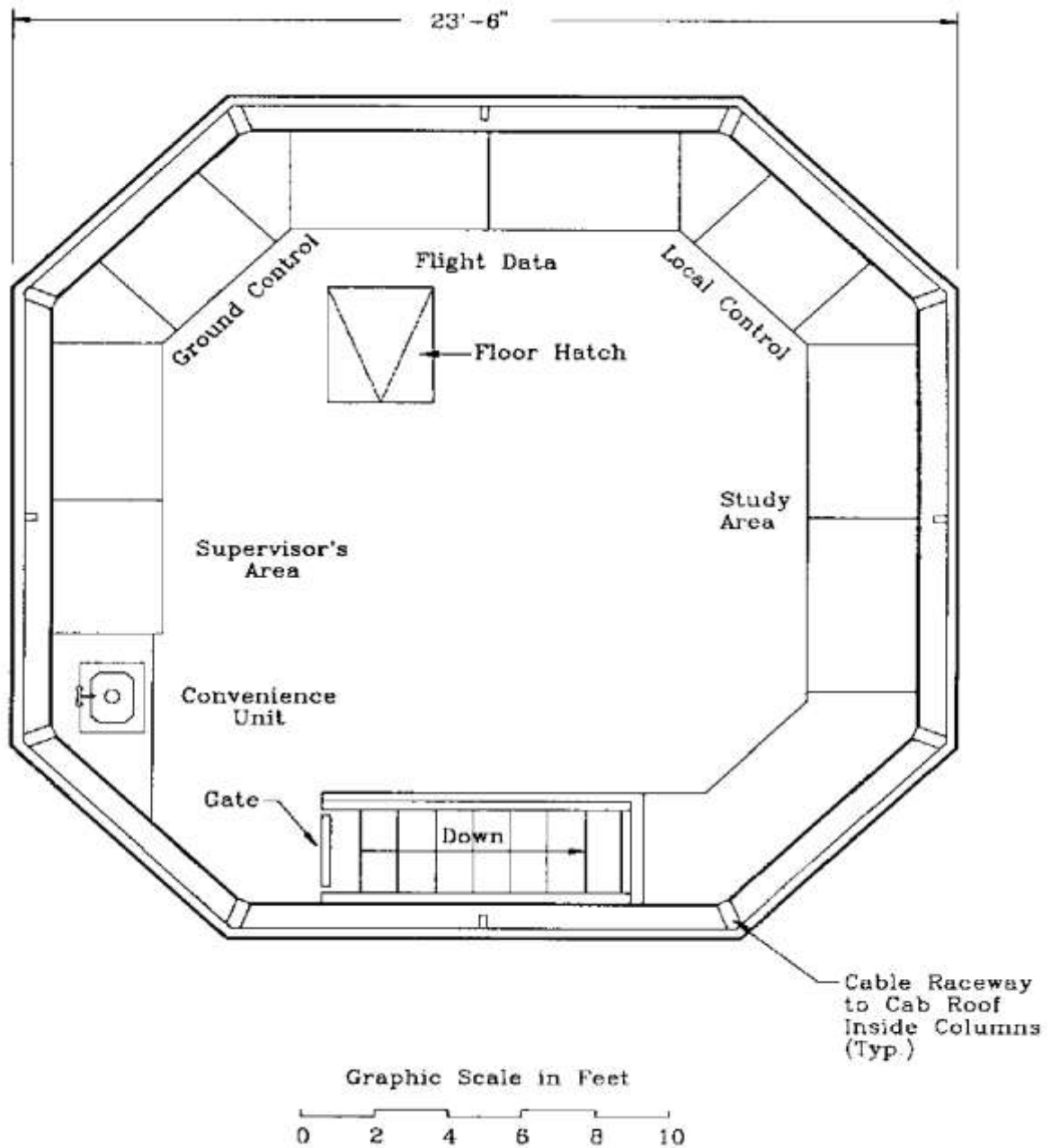


Figure 15
Air Traffic Control Tower (Low Density)
Tower Cab Layout

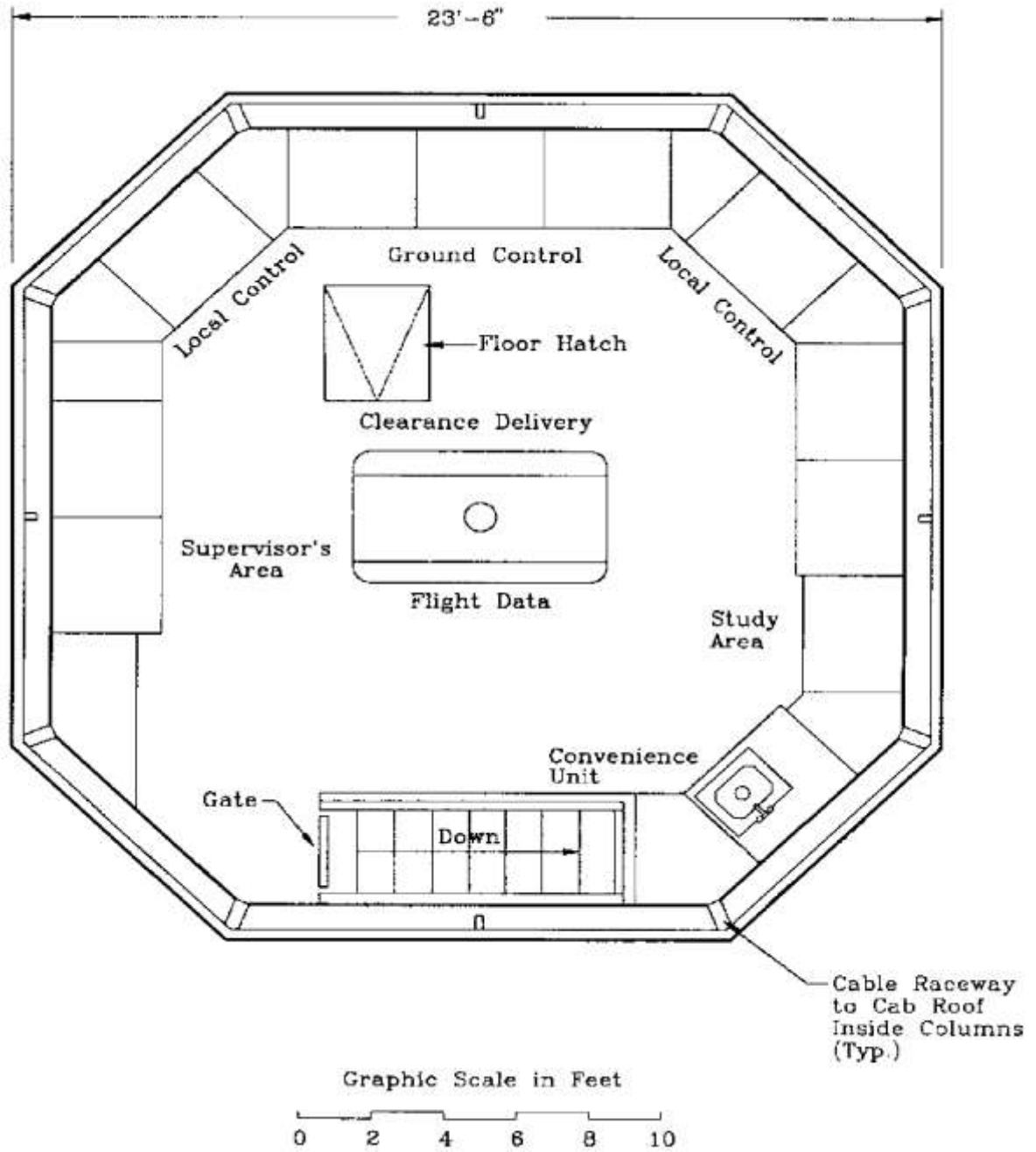


Figure 16
Air Traffic Control Tower (High Density)
Tower Cab Layout

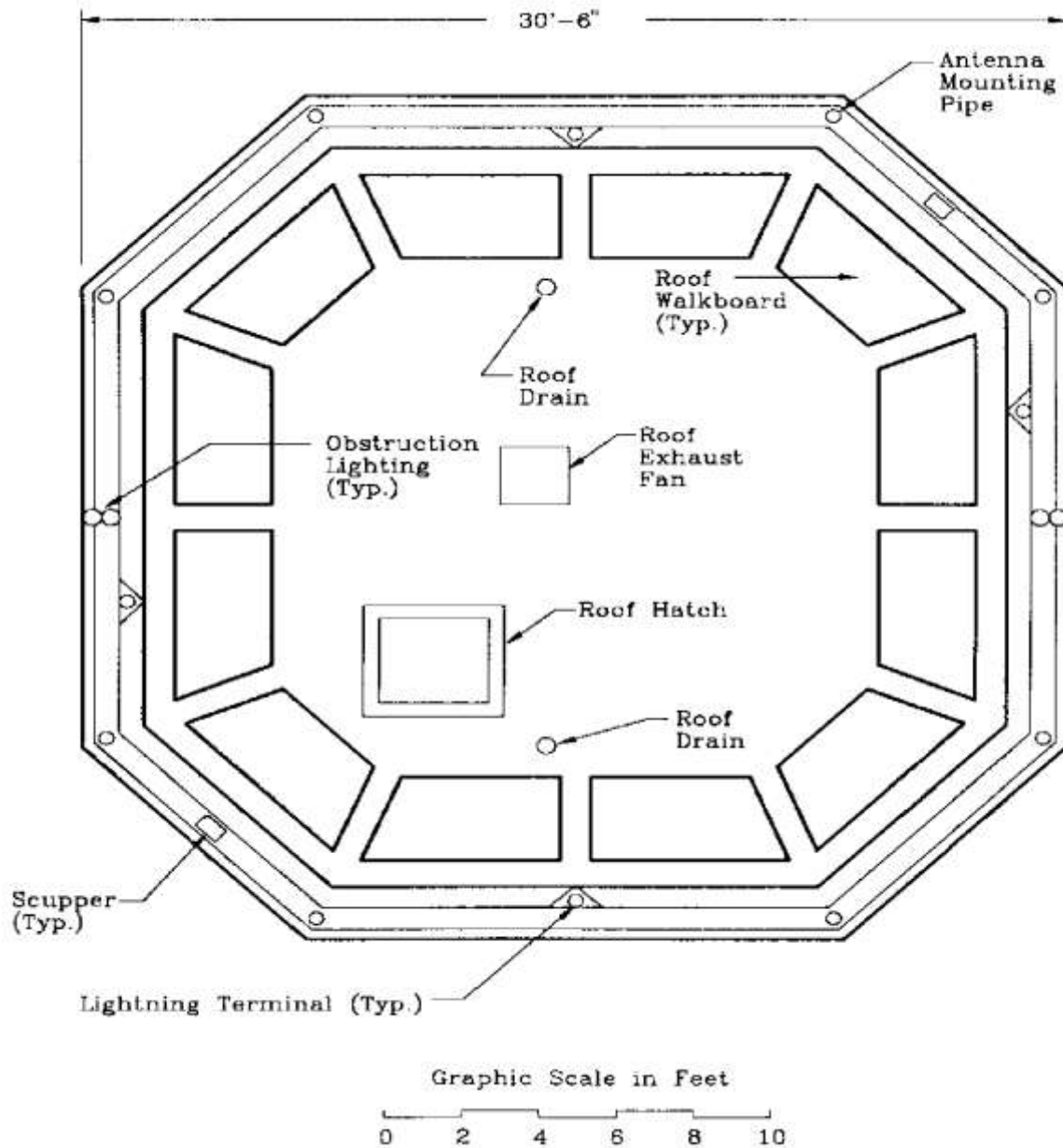


Figure 17
Air Traffic Control Tower
Cab Roof Plan

			<u>Air Traffic Control Tower</u>
Plumbing Requirements:			
Water;			
Cold	G.P.M.		12
Hot			
Recovery Rate (100 Degs. Rise)	G.P.M.		20
Storage	Gal		20
Fire Protection Requirements Not Included			
Heating Requirements (BTU/HR x 1000):			
(Inside Design Temperature = 72 Degs. F)			
Outside Design Temperature	-5 Degs. F		215
	+5 Degs. F		185
	+15 Degs. F		160
	+25 Degs. F		130
Air Conditioning Requirements (BTU/HR x 1000):			
Based on 91 Degs. D.B. 76 Degs. W.B. Outside Design Conditions; Cooling Load			
			185
Heat rejected to conditioned spaces by energized test. Equipment & parts under repair not included.			
Electrical Requirements (KVA):			
Lights;			
Connected Load			12.0
Estimated Demand			11.0
Power;			
Connected Load			62.0
Estimated Demand			56.0
Air Conditioning;			
Connected Load			13.0
Estimated Demand			12.0
Total;			
Connected Load			87.0
Estimated Demand			79.0
Emergency Generator (KW)			60.0
Areas (SF):			
Gross area including mechanical equipment room			3,940

Figure 18
Air Traffic Control Tower
Facility Design Notes

4.3.2 WINDOWS. Do not use windows in tower structure. Provide tower cab with heat-absorbing insulated window units in accordance with Owner requirements. Provide units with a light transmissivity of not less than 85 percent, heat transmission (U value) of 0.60 maximum, and free of parallax or other optical distortion. Provide spare window units interchangeable with any other similar unit in the tower cab. Provide window shades for tower cab windows. Refer to FAA Specification FAA-E-2470.

4.4 MECHANICAL REQUIREMENTS. Use peripheral strip cooling diffusers to reduce solar impact to the personnel and wall diffusers to control tower cab temperatures.

4.5 ELECTRICAL REQUIREMENTS

4.5.1 EMERGENCY ELECTRICAL POWER. Provide an emergency generator with automatic starting and switching capability. Consider a common generator when the air traffic control tower is sited adjacent to the air operations building, TRACON, ACSFAC, JCF, or tower base building. Provide emergency power to the following:

- a) Loads as required by NFPA-101.
- b) Electronic equipment in the tower cab and communications equipment rooms.
- c) Building mechanical systems supporting electronic equipment.
- d) Exterior security lighting and security systems.

4.5.2 UNINTERRUPTED POWER SUPPLY (UPS). Provide non-redundant UPS. Use anticipated load to determine the size of UPS.

4.6 LIGHTING. Design lighting in accordance with Owner requirements. Provide dimmer adjustable white ceiling lights in tower cab. Provide down lighting over work areas on separate switch.

4.7 FIRE PROTECTION. Refer to NFPA 101. Consult local fire prevention agency to determine if air traffic control tower meets height criteria to be classified as a "High Rise Building."

4.8 SECURITY. Air traffic control towers are normally located within restricted areas which meet the minimum security measures for external security. If the facility is located within a restricted area of a lower level of security, provide additional measures to meet the minimum security requirements for the level of security assigned to the facility. The level of security and the designer's responsibility for particular security elements will be designated by the Owner. Provide an electronic cipher door lock at the first floor entrance with an intercom and remote lock release in the tower cab.

4.9 ADDITIONAL DESIGN CRITERIA. Refer to Owner for facility design requirements not addressed above.

5. AIR TRAFFIC CONTROL TOWER BASE BUILDING

5.1 FUNCTION. The air traffic control tower base building provides housing for equipment and personnel to support IFR control of aircraft on approach to or departure from the terminal radar facility or airport. Other functions include ground controlled approach (GCA) or PAR for landing aircraft during inclement weather and limited visibility.

5.2 LOCATION. Locate adjacent to the air traffic control tower.

5.3 ARCHITECTURAL AND STRUCTURAL REQUIREMENTS. Provide the following:

- a) Removable, modular, access flooring in the IFR and terminal equipment rooms with 18 inches of clearance provided between the floor panels and subfloor to accommodate wiring and insulated piping.
- b) A 9-foot clear ceiling height above accessible flooring.
- c) Built-in workbenches and shelving in the terminal equipment room.
- d) Facility and restroom areas readily accessible by the physically handicapped.
- e) Interior and exterior acoustical treatment to attain the room criteria required by Owner.
- f) Cable troughs or conduits between the air traffic control tower and the base building for intrafacility cabling. Exact dimensions of the cable trough or size and number of conduits are specified by the Owner.

5.3.1 WINDOWS. Do not provide windows in IFR or terminal equipment rooms. Provide insulated glazing for noise reduction in administrative areas.

5.4 ELECTRICAL REQUIREMENTS

5.4.1 UNINTERRUPTED POWER SUPPLY (UPS). Provide non-redundant UPS. Use the anticipated load to determine the size of the UPS.

120

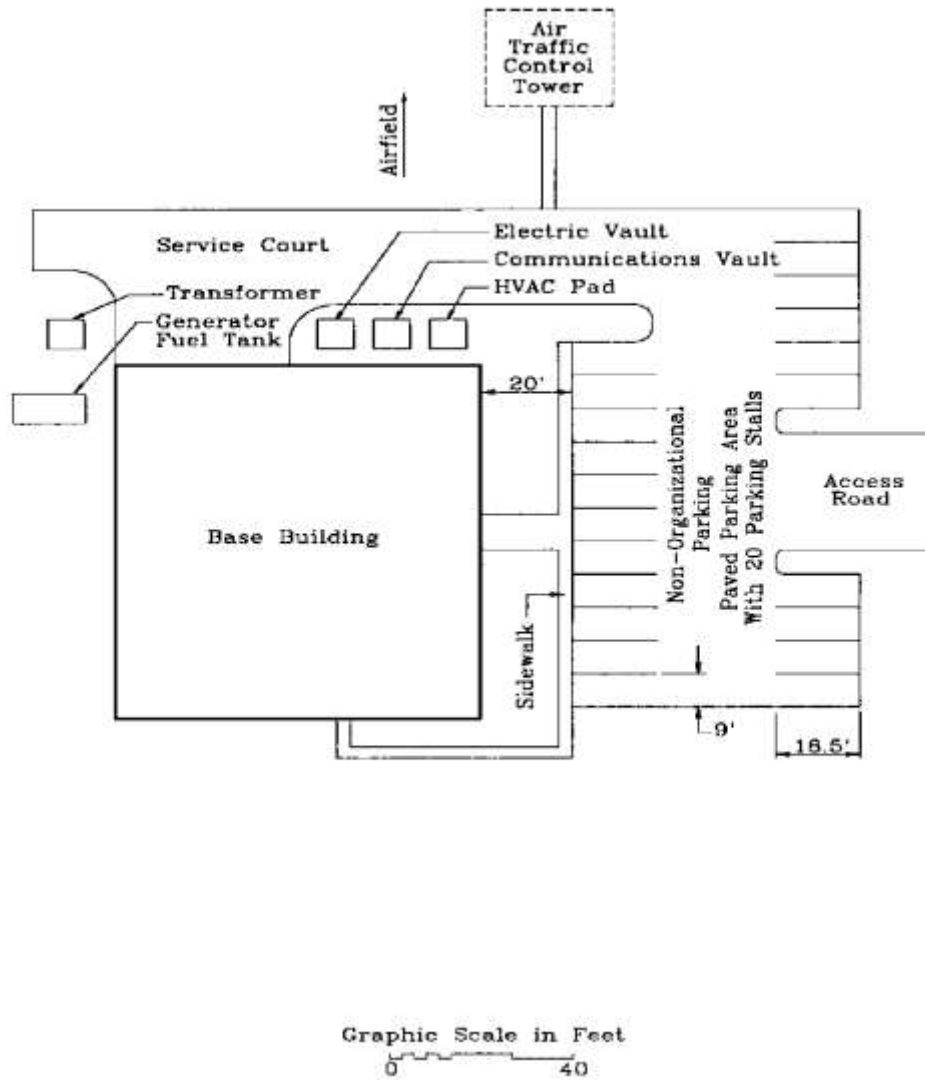


Figure 19
Air Traffic Control Tower
Base Building Facility Site Plan

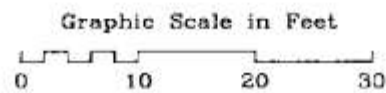
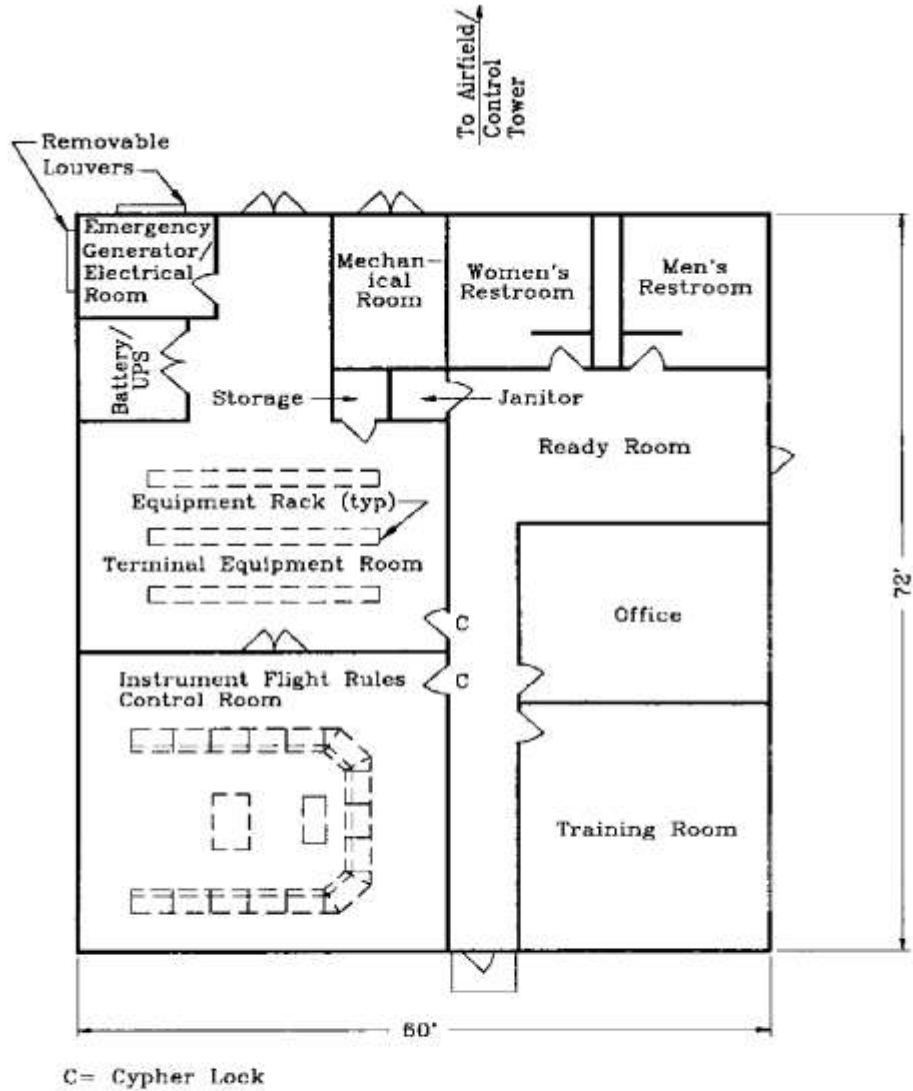


Figure 20
Air Traffic Control Tower
Base Building Layout

<u>Base Building</u>		
Plumbing Requirements:		
Water;		
Cold	G.P.M.	62
Hot		
Recovery Rate (100 Degs. Rise)	G.P.M.	17
Storage	Gal	40
Fire Protection Requirements		
Not Included		
Heating Requirements (BTU/HR x 1000):		
(Inside Design Temperature = 70 Degs. F)		
Outside Design Temperature	-5 Degs. F	95
	+5 Degs. F	85
	+15 Degs. F	75
	+25 Degs. F	65
Air Conditioning Requirements (BTU/HR x 1000):		
Based on 91 Degs. D.B. 76 Degs. W.B. Outside Design		
Conditions; Cooling Load		
		275
Heat rejected to conditioned spaces by energized test.		
Equipment & parts under repair not included.		
Electrical Requirements (KVA):		
Lights;		
Connected Load		15
Estimated Demand		11
Power;		
Connected Load		65
Estimated Demand		46
Air Conditioning;		
Connected Load		100
Estimated Demand		70
Total;		
Connected Load		180
Estimated Demand		127
Emergency Generator (KW)		125
Areas (SF):		
Gross area including mechanical		
equipment room		
		4,320

Figure 21
Air Traffic Control Tower
Base Building Facility Design Notes

5.4.2 EMERGENCY ELECTRICAL POWER. Provide an emergency generator with automatic starting and switching capability. Provide emergency power to the following:

- a) Loads as required by NFPA-101.
- b) Electronic equipment in IFR and terminal equipment rooms.
- c) Building mechanical systems supporting electronic equipment.
- d) Exterior security lighting and security systems.

5.4.3 400-HZ POWER. Provide 400-Hz power in accordance with Owner requirements.

5.5 LIGHTING. Provide dimmer adjustable red lights in IFR control room.

5.6 SECURITY. Air traffic control tower base buildings are normally located within restricted areas which meet the minimum security measures for external security. If the facility is located within a restricted area of a lower level of security, provide additional measures to meet the minimum security requirements for the level of security assigned to the facility. The level of security and the designer's responsibility for particular security elements will be designated in the IDSEP. Refer to par. 2. Provide the following:

- a) Electronic cipher door locks at interior entrance doors to IFR and terminal equipment rooms.
- b) Exterior doors in IFR and terminal equipment rooms with no access hardware on the outside.

5.7 ADDITIONAL DESIGN CRITERIA. Refer to Section 2 for facility design requirements not addressed above.