UNITED STATES POSTAL SERVICE®

Standard Design Criteria

Handbook AS-503

October 1, 2021

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How to Use This Handbook

General

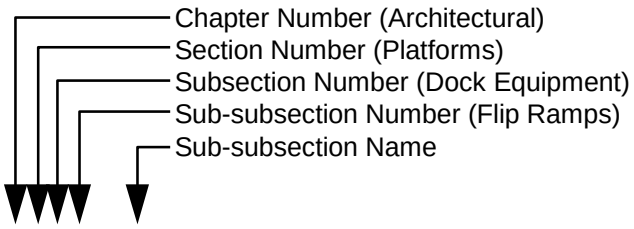
The Standard Design Criteria is organized into four modules:

- Module 1 - Criteria that are common and applicable to all facility types, but in particular to the two primary facility types [Mail Processing Facilities (MPFs) and Customer Service Facilities (CSFs)].
- Module 2 - Additional criteria that are unique to the two primary facility types: MPFs (Module 2A) or CSFs (Module 2B).
- Module 3 - Criteria for repair and alteration projects.
- Module 4 - Criteria for those special components that at times may be a part of any of the facilities.

For new construction, Module 1 must be used in conjunction with the appropriate section of Module 2 in order to obtain the complete criteria for the facility type (MPF or CSF). In addition, portions of Module 4 may be required, depending on the particular project.

For repair and alteration projects in existing facilities, Module 3 must be followed. Module 3 may direct the reader to use other modules or portions of modules. If a particular issue is not addressed in Module 3, refer back to modules 1 or 2.

Numbering System



Sample Number: **2-3.8.1 Flip Ramps**

For example, “2-3.8.1 Flip Ramps” can be found in Chapter 2 (Architectural), Section 3 (Platforms), Subsection 8 (Dock Equipment). The Module name and number are noted in the footer on each page. Numbering for appendices is similar, starting with an M prefix to designate the Module. For example, the first appendix in Module 1 would be “M1-A.”

Facility Type Reference Box

The facility type reference box is used in Module 1 to prompt the user of all or additional information on a particular topic found in Module 2, Prototype-Specific Criteria.

Example:

2-2.2 Wire Screen Enclosures | Module 2A, Module 2B

Related SDC Module Reference Box

The facility type reference box is used to prompt the user of all or additional information on a particular topic found in another SDC Module.

Example:

2-5.2 Self Service | Module 4A

USPS Document Reference Symbol

This symbol prompts the user to refer to a USPS document for additional information not contained within the *Standard Design Criteria*.

Example:

2-6.1.2 Windows | USPS Handbook RE-5

Indicates reference to Handbook RE-5 is required for additional security issues concerning windows.

Standard Detail Reference Symbol

This symbol is used to reference the standard detail(s) applicable to a particular design criteria item.

Example:

2-3.8.5 Bumpers | 2-3-8a→c1

Indicates reference to the bumper detail numbers. The details, including an explanation of their numbering system, can be found in the *SDL Reference and Drawing Index*.

Exclamation Point

Used to draw the user's attention to particular design criteria item.

Checklists

Complete the checklists located at the end of the chapters at various stages of design. Please see the checklists for additional information. Refer to the *Standard Design Criteria* for clarification of checklist content.

Revisions Sidebar

The revisions sidebar in the left margin is to indicate changes to content since the last version of the Design Criteria. Changes include additions, revisions, and deletions of content.

Acronyms and Abbreviations

AABC	Associated Air Balancing Council
A/E	Architect/Engineer of Record
AFCS	Advanced Facer Canceler System
AFF	Above Finished Floor
AFUE	Annual Fuel Utilization Efficiency
AGV	Automated Guided Vehicles
AIC	Amps Interrupting Capacity
AMC	Airport Mail Center
AMF	Airport Mail Facility
APC	Automated Postal Center
ANSI	American National Standards Institute
APPS	Automated Package Processing System
AQ	Alternate Quarters
ASF	Auxiliary Service Facility
ASF	Administrative Support Facility
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
BDS	Building Design Standards
BDS	Bio-detection System
BFF	Below Finish Floor
BMC	Bulk Mail Center (now called NDC)
BMEU	Business Mail Entry Unit
BOCA	Building Officials and Code Administrators
BRC	Bullet Resistant Counterline
BTU	British Thermal Unit
CARS	Contract Access Retail System
CAX	Carrier Annex
CB	Circuit Breaker or Call Button
CBU	Cluster Box Unit
CCR	Consolidated Computer Room
CCTV	Closed Circuit TV
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CFS	Computerized Forwarding System
CFT	Customs Forms Terminal
CIO	Criminal Investigative Office
CIP	Camera Interface Panel

CIS	Criminal Investigative System
CoA	Certificate of Accessibility
CoF	Coefficient of Friction
COLOC	Local Processing Center
COP	Coefficient of Performance
CP	Consolidation Point
CPDC	Centralized Package Distribution Center
CPI	Consumer Price Index
CPI	Crime Prevention Index
CPU	Contract Postal Unit
CSF	Customer Service Facilities
Cx/CxA	Commissioning/Commissioning Agent
DAR	Decision Analysis Report
DAS	Distributed Antenna System
DB	Dry Bulb
DB	Design/Build
DBB	Design/Bid/Build
DBE	Design Build Entity
D&C	Design and Construction
DCV	Demand Control Ventilation
DMPA	Dock Maneuvering Paved Area
DMU	Detached Mail Unit
DOT	Department of Transportation
DPS	Delivery Point Sorting
DV	Direct Vendor
EA	Environmental Assessment
EAS	Electronic Article Surveillance
ECC	Energy Compliance Certification
eDCCS	Electronic Design and Construction Contract System
EEMS	Enterprise Energy Management System
EER	Energy Efficiency Ratio
EMT	Electric Metallic Tubing
EPA	Environmental Protection Agency
ePACS	Enterprise Physical Access Control System
eRECS	Electronic Real Estate Contract System
ER	Equipment Room (for telecommunication equipment)
EVACS	Emergency Voice/Alarm Communication System
EWT	Entering Water Temperature
FACP	Fire Alarm Control Panel
FC	Fixed Camera
FDC	Fiber Optics Distribution Center
FDS	Functional Design Specifications
FICS	Facility Investment Cost Sheet
FPC	Facility Planning Concept
FPO	Federal Preservation Officer
FRP	Fiberglass Reinforced Plastic
FRRM	Facility Risk Rating Model
FSD	Facility Survey Data
FSO	Facilities Service Office (old term)
FSS	Flat Sequencing System
FSSP	Facilities Single Source Provider
FT	Foot/Feet
FXP	Fixture Piece
GC	General Contractor
GPMC	General Purpose Mail Container
HC	Handicapped

HC	Horizontal Cross Connect
HCFC	Hydrochlorofluorocarbons
HDD	Heating Degree Days
HEBR	Hyper Electronic Badge Reader
HOA	Hand-off Automatic
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilation & Air Conditioning
IAQ	Indoor Air Quality
IAT	Inside Air Temperature
IBC	International Building Code
IDF	Intermediate Distribution Frame (old term – see HC)
IDS	Intrusion Detection System
IES	Illuminating Engineering Society
IMPC	International Mail Processing Center
IN	Inch(es)
IO	Investigative Office
I/O	Information Outlet (old term – see T/O)
IP	Internet Protocol
IPSS	Image Processing Sub-System
IPLV	Integrated Part Load Value
IRT	Integrated Retail Terminal
IS	Investigative System
ISDN	Integrated Services Digital Network
ISIP	Integrated Security & Investigative Platform
ITSC	Information Technology Service Center
JOC	Job Order Contract
JOE	Justification of Expenditure
KWH	Kilowatt Hour
LA	Lobby Assistant
LAN	Local Area Network
LCCA	Life Cycle Cost Analysis
L&DC	Logistics and Distribution Center
LEC	Local Exchange Carrier
LLV	Long Life Vehicle
LMP	Lean Mail Processing
LOMF	Laser Optimized Multimode Fiber
LPC	Label Printing Center
LPG	Liquid Propane Gas
LSM	Letter Sorting Machine
LSS	Lean Six Sigma
MAP	Module Assembly Program
MAX	Maximum
MC	Main Cross Connect
MDF	Main Distribution Frame (old term – see MC)
MDF	Medium Density Fiberboard
MDO	Manager Distribution Operations
MER	Mechanical Equipment Room
MERLIN	Mail Evaluation Readability Lookup Instrument
MHS	Material Handling System
MIN	Minimum
ML	Magnetic Lock
MLB	Materials Logistic Bulletin
MPF	Mail Processing Facilities
MPFS	Mail Processing Facilities Specifications
mPOS	Mobile Point of Sale
MR	Mailing Requirements

MTE	Mail Transport Equipment
MULTI-D/S	Multi-Directional or Multi-Sensor Camera
NCL	New Construction Leased
NCO	New Construction Owned
NDC	Network Distribution Center (formerly called BMC)
NDSS	National Directory Support System
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIST	National Institute of Standards & Technology
NLECC	National Law Enforcement Communication Center
NPDES	National Pollutant Discharge Elimination System
NPV	Net Present Value
NRCA	National Roofing Contractors Association
NRO	National Recycling Operation
OAT	Outside Air Temperature
OCR	Optical Character Reader
ODP	Ozone Depleting Potential
OIG	Office of the Inspector General
OSHA	Occupational Safety and Health Administration
OSL	Operational Systems Layout
PCI	Precast Concrete Institute
PACS	Physical Access Control System
P&DC	Processing & Distribution Center
P&DF	Processing & Distribution Facility
PIT	Powered Industrial Trucks
POAC	Postal Operations Activation Coordinator
PoE	Power over Ethernet
POE	Post Occupancy Evaluation
POE	Post Office Express
POS	Point of Service
PM	Postmaster
PMPC	Priority Mail Processing Center
PSDS	Postal Service Data System (now referred to as TACS)
PSF	Per Square Foot
PSS	Physical Security Specialist
PSTN	Postal Satellite Training Network
PTZ	Pan/Tilt/Zoom Camera
R&A	Repair and Alterations
RA	Retail Associate
RAMS	Roof Asset Management Supplier
RBCS	Remote Bar Code Sorter
RH	Relative Humidity
RITSC	Raleigh Information Technology Support Center
RRW	Retail Requirements Worksheet
SBD	Standard Building Code
SDO	Stamp Distribution Office
SDS	Safety Data Sheet (formerly MSDS, or Material Safety Data Sheet)
SEER	Seasonal Energy Efficiency Ratio
SF	Square Feet
SME	Subject Matter Expert
SNAP	Significant New Alternatives Policy (EPA's Refrigerant Program)
SPDES	State Pollutant Discharge Elimination System
SPSS	Small Package Sorting System

SPV	Single Present Value
SSA	Sales Service Associate
SSK	Self-Service Kiosk
STC	Sound Transmission Coefficient
STP	Shielded Twisted Pair
SCS	Structured Cabling System
SUQ	Start-up Questionnaire
TACS	Time and Attendance Collection System
TC	Telecommunications Closet
TE	Telecommunications Enclosure
T/O	Telecommunications Outlet
TR	Telecommunications Room
UBC	Uniform Building Code
UL	Underwriters Laboratory
UPV	Uniform Present Value
USPIS	United States Postal Inspection Service
USPS	United States Postal Service
USPS A/E	USPS Architect or Engineer Project Manager
UST	Underground Storage Tank
UTP	Unshielded Twisted Pair
VAV	Variable Air Volume
VFS	Ventilation and Filtration System
VMF	Vehicle Maintenance Facility
VOA	Vehicle Operations Assistant
VOMA	Vehicle Operations Maintenance Assistant
VPO	Village Post Office
VRAT	Vulnerability and Risk Assessment Tool
VSAT	Very Small Aperture Terminal
VSL	Vehicle Sensor Loop
VT/SC	Visible Transmittance/Shading Coefficient
WAN	Wide Area Network
WOS	Window Operations Survey
WTIL	Wait Time In Line

Standard Design Criteria

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Introduction

0-1 Policy Statement

The *Standard Design Criteria* is an integral part of the Postal Service (USPS) Building Design Standards. Together with the other Standards components – such as the Standard Detail Library, the USPS Specification, and the various standard building designs – the Standard Design Criteria conveys the necessary information to define how Postal Service facilities are to be designed and constructed.

Use the Building Design Standards on all facility-related projects by selecting the appropriate documents based on facility size and type. This policy applies equally to all design and construction-related activities regardless of size, whether new construction or repair and alteration, owned or leased. If a requirement is specified by a particular program name, i.e., Mail Processing Facility (MPF) or Customer Service Facility (CSF), the requirement is construed as applicable to any facility of that size range or operation.

0-1.1 Coordination of FedEx Boxes

The Real Estate Specialist responsible for the project must forward to the district FedEx coordinator a copy of the award letter for any construction projects that will result in the closing or moving of a facility with an existing FedEx box and all award letters for new construction projects so the district coordinators can give FedEx notice of new facility locations.

0-1.2 Coordination of Office of Inspector General (OIG) Projects

If a planned USPS project (e.g., consolidations, building sales, facility closures, and facility replacements) will displace or impact an existing OIG occupancy at the subject facility, USPS Project Managers must contact the OIG Facilities Group to determine how the OIG will be accommodated. OIG Facilities maintains their own building design standards and will work with the USPS project manager to establish space needs as may be applicable. Send an email to OIG Facilities at: oigfacilities@uspsoig.gov .

0-1.3 Coordination of International Mail Facility Projects with U.S. Customs and Border Protection (CBP)

If a USPS project includes Customs and Border Protection (CBP) space at a new International Mail Facility (IMF), or renovations to an existing IMF, the space within an IMF dedicated to CBP operations and the interface with USPS operations must comply with CBP's design standards. CBP has detailed Design Standards for IMFs, much of which is different from USPS Building Design Standards. The USPS Project Manager must request assistance from CBP in designing the proposed CBP space. The request for CBP project management support should be directed to the CBP Field Office responsible for the facility.

0-2 Codes and Standards

Various standard components have been established within the USPS Building Design Standards to address the particular needs of different facility and project types. These components are as follows:

- **Standard Design Criteria** This document acts as an umbrella and establishes the overall performance criteria for all facility types, including site adapt standard designs, alternate quarters, and repair and alteration projects.
- **Specification** This is a library of guideline specifications for each type of USPS facility (i.e., MPF, CSF, and Compact). The standard USPS Division 01 specifications are also included in a separate folder.
- **Drawing Library** – This library contains three types of CAD files:
  - Prototype Drawings: These documents provide 10 percent to 90 percent complete designs of various facility types.
  - Standard Details: These drawings form a library of Postal specific construction details for use on all facility types.
  - Blocks: These are standard blocks for use on USPS projects, including Postal-specific symbols, casework, equipment, security, and title blocks.

Together, these components establish the design standards for all postal facilities.

The Design Standards do not, however, serve as relief from full A/E responsibility for the design adequacy of the project. The A/E's responsibility includes verifying and ensuring the accuracy and completeness of this USPS data as furnished and compliance with all applicable codes, regulations, and Federal legislative requirements.

Various editions of the International Building Code (IBC) have been adopted by all 50 states within the United States. For this reason, the IBC shall be deemed as the model building code for the USPS. Where, state or local governments have amended the IBC, the current version of state and local amendments shall apply to USPS projects within that jurisdiction. All codes in force at the time of solicitation shall apply and shall be utilized consistently in conjunction with the Postal Accountability and Enhancement Act (PAEA) of 2006. Send all communication with local officials associated with PAEA via Certified Mail, and place the receipts in the project files.

0-2.1 Compliance with Building Codes and Standards

All Postal facilities must be designed in accordance with the more stringent applicable requirements of current federal, state, and local building codes and standards, including, but not limited to:

USPS Handbook RE-4

USPS Handbook RE-5

- the International Building Code,
- NFPA 101 Life Safety Code.
- OSHA General Industry Standards.

In addition to meeting Building Code Seismic requirements for foundations, structural framing, floor and roof systems for those areas susceptible to seismic activity, non-structural components shall be adequately attached to supporting structure so that seismic activity does not cause them to topple or

fall, injuring building occupants or obstructing exit paths. Such non-structural components include but are not limited to:

- Architectural features such as exterior cladding and glazing, ornamentation, ceilings, interior partitions, and stairs.
- Mechanical components and systems including air conditioning equipment, ducts, elevators, pumps, and emergency generators.
- Fire protection systems including piping and tanks.
- Plumbing systems and components including piping, fixtures, and equipment.
- Miscellaneous components including storage racks and shelving, mechanized equipment, and data racks and equipment.

Additionally, all Postal facilities must comply with all USPS Building Design Standards, including in particular:

- USPS Handbook AS-503, Standard Design Criteria
- USPS Handbook RE-4, Standards for Facility Accessibility by the Physically Handicapped. (See BDS folder G1.)
- USPS Handbook RE-5, Building and Site Security Requirements. (See BDS folder F4.) Although the requirements contained in RE-5 have now been incorporated into the Standard Design Criteria, RE-5 contains additional material that may help clarify Postal security requirements, if they are unfamiliar to the designer.

Where current federal, state, and local building codes and standards conflict with USPS Building Design Standards to the extent that they negatively impact USPS operational needs, the Building Design Standards will govern. Only NFPA and OSHA Standards will take precedence over the USPS Building Design Standards.

Exhibit 0-2.1 summarizes the occupancy classification and construction type for the primary programs covered by the USPS, MPF, and CSF Design Criteria. This summary is for the main occupancy and is for reference only and does not take into account area increases allowed for sprinkler systems and public ways; the A/E is responsible for coordination of allowable efficiencies for cost containment based on the particular design and for final compliance with the referenced and local codes and ordinances.

Exhibit 0-2.1
Code and Standards Summary

Program Space	Occupancy Classification	See Footnotes	Type of Construction and Allowance Area							
			Type I		Type II		Type III		Type V	
			A	B	A	B	A	B	A	B
Mail Processing Facilities	F-1	NS	NA	NA	NA	NA	NA	NA	NA	NA
		SI	UL	UL	100,000	62,000	76,000	NA	NA	NA
		SM	UL	UL	75,000	NA	NA	NA	NA	NA
Customer Service Facilities Medium (10,200 SF to 60,000 SF) & Carrier Annexes	F-1 (if facility has mechanized equipment)	NS	UL	UL	25,000	15,500	19,000	12,000	14,000	NA
		SI	UL	UL	100,000	62,000	76,000	48,000	56,000	34,000
		SM	UL	UL	75,000	46,500	57,000	36,000	42,000	25,500
	B (if facility does not have mechanized equipment	NS	UL	UL	37,500	23,000	28,500	19,000	18,000	9,000
		SI	UL	UL	150,000	92,000	114,000	76,000	72,000	36,000
		SI	UL	UL	112,500	69,000	85,500	57,000	54,000	27,000
Customer Service Facilities Small (1,350 SF to 11,390 SF) & Customer Service Facilities Compact (under 1,350 SF)	B	NA	NA	NA	37,500	23,000	28,500	19,000	18,000	9,000
		NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviations:

UL: Unlimited Area

NA: Not applicable

NS: No fire sprinkler system

S1: One story with fire sprinkler system

SM: Two or more stories with fire sprinkler system

Notes:

1. Refer to IBC Chapters 4 and 5 for specific exceptions to the allowable height in the chapter.
2. See IBC section 903.2 form the minimum thresholds for protection by an automatic sprinkler system..
3. Refer to IBC Table 504.3 for allowable building heights for the types of construction.
4. Refer to IBC table 504.4 for the allowable number of stories for the types of construction.
5. Refer to IBC table 506.2 for the allowable building areas allowed for the types of construction and sprinkler system.
6. NFPA requires sprinkler if 'work area' exceeds 12,000 SF.
7. NFPA requires sprinkler if overall floor area exceeds 24,000 SF.
8. Electric-powered mail processing equipment shall be considered "mechanized equipment".

0-2.2 Compliance with Energy Requirements

Design all new Postal facilities to comply with the Energy Policy Act (EPAct) of 2005, and the Energy Independence and Security Act of 2007, and in accordance with the USPS Standard Design Criteria and ASHRAE 90.1-2010. When the latter two standards are in conflict, follow the more stringent requirements, unless specifically excluded by the Standard Design Criteria. These mandates require that all new Postal facilities be designed to exceed the ASHRAE 90.1-2010 Compliant Base Case by 30 percent, or to the greatest extent practicable.

An Energy Compliance Certification (ECC) form must be submitted to the Facilities Program Management, Energy/Standards Program Manager for all new Postal facilities, and major R&A projects, at the 30% design submission, and again at project acceptance, after Commissioning has been completed. The purpose of this form is to certify that new USPS facilities, and facility projects with a significant energy impact, comply with Federal energy requirements, and that we implement the most energy efficient project solution that is life cycle cost effective over a 20 year period. Submissions should include supporting documentation, such as a Life Cycle Cost Analysis (LCCA), or as otherwise directed by the USPS Project Manager.

Document HVAC and Lighting system selections and alternatives in an LCCA. The LCCA must use the:

- Latest edition of NIST Handbook 135, Life Cycle Costing Manual for the Federal Energy Management Program.
- Current USPS economic factors. These factors can be obtained from the USPS intranet and will be provided by the USPS (USPS Memorandum titled “Decision Analysis Report Factors/Cost of Borrowing/new Facility Start-Up Costs Update”).

Forms current as of the issuance of these Building Design Standards can be found in BDS folder G2, but it is strongly recommended that the A/E confirm with the USPS Project Manager, at the start of design, that they have not been superseded.

0-2.3 Inspection Service Role

The Postal Inspection Service is solely responsible for evaluating and approving the need for security-related equipment and for security personnel [see the Administrative Support Manual (ASM) 271.4]. All security-related CCTV systems, access control systems, bullet-resistant counterlines, and burglar or duress alarms must be evaluated and approved by the Inspection Service when the design of those systems deviates from the requirements found in this document. After developing a risk analysis and/or security survey recommendations, the Inspection Service determines the need for these or other security products and services, and provides the results of the analysis, in writing, to local Postal Service management. Any deviation must be submitted in writing in accordance with the submittal process described in section 0-4. The preparer is responsible for ensuring that a copy of a recently completed risk analysis is submitted with all deviation requests involving modification to any security-related design requirements.

0-2.4 Areas of Discrepancy

In areas of discrepancy between the standard design programs, Handbook AS-503, *Standard Design Criteria,* takes precedence. In order of priority, from highest order of precedence to lowest, following this hierarchy:

- Standard Design Criteria.
- Specifications.
- Standard drawings.
- Standard details.
- Program manuals.

All such discrepancies should be brought to the attention of the Manager, Facilities Program Management to allow for correction to the design standards. Handbook RE-4, *The Standards for Facility Accessibility,* carries the force and effect of law and, as such, shall supersede in areas of discrepancy between the design standards programs and the RE-4. Similarly, requirements mandated by local codes shall be followed in the design of USPS facility design. A/Es are encouraged to submit suggestions for improvements to any of the design standards, using the A/E Feedback Form found in the Introduction Appendices. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

The current *Standard Design Criteria* includes revisions to the previous version.

0-3 Facility Types and Programs

Over the years, the Postal Service has developed several facility types and programs. The most common USPS facilities and programs associated with providing customer service and collecting, processing and distributing mail include the following:

- **Mail Processing Facilities (MPF)**, approximately 60,000 SF and larger.
- **Medium Size Post Offices (CSF Medium) and Carrier Annexes**, approximately 10,000 SF to 60,000 SF.
- **Small Size Post Offices (CSF Small)**, 1,350 SF to 10,000 SF.
- **Compact Size Post Offices (CSF Compact)**, under 1,350 SF.
- **Vehicle Maintenance Facilities** (VMF).
- **Retail Design Standards**.
- **Alternate Quarters.**
- **Repair and Alteration** (R&A).

Following is a brief description of each facility type or program and the standards components. **Throughout this document, each facility type is referred to by the standard design program associated with it (e.g., MPF, and CSF Medium).**

0-3.1 Mail Processing Facilities (MPF) *(Also refer to Module 1 and Module 2A)*

Module 1, Module 2A

MPFs provide mail processing and distribution to the local Post Office as well as other smaller distribution facilities and are usually equipped with fixed mechanization for mail processing. Major components include workroom, mailing platforms, employee facilities, support areas, Investigative System, Business Mail Entry Units, and sometimes, retail functions.

This building program includes facility operational types such as:

- AMC (Airport Mail Center).
- AMF (Airport Mail Facility).
- APPS (Automated Package Processing System).
- ASF (Auxiliary Service Facility) similar to an NDC.
- FSS (Flats Sequencing System).
- HASP (Hub and Spoke Operation).
- ISC (International Service Center).
- L&DC (Logistics and Distribution Center).
- LPC (Label Printing Center).
- MTESC (Mail Transport Equipment Service Center).
- NDC (Network Distribution Center, previously called Bulk Mail Center).
- P&DC (Processing and Distribution Center).
- P&DF (Processing and Distribution Facility).
- PMPC (Priority Mail Processing Center).

0-3.2 Medium Size Post Offices (CSF Medium) *(Also refer to Module 1 and Module 2B)*

Module 1, Module 2B

CSF Medium buildings range in size from approximately 10,000 SF to 60,000 SF and provide mail distribution and collection to and from the local community. Retail services are also provided, except in carrier annexes. Major components include the retail area with administrative support, workroom, mailing platforms, and employee support areas. Larger facilities may also include Passport Acceptance Counters and/or Business Mail Entry Units. There is also a variation of this size of facility called a “carrier annex”, without a customer-service function. The standards for these facilities are the same as CSF Medium, except for the lack of retail and PO Box lobby functions.

Standards:

- Standard Design Criteria.
- CSF Project Manager’s Manual.
- Prototype Drawings under CSF, Medium: 30 percent complete documents (e.g., floor plans, elevations, schedules, and specific details).
- Details from CSF Standard Detail Library.
- Specification sections from the CSF Specification.

0-3.3 Small Size Post Offices (CSF Small) *(Also refer to Module 1 and Module 2B)*

Module 1, Module 2B

These buildings are up to 10,000 SF and provide mail distribution and collection to and from the local community. Retail services are also provided. Major components include workroom, a small dock area, minimal support areas, and a retail lobby. There is also a variation of this size of facility called a “carrier annex”, without a customer-service function. The standards for these facilities are the same as CSF Small, except for the lack of retail and PO Box lobby functions.

Standards:

- Standard Design Criteria.
- CSF Project Manager’s Manual.
- Prototype Drawings under CSF Small: 30% complete documents for 19 prototype designs ranging from 1,500 SF to 10,000 SF (floor plans, elevations, schedules, and specific details).
- Details from CSF Standard Detail Library.
- Specification sections from CSF Specification.

In addition, a Site MAP (Module Assembly Program) has been developed as a site design layout software package that USPS Project Managers can use to facilitate the preliminary site design process. Site MAP can be also be used on medium or other projects.

0-3.4 Compact Size Post Offices (CSF Compact)

Compact Post Offices (see Exhibit 0-3.4) vary in size from 418 SF to 1,340 SF. They are typically used for small rural communities to provide mail distribution and collection to and from local communities. Retail services are also provided.

Exhibit 0-3.4
Compact Building, Eagleville, MO

0-3.4.1 Program Overview

Compact Buildings were originally fabricated in a highly controlled factory environment, according to Postal specifications. The building manufacturer transported the unit to the site, which was prepared in advance by a separate, site-installation contractor.

The units were shipped to the site virtually complete, allowing for a consistent, high-quality product in all locations, even where local contractors may not be familiar with USPS facilities standards.

The current approach to buildings of this size is that they would primarily be factory manufactured, but could also be stick built in the field, or used as the basis of design for small alternate quarters projects.

0-3.4.2 Standard Designs

There are ten standard Compact Building designs, ranging in size from approximately 418 SF to 1,340 SF.

Within the six standard plan sizes, are two basic configurations: single-wide and double-wide units. If factory manufactured:

- Single-wide units are delivered to the site and placed on the foundation by the compact building manufacturer, then secured in place by the site-installation contractor.
- Double-wide units are transported to the site in two separate pieces, then hoisted by crane onto the foundation, where the compact building manufacturer splices the two together.

In both cases, the site-installation contractor is responsible for site preparation, including foundations, sidewalks, utility connections, and completion of all exterior elements, such as entry canopy and building-mounted signage.

Complete drawings, specifications, standards, and information on possible options for the design of Compact Buildings are included in the Building Design Standards.

Standards:

- Standard Design Criteria.
- Project Manager's Manual
- Prototype Drawings – under CSF Compact: 100% complete documents for ten standard plans.
- Compact Program Specifications.

0-3.5 Vehicle Maintenance Facilities *(Also refer to Module 4D)*

Module 4D

These buildings typically serve as repair garages for USPS vehicles. Along with the expected repair and wash bays and associated support areas, these facilities include an administrative area, employee facilities, and fuel islands.

Standards:

- Standard Design Criteria.
- VMF Sample Drawings – reference as an example only. Follow Form PS-4551 for the requirements for a specific project.

0-3.6 Retail Design Standards *(Also refer to Module 2B and Module 4A)*

Module 2B, Module 4A

These facilities provide retail service to local communities. Major components include Self-Service, P.O. Boxes, and Full Service Counters. Some facilities also include Passport counters or Passport Centers. This program is typically used for alternate quarters, major repair and alteration projects, and other facilities with retail components.

Standards:

- Standard Design Criteria – Module 4A.
- Prototype Drawings – under CSF Medium Retail Modules or CSF Small.
- Details from CSF Standard Detail Library.
- Specification sections from CSF Specification.

0-3.7 Alternate Quarters (AQ)

Non-retail alternate quarters must comply with the appropriate documents and materials of the Building Design Standards, based on the size and type of the facility in question. For retail Alternate Quarters (AQs), see 0-3.6 above.

Standards:

- Standard Design Criteria – Module 3.
- Details from CSF Standard Detail Library.
- Specification sections from CSF Specification.

0-3.8 Repair and Alteration (R&A) *(Also refer to Module 3)*

Module 3

In addition to retail-related R&A as mentioned in 0-3.6, all types of repair and alteration projects (including expansions) must comply with the appropriate documents and materials of the USPS Building Design Standards. Examples of typical R&A projects include building expansion, roof repair or replacement, and addition of an Investigative System.

Standards:

- Standard Design Criteria.
- Details from Standard Detail Library.
- Specification sections from USPS Standard Specification.

0-4 Commissioning

0-4.1 Purpose

The basic purpose behind commissioning building systems for the USPS is to confirm that the functionality of new equipment and systems meets the original design intent, operates efficiently, and demonstrates that all the required features of the new system are functioning as specified in the design documents. The commissioning of some systems is required based on the type of building, project, and system. But commissioning is optional on many projects, so the degree of commissioning that will be required should be considered early in the design stage. The USPS Project Manager and the A/E should take into consideration the work to be performed, the cost of commissioning, and the impact to Postal operations should the system or

equipment fail, especially for mission critical systems. In addition, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning effort may be expanded to evaluate the feature or performance characteristic on all units, but to accomplish this the commissioning plan and process must already be in place.

For details about the requirements for commissioning mechanical systems, refer to Paragraph 4-1.3 of Modules 1, 2A, 2B, and 3.

For details about the requirements for commissioning electrical systems, refer to Paragraph 5-1.3 of Modules 1, 2A, 2B, and 3.

Modules 1, 2A, 2B, 3

In general, deciding which systems will require commissioning should be finalized with the completion of the 10% design documents. The development of the Commissioning Plan should commence no later than the 30% design and be completed and ready for review with the 95% design documentation.

The USPS Building Design Standards contains specifications sections specific to commissioning, and the appropriate sections must be used whenever a project includes formal commissioning of systems and equipment:

- 019113 - General Commissioning Requirements
- 220800 - Commissioning of Plumbing
- 230800 - Commissioning of HVAC
- 250804 - Building Automation System (BAS) Commissioning
- 260800 - Commissioning of Electrical Systems

0-4.2 Commissioning Agent Services

The USPS uses prequalified Commissioning Agent (CxA) suppliers for commissioning services. Commissioning services cannot be provided through the A/E, the Design/Build Entity (DBE), or the General Contractor (GC).

The decision to use commissioning services should occur after the completion of the 10% design documents and the scope of the Commissioning Plan is known. When choosing an IQC Commissioning Agent, try to use an agent near the project location that possess the experience and skill level that meets the scope of the Commissioning Plan.

The CxA should develop the Commissioning Plan parallel to the development of the design documentation. This can occur in two ways based on the contract type.

For Design/Bid/Build (DBB) projects the plan should be completed and ready for review with the 95% design documentation, and the A/E should have all the necessary information from the plan incorporated into construction documents.

For Design/Build (DB) projects, the CxA should develop an outline of the Commissioning Plan that the A/E must include in the solicitation documents. Once the contract is awarded, the CxA will continue to develop the Commissioning Plan parallel to the development of the design documentation by the DBE.

In either situation, the GC or DBE must be informed of the extent of the commissioning that will be required for the project prior to contract award

because the GC or DBE is also responsible for providing the required assistance from their subcontractors to complete the Commissioning Plan.

The services of the CxA extend through construction and project completion, but typically becomes more involved near the end of the construction stage. At that time the CxA is responsible for ensuring that the systems to be commissioned are properly tested and will perform in accordance with the design. The commissioning agent uses measurement and verification equipment and procedures for monitoring optimum system performance.

For details about the requirements for Mechanical Measurement and Verification (M&V), refer to Paragraph 4-1.4 of Modules 1, 2A, 2B, and 3.

Modules 1, 2A, 2B, 3

For details about the requirements for Electrical Measurement and Verification (M&V), refer to Paragraph 5-1.4 of Modules 1, 2A, 2B, and 3.

At project completion the CxA duties may include obtaining, reviewing, and approving Operation & Maintenance manuals for the systems that were commissioned.

0-5 Deviation Policy

0-5.1 Building Design Deviations

The Standard Design Criteria, in conjunction with the various other Building Design Standards programs, must be used on all building-related projects. Deviation from the use of these programs or from their specific requirements is not permitted without written authorization from the Manager, Facilities Program Management.

Requests for Deviation approval are to be prepared by the responsible USPS Project Manager, using the most recent version of the Deviation Request Form from BDS Folder B2. Completed form and all appropriate supporting documentation should be forwarded to the responsible Functional Manager from one of the Repair and Alteration or Implementation Teams for review and signature. The Functional Manager will forward the completed Deviation package to the Building Design Standards Manager for processing.

Deviation requests which impact Retail areas must include a current WOS Earned-Actual Staffing Graph, plus the Retail Requirements Worksheet (RRW). Deviation requests which impact security requirements (whether to increase or decrease security measures) must be supported by a risk assessment from the Inspection Service and a letter of support from the PSS. A copy of the recently completed risk management assessment must be submitted with all deviation requests involving impact to security related items listed in section 0-2.

Note that exterior signage deviation requests are to follow the policy in Module 4C, Exterior Signage. *(Also refer to Module 4C)*

Module 4C

0-5.2 Space Requirements and Planning Deviations

Deviation from the policies contained in the revised Handbook AS-504 (currently pending approval) is not permitted without prior approval from the Manager, Facilities Program Management.

Requests for deviation approval must provide written justification with appropriate supporting information and must be submitted during the planning phase of the proposed project.

0-5.3 Retail Planning Deviations

The Retail Requirements Worksheet is used to determine retail planning requirements such as number of Full Service Counters, cash registers, and type of product merchandising. Submit requests for deviation from the requirements generated by the Retail Requirements Worksheet to the Manager, Facilities Program Management, who will forward to the Manager, Retail Management, for review and input.

0-6 Design Review Policy

Headquarters Retail no longer has an A/E on staff to perform Design Reviews, so HQ Retail Design Reviews are no longer required.

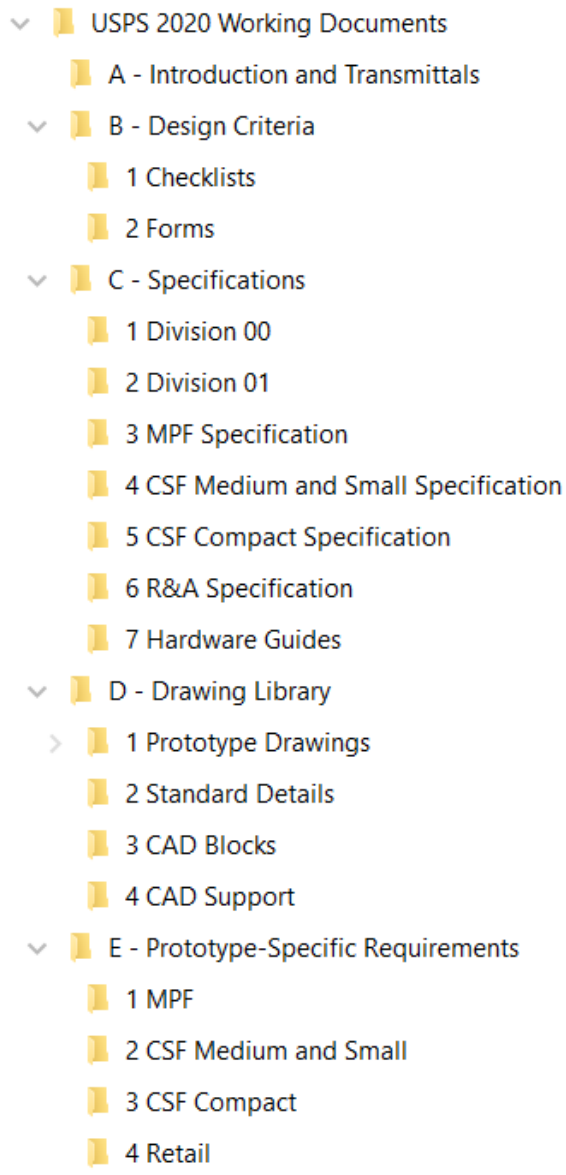
See Appendix M0-C for information about Product Line Design Review requirements.

0-7 Post Occupancy Evaluation Policy

All new space projects over 5,000 SF must undergo Facilities' Post Occupancy Evaluation (POE) process to determine how well a recently completed facility meets the needs of its end users and to identify areas for possible improvement in future facilities. The process requires completion of a standard questionnaire by the facility's Postmaster or Manager, as well as by the local District Post Office Operations Manager. The Manager of the Implementation Team responsible for constructing the facility must ensure that the POE questionnaire is completed between 4 and 6 months after the facility is occupied. The Manager must review it to make sure all comments, both positive and negative, are clear and unambiguous, and, if necessary, to obtain further clarification or more detail. If there are any comments arising from misunderstanding or from lingering contractual problems, those must be addressed. Forward completed questionnaires are to be forwarded to the Manager, Facilities Program Management, for evaluation with respect to the Building Design Standards. The goal is to improve the standards wherever possible, so as to continually improve our facilities. A copy of the POE Questionnaire, and a draft email message, can be found in the "...\B – Design Criteria\2 Forms\" folder in the Building Design Standards.

0-8 Directory Structure

Exhibit 0-7
USPS Digital File Directory Structure



- F - Other Requirements and Info
  - 1 PAEA Policy
  - 2 Handbook AS_504 Space Planning Requirements
  - 3 Handbook AS_506 Architect Engineer Project Requirements
  - 4 Handbook RE-5 Building and Site Security Requirements
  - 5 Structured Cabling Installation
  - 6 Direct Vendor
    - 1 Order Forms
    - 2 Catalogs
      - 1 Signage
      - 2 Casework
  - 7 CCTV and ePACS Documents
  - 8 Facilities Investment Cost Sheet
  - 9 Planning
  - 10 One-time Capital Equipment
    - Portable Eye Wash Specs
  - 11 USPS Environmental Safety Standards
  - 12 Handbook RE-1 USPS Facilities Guide to Real Property Acquisitions and Related Services
  - 13 Cluster Box Units
  - 14 Security Signage
- G - Special Programs
  - 1 Accessibility
    - 1 Leased Space Accessibility Program (LSAP)
    - 2 Handbook RE-4 - Standards for Facility Accessibility
  - 2 Energy and Sustainability
  - 3 Building Inspections
  - 4 Boiler-Elevator-UPV Inspections
  - 5 Historic Preservation

0-9 USPS Reference Documents

The USPS Project Manager is responsible for ensuring that the A/E has received all current and/or updated information relevant for any given project, in order to be able to develop the appropriate construction documentation package.

Reference documents such as Handbook AS-504, *Space Requirements,* AS-506, *Architect/Engineer Project Requirements,* and RE-5, *Building and Site Security Requirements,* are not updated frequently. In case of conflicts, the most current Design Criteria governs.

Following is a list of USPS documents that are either referenced or have been used as a basis for stating the requirements in the Standard Design Criteria. Documents with an asterisk are included in the indicated Folders F or G of the Building Design Standards. Other documents can be obtained from the USPS Project Manager on an as-needed basis.

NAME	ISSUE DATE (FOLDER)
USPS Handbook RE-1: Facilities Guide to Real Property Acquisitions and Related Services	October 2015 * (F12)
USPS Handbook RE-4: Standards for Facility Accessibility by the Physically Handicapped	March 2005 * (G1)
USPS Handbook RE-5: Building and Site Security Requirements	September 2009 * (F4)
USPS Handbook RE-6: The Facilities Environmental Guidebook	October 2015
USPS Handbook AS-504: Space Requirements	April 2011 * (F2)
USPS Handbook AS-506: Architect/Engineer Project Requirements	September 2010 * (F3)
USPS Handbook AS-556: Asbestos Management Guide	January 2017 * (F11)
USPS Management Instruction EL-890-2019-3: Lead Hazard Management Program	2019 * (F11)
USPS Management Instruction EL-890-2019-4: Recycling Standards for Paper, Cardboard, and Plastic for Mail Processing and Delivery Operations	2019
USPS Management Instruction EL-890-2007-5: Integrated Waste Management	2007
USPS Management Instruction EL-890-2016-3: Managing Asbestos in Postal Service Facilities	2016 * (F11)
USPS Management Instruction AS-516-2008-1: Mold Prevention, Assessment and Remediation	2008
USPS Management Instruction AS-510-2004-13: Environmental Integration in the Construction Process	2004
USPS Handbook EL-800: Managing Contractor Environmental Health and Safety Compliance	April 2017
Construction Administration and Facilities Inspection Handbook	September 2001

Appendix M0-A

Building Design Standards Feedback Form

Receiving feedback on the strengths and weaknesses of the Design Standards is essential for continuous improvement. All end users of the Standards programs, whether A/Es, contractors, District personnel, or USPS Project Managers, are encouraged to share their insights on how to make the programs even more successful. Use the Feedback Form when suggesting changes to the *Standard Design Criteria* or any of the Building Design Standards programs.

Print out the form on the following page and complete it manually or use the Microsoft Word file entitled "M0-A_Feedback_xxxx-xx-xx.doc", which can be found in the "...\B – Design Criteria\2 Forms\" folder in the Building Design Standards.

BUILDING DESIGN STANDARDS FEEDBACK FORM

Date:

USPS BUILDING DESIGN STANDARDS (BDS) MANAGER
FACILITIES PROGRAM MANAGEMENT

[Note: Alternatively, feedback may be sent directly to the BDS Manager at TDY6H0@usps.gov (the last character is a zero) in an email message, but please provide the same information as requested below.]

LOCATION WITHIN DOCUMENT: (Be as specific as possible; identify the document, Module No., Chapter No., Page No., Section No., Plan No., Drawing No., Detail No., etc.)

PROBLEM OR CONCERN:

PROPOSED SOLUTION:

Name of Reviewer: _____

Telephone Number: _____

Appendix M0-B

Building Design Deviation Request Form

Submit requests for deviation from USPS Building Design Standards in accordance with the procedures outlined in Section 0-4 Deviation Policy.

Printout the form on the following page and complete it manually or use the Microsoft Word file entitled "M0-B_Deviation Request_xxxx-xx-xx.doc", which can be found in the "...\B – Design Criteria\2 Forms\" folder in the Building Design Standards.

UNITED STATES POSTAL SERVICE
Facilities Headquarters

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INSTRUCTIONS

- *All text in red must be edited or replaced with the appropriate information and changed to black.*
- *Any remaining red text, including any instructions, must be deleted before submission.*
- *Before obtaining any signatures, submit a draft of this Word document to USPS Building Design Standards Manager.*
- *Deviations must be signed by the appropriate Product Line Manager.*

****

REQUEST FOR DEVIATION

Month Day, Year

Project Location: Facility Name
Address, City, State Zip (Finance/Sublocation Number)
Project Number: eFMS Project number or FSSP Problem number
Project Manager: Name Phone Number: (000) 000-0000

DEVIATION FROM:
Check all that apply

- ☐ CSF Specification
- ☐ CSF Design Criteria
- ☐ Compact Building Program
- ☐ BMEU
- ☐ Handbook AS-504
- ☐ Exterior Signage
- ☐ MPF Specifications
- ☐ MPF Design Criteria
- ☐ Standard Detail Library
- ☐ Other: _____

BACKGROUND:
Briefly describe the type and size of the facility.
Explain the goal of the project.

JUSTIFICATION:
Explain the issue, difficulty, or hardship that makes the deviation necessary; e.g. “because of that we need to do this…”

SUMMARY:
State the specific document and requirement the deviation is requested for; e.g. “therefore, a deviation from Handbook AS-503, Module1, Paragraph 1-1.1 is requested to do this instead…”

SUBMITTED BY:

_____ Date: _____
Manager, Facilities R&A East/West/Implementation

Attachments:
Attachment 1 Title & Date, Attachment 2 Title & Date, Attachment 3 Title & Date
Insert list of supporting documentation, including but not limited to: PS919 or FPC, floor plan, site plan, etc. All requests having to do with retail space must include a copy of the Retail Requirements Worksheet (RRW) and WOS Earned-Actual Staffing Graph All requests having to do with security or investigative requirements must have supporting documentation from the US Postal Inspection Service and/or the Office of the Inspector General.

Approval Signature: ☐ Approved ☐ Approved as Noted ☐ Denied

_____ Date: _____
Manager, Facilities Program Management

Comments:

_____

_____

Concurrence Signatures

Not all of these signatures will be required. The USPS Building Design Standards Manager will provide assistance in determining which will be needed. All requests having to do with security or investigative requirements must have concurrence from the US Postal Inspection Service and/or the Office of the Inspector General.

_____ Date: _____
US Postal Inspection Service

_____ Date: _____
Office of the Inspector General

_____ Date: _____
Facilities Planning

_____ Date: _____
USPS Federal Preservation Officer

_____ Date: _____
USPS Office of Sustainability

_____ Date: _____
Government Relations

_____ Date: _____
Retail Management

_____ Date: _____
Delivery & Post Office Operations

_____ Date: _____
Safety

_____ Date: _____
Information Technology

Appendix M0-C

Product Line Design Review Requirements

Submit project designs to Facilities Program Management for review and approval prior to proceeding with approval of the A/E firm's 30% design submission.

Printout the form on the following page and complete it manually or use the Microsoft Word file entitled "M0-C_Design Review_xxxx-xx-xx.doc", which can be found in the "...\B – Design Criteria\2 Forms\" folder in the Building Design Standards.

30% PRODUCT LINE DESIGN REVIEW REQUIREMENTS

Product Line Design Reviews are required for

- All R&A projects estimated at over $1M
- All CSF new space projects over 5,000 Square Feet
- All MPF new space projects and expansions

The purpose is to ensure compliance with applicable standards, and incorporation of cost reduction initiatives and Energy Program requirements. The Product Line Team Leaders will be responsible for the Design Reviews for their respective groups and must ensure the product line design review requirements are adhered to. It is expected that any **required** Design Deviations will have been submitted and approved **prior** to completing 30% design. The Team Leader must confirm that approved Deviations are on file prior to completing the review. **Complete Product Line Design Review packages shall be uploaded to the Facilities Program Management network drive prior to CIC or Peer Review.**

For R&A projects, the 30% Product Line Design Review Letter signed by the Team Leader shall be included with the CIC or Peer Review submittal.

For Implementation projects, the 30% Product Line Design Review Letter signed by the Team Leader and the Manager, Facilities Implementation shall be included with the CIC or Peer Review submittal.

Upload files to Facilities Program Management at the following network drive location:

\\Wadchqsxf12\shr_hq_hq_coo\Facilities\Program Mgmt\30% Product Line Review Submissions

Access to the drive can be obtained through eAccess.

The following steps should be followed when uploading Product Line Design Review packages:

1. Create a Project Folder under the appropriate Area Folder and upload the documents
2. Send an email indicating that files have been uploaded for review, to both the Program Manager Energy and the Program Manager Building Design Standards.

Facilities Program Management will perform a cursory review of the submitted documents, looking at consistency in application of the Building Design Standards to ensure all documents are fully developed. Design Review submittals should be limited to only those items that are appropriate to the particular project.

Energy impacting projects must include an ECC-S (or ECC-EZ) package and associated backup documentation, plus a Life Cycle Cost Analysis (LCCA). Energy Team review will pay particular attention to these forms, to make sure they are fully developed.

Roofing projects must include the Investigative Report.

Other items that may be submitted, as applicable, include:

- Complete project scope
- Site plans
- Floor plans (floor layout with equipment/casework)
- Reflected ceiling plans with lighting/HVAC layout
- FFDAR, if completed
- Roof plan
- Interior and Exterior Elevations, including signage/graphics
- Interior and exterior photometrics
- Finish and equipment schedules
- Wiring and controls schematics
- Photographs of surrounding area (if relevant due to exterior design considerations)
- 30% Product Line Design Review Letter (see attached template)
- Approved Design Deviations

Facilities Program Management will provide any pertinent comments to the Project Manager, Team Leader and Sponsoring Product Line prior to CIC or Peer Review Meeting.

UNITED STATES POSTAL SERVICE

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INSTRUCTIONS

- *Use this form for both R&A and Implementation projects*
- *All text in red must be edited or replaced with the appropriate information and changed to black.*
- *Any remaining red text, including any instructions, must be deleted before submission.*
- *The form must be signed by the appropriate Team Leader.*

****

30% PROJECT DESIGN REVIEW REQUEST

Month Day, Year
Project Location: Facility Name
Address, City, State Zip (Finance/Sublocation Number)
Project Number: eFMS Project number or FSSP Problem number
Project Manager: Name Phone Number: (000) 000-0000

PROJECT DESCRIPTION:
Briefly describe the type and size of the facility.
Explain the goal of the project.

The 30% drawings, specifications, ECC-S (if applicable), and LCCA for the subject project have been reviewed for compliance with USPS Building Design Standards, and all deficiencies have either been corrected or Design Deviation Requests for non-compliant items have been submitted and approved.

_____ Date: _____
Team Leader Name, R&A East/West/Implementation

Attachments: Copies of all approved Deviation Requests

Module 1 - General Criteria

Chapter 1 Civil

Chapter 2 Architectural

Chapter 3 Structural

Chapter 4 Mechanical

Chapter 5 Electrical

Appendices

Appendix M1-A Boundary and Topographic Site Survey
Appendix M1-B Specifications for Subsurface Exploration
Appendix M1-C ASHRAE Climate Zone Map
Appendix M1-D USPS Interior Finishes and Colors
Appendix M1-E ASHRAE 90.1 HVAC Minimum Efficiency Requirements
Appendix M1-F Building and Site Security by Type of Facility and Square Footage

Module 1 - General Criteria

Chapter 1 - Civil

1-1 Site Information

1-1.1 Site Survey
1-1.2 Subsurface Investigation
1-1.3 Environmental Assessment
1-1.4 Codes and Standards

1-2 Site Design

1-2.1 Utilities
1-2.2 Stormwater Management
1-2.3 Sediment and Erosion Control
1-2.4 Parking and Drives
1-2.5 Stairs, Ramps, Walks and Retaining Walls
1-2.6 Landscaping
1-2.7 Security Fencing
1-2.8 Not Used
1-2.9 Construction Waste Disposition/Recycling
1-2.10 Safety
1-2.11 Off-Site Improvements
1-2.12 Guardhouses

Civil Design Checklists

Chapter 1 - Civil

1-1 Site Information

1-1.1 Site Survey

USPS-furnished topographical data, location of available utilities, wetlands (if applicable), boundary survey and any other existing conditions information shall be verified by the Architect/Engineer of Record (A/E) prior to completion of final design documents for possible changed conditions, and confirmation that permanent corner monuments are in place for use by the contractor. On a given project, the USPS may or may not provide survey data for the A/E's use. In either case, the A/E is responsible for obtaining any additional survey data necessary to complete the design. The A/E assumes full responsibility for the accuracy of data furnished if the data is used as a basis for professional judgments or incorporated into the construction documents. A copy of the most current boundary and topographic survey shall be included in the construction documents. The final survey shall identify the extent and location of all existing site features (e.g. buildings, structures, easements, foundations, wells, underground tanks, and utilities). See Appendix M1-B for specific requirements.

The A/E is responsible for the preparation, review, and coordination of a Surface Investigation showing locations, genus and species of all isolated trees in excess of 4 inch caliper, and/or any other landscape features typical of the region. The Surface Investigation will be utilized together with the Subsurface Investigation and the Environmental Assessment (EA) in order to determine the areas of the site with the most potential for development of all the program elements. The A/E must retain as many of the existing landscape features in the final site design as possible.

1-1.2 Subsurface Investigation

Any preliminary geotechnical investigation data developed during the site selection process will be furnished to the A/E by USPS. The A/E assumes full responsibility for the accuracy of data furnished if the data is used as a basis for professional judgments or incorporated into the construction documents. The A/E is to arrange for a full geotechnical subsurface investigation if such service is needed for the project and include its findings in the solicitation package. This information shall be considered when locating proposed site improvements as well as provide the basis for the design of paving, building foundations and the selection of proposed plant materials. The selection of a geotechnical consultant shall be subject to USPS approval.

The A/E is responsible for verifying that the final design takes into consideration the recommendations contained in the final geotechnical report. A copy of the report shall be included in the construction documents.

1-1.3 Environmental Assessment *(Also refer to USPS Handbook RE-6)*

USPS Handbook RE-6

A copy of the (EA) and/or any other environmental reports, including those recommending mitigation for the site will be furnished to the A/E by USPS before the design phase. The A/E is responsible for verifying and coordinating information from the EA and/or other reports into each project design.

The A/E shall give special consideration to mitigation measures which impact design and construction activities, including projection of costs associated with mitigation. While there are standard mitigation measures (e.g. controlling erosion and sedimentation; preventing excess noise and air pollution during normal business hours; and maintaining construction vehicles and equipment), give special attention to all case-specific mitigation measures indicated in the report.

The A/E is responsible for delineating the full extent of any wetlands on the project site, if applicable.

1-1.4 Codes and Standards

1-1.4.1 Easements, Zoning, and Covenants

The A/E shall identify all on-site and off-site easements, zoning restrictions and/or property covenants which affect the design or future use of the site. Those which are determined to impact the design shall be immediately brought to the attention of the Contracting Officer and confirmed in writing.

1-1.4.2 National/State Pollutant Discharge Elimination Systems (N/SPDES)

Construction shall be performed in accordance with 40 CFR 122-124. Under this regulation, an NPDES or SPDES permit is required for construction disturbing one (1) or more acres (considered an “industrial” activity). Most states have been delegated the authority to administer these permits.

1-1.4.3 Materials, Testing, and Construction

All materials, testing, and construction specifications must meet the requirements of the Standard Specifications for Road and Structures issued by the Department of Transportation (or equivalent) in the state where the project is located.

1-2 Site Design *(Also refer to Module 2A)*

Module 2A

Existing or proposed development by local authorities, community planning agencies, and transportation departments for areas in the project vicinity shall be reviewed and considered for impact with regard to each facility site design. The A/E shall evaluate and recommend to USPS the benefit or detriment associated with accommodating these plans and incorporate their determinations into a functional and cost effective site design.

G1-2-0a→4c2

Guardhouses may be provided only if a deviation request has been approved. Construction of guardhouses must be in conformance with RE-5.

Replacement of existing guardhouses does not require a deviation request.

A/E to follow the more stringent requirements of RE-6, 3-3.2.8 or local code for Buildings Construction with floor elevations in 100 year flood plains.

When the facility is located in a climatic zone that requires snow removal, an area for snow storage must be provided.

The orientation of the building must consider local climatic conditions, including prevailing winds, snowdrift at docks and natural light. Where possible, in cold climates orient the building so that the loading docks are not facing the direction of prevailing winds.

For Customer Service Facilities (CSF) Small and CSF Medium use the following criteria as the basis for the overall design: Two (2) separate and distinct means of access to the site: one for truck and employee traffic; and the other for visitors and retail customers are preferred.

1-2.1 Utilities

The A/E shall confirm that availability of all utilities required for a complete and usable facility (including gas, water, electric, sanitary sewer, and stormwater). The A/E will furnish copies of “will serve” letters from applicable agencies and/or utility companies furnished to USPS as soon as the A/E receives them.

Existing utility services must be shown on a plot drawing and include sizes, elevations, pressures, capacities, test reports, etc., as applicable.

1-2.2 Stormwater Management

Drainage techniques must satisfy the local stormwater management regulations for quality and quantity control, and local rainfall intensity duration data must be used for design computations. Techniques must also satisfy federal and state requirements, including the Energy Independence and Security Act of 2007. All calculations and permit applications must be consistent with the Postal Accountability and Enhancement Act of 2006.

Use existing natural drainage patterns wherever possible, and where feasible, use vegetation to filter storm water for metals and nutrients with methods such as basins with wetlands species, channeling flow through grass swales, or directing storm water through vegetated buffer strips. Use Best Management Practices (BMPs) for all stormwater runoff quality controls.

Underground storm lines must be an outlet on site where practical. However, separate sanitary and storm sewer lines within the site boundary even if the local jurisdiction will allow them to be combined. For co-located facilities (e.g., VMF and MPF), do not commingle storm sewer lines or discharge flows from VMF drainage areas with those of the co-located facility. Use surface drainage techniques wherever practical, however in cold climate regions, do not allow water to drain across paved areas. Water accumulation can form icy patches in freezing weather on parking lots, sidewalks, and other paved areas (see 1-2.4.1 for paved area slope requirements). Sheetflow from grassed areas is not permitted to flow across pavements. Finish grading immediately outside buildings must be below finished floor elevation. Do not locate storm drain inlets within driving lanes or concrete aprons. Provide oil-water separators and similar pollution control systems where required by authorities having jurisdiction, or in areas prone to hazardous materials release (e.g., dock drains).

Stormwater drainage must be a combination of sheet flow into swales and drain inlets to a piped conduit system connecting to the detention/retention

stormwater facilities. When feasible and cost effective, use open channels in lieu of trench drains to transport parking lot stormwater run-off. Consolidate mass stormwater detention/retention facilities in one location wherever possible. No standing water within the site is permitted at facilities in close proximity to an airport.

1-2.3 Sediment and Erosion Control

Develop a sediment and erosion plan in accordance with local, state, and federal laws. At a minimum, include the following in the plan requirements for all projects:

- Minimizing amount and duration of soil exposure.
- Sequencing construction.
- Preventing eroded sediment from entering water bodies or other habitats.

Incorporate organic means of erosion control wherever possible, such as the use of plant root mats in final site design.

1-2.4 Parking and Drives *(Also refer to Module 2A)*

Module 2A

Treat storm water runoff from all paved areas for pollutants in accordance with the requirements of the local storm water management regulations. If practical, allow storm water runoff to flow across vegetated areas to treat storm water for pollutants. Provide parking islands only when required by local ordinance.

- Vehicle parking requirements are as designated in the planning documents.

Design parking to maximize free circulation without dead-ends.

Locate handicap accessible employee parking spaces as close as possible to the employee entrance.

For all new construction, handicap accessible parking spaces must meet all local code requirements and at the very least meet the criteria listed in Exhibit 1-2a for alteration and expansion projects. If local codes are more stringent than Exhibit 1-2a criteria, then the A/E is to review all details with contracting officer.

Design layout of customer parking and driveways to minimize danger from run-away vehicles. Use bollards, landscape areas, and curbs as required to lessen accident occurrences, particularly in accessible parking areas. Include Standard Detail G1-2-4h for signage and protection at accessible customer parking areas, and at accessible employee parking areas as appropriate.

The minimum size of parking spaces (excluding driveways) and turning radii for some of the postal vehicles is contained in Exhibit 1-2a. For vehicle space requirements at docks refer to the standard plans.

Exhibit 1-2a

Typical Postal Vehicle Parking Requirements[1]

VEHICLE	LENGTH	WHEEL BASE	TURNING CIRCLE (curb to curb)	PARKING	Aisle Width (with parking perpendicular)
Trailer 	40' 48' 53'	N/A N/A N/A	(w/ tractor) 87' 91' 93'	(w/o tractor) 12'x45' 12'x53' 12'x58'	50' 50' 50'
Tractor 	17' to 22'	9' to 13'	40' to 50'	10'x24'	24
7, 11-Ton Cargo Van 	28'-10" 34'-10"	17'-7" 19'-8"	55 62	12'x30' 12'x35'	30' 30
1, 2, 2.5-Ton A1 	18'-9" 21'-4" 23'-4"	10'-7" 11'-6" 13'-2"	45' 50' 52'	10'x24' 10'x24' 10'x24'	30' 30' 30'
ProMaster Delivery Van 	17'-9"	11'-4"	41'	10'x20'	24'
Long Life Vehicle (LLV) 	14-8"	8'-5"	40'	10'x20'	24'
Minivan 	16'-8"	10'-0"	38'	10'x20'	24'
Standard Cars	>15'-4"	>9'-1"	Varies	9'x18'	24'
Compact Cars	≤15'-4"	≤9'-1"	Varies	8'x16'	24'
Car (HC) Accessible[1]	Parking: 14'x18' including 5'-6" side access aisle				24'
Van (HC) Accessible[1]	Parking: 17"x18' including 5'-6" or 8'-6" side access aisle				24'

Notes:

1. Verify local and state requirements and comply with most stringent applicable requirement. Postal property is subject to the Architectural Barriers Act of 1968, as implemented in Handbook RE-4, Standards for Facility Accessibility by the Physically Handicapped. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

2. To facilitate trailer inspections, 5-feet has been added to the trailer lengths to determine the length of parking spaces.

1-2.4.1 Paving

Each facility must be designed for the minimum amount of impervious surface area possible. Consider use of open concrete pavers on a case specific basis to further reduce impervious area. Pervious paving must be used for large parking areas designated for “vehicles awaiting sale” and for emergency access where local codes permit.

Provide rigid concrete paving for the full width of the mailing platform, dock aprons, and at trash and recycling dumpster(s)/compactor(s). Provide 10 foot wide concrete strips for trailer parking stalls. For all other paved areas, perform a Life-Cycle Cost Analysis (LCCA) analysis to determine the most cost-effective solution. The analysis must compare rigid concrete to flexible asphalt pavement for a 20-year period.

A 70-foot deep concrete dock apron (measured from face of dock) is required at any docks subject to use by tractor trailers. A 30-foot deep concrete dock apron is required for docks where tractor-trailers will not be used. For dock aprons at CSF, heavy duty asphalt may be used in lieu of concrete if justified by a cost-benefit analysis. For all new construction slope the dock apron away from the building at 1% for the full distance (Refer to Exhibit 2-3a in Chapter 2 Architectural).

Exhibit 2-3a

The truck maneuvering area must be sized appropriately for the trucks expected to use the facility. For MPFs and larger CSFs, tractor trailers require a minimum pavement width of 150 feet from the face of the dock to the back of the truck maneuvering area. For smaller CSFs, smaller trucks require less maneuvering area. Confirm requirements for smaller vehicles with the local Transportation Manager.

Reinforce concrete pavement with minimum 6x6 W2.9xW2.9 welded wire fabric or polypropylene fibers. Space expansion joints a maximum of 60 foot on center, contraction joints 24 times slab thickness but no more than a maximum of 15 feet on center. Jointing details shall be as specified in the “Standard Details for Road and Bridge Construction” in the state where the project is located. Shear transfer shall be provided across all joints in rigid pavement. Seal all pavement joints in accordance with state Department of Transportation (DOT) or local regulations, whichever is more stringent. Where state or local requirements are not available, the minimum requirements for sealing pavement joints shall be as stated in AASHTO, Section 1. Base rigid pavement design on a 20-year life span. Unless thicker pavement is required by the geotechnical report, the minimum slab thickness for rigid pavement subject to truck traffic is 6 inches.

All other pavement subject to vehicular traffic may be flexible pavement unless otherwise noted. Rigid pavement may be substituted for flexible pavement where first cost of rigid pavement does not exceed first cost of flexible pavement. Design flexible bituminous pavement to support AASHTO HS-20 loading in accordance with the latest edition of the AASHTO Guide for Design of Pavement Structures and/or state DOT specifications, whichever is more stringent. Base design on 10-year projection of traffic volumes plus 25%. Minimum flexible pavement thickness shall be as per AASHTO or the recommendation of the geotechnical report (where applicable) with the most stringent requirement taking precedence.

Required minimum depth of paved area, from the face of the mail platform to the back of the truck maneuvering area, is dependent upon the size of the vehicles. The design of the truck maneuvering area must be based on the requirements of the trucks expected to use the facility. These trucks may be

non-USPS owned vehicles, which are larger and require more space than USPS vehicles. Verify vehicle size requirements with the USPS Contracting Officer before proceeding with site design.

Design pavement slopes to provide adequate drainage and in accordance with the table in Exhibit 1-2b below.

Exhibit 1-2b
Pavement Slopes

Area	Minimum Slope		Maximum Slope	
	Centerline	Crown or Cross Slope	Centerline	Crown or Cross Slope
Driveways:				
Without curb	1.0%	2.0%	5.5% [1]	2.0%
With curb	2.0% [1]	2.0%	5.5% [1]	2.0%
Sidewalks:				
Walks	0.5%	0.5%	5%[2]	1.0%
Landings	------	0.5%	------	2.0%
Plazas	------	2.0%	------	3.0%
Parking & Maneuvering	2.0%	------	4.0%	------

G1-2-4f-f1

Keyed Notes:

1. Centerline slope of driveways in areas where vehicles may be at a complete stop (gates, queuing areas, stop signs, etc.) shall be 2% for the full length of the vehicle.
2. See Handbook RE-4 for ramps exceeding 5% slope *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

If snorkel/mail drop-off lane(s) are required, locate them in flat areas to prevent vehicle accidents or slipping during inclement weather. Design snorkel/mail drop-off lane(s) to permit the driver to drop off the mail from the vehicle.

Design all paving and similar work to avoid differential settlement and control cracking due to shrinkage and other causes.

1-2.4.2 Curbs and Curb Cuts *(Also refer to USPS Handbook RE-4)*

Use straight concrete curb construction, except for CSF Small facilities. CSF Small facilities must be designed without the need for curbs unless required by local authorities. Curbs are to be reinforced unless joints align. Use curb and gutter only with an approved deviation. Curbs must not be higher than 6 in. above paved areas. Curbs supporting handrails must have chamfered tops.

USPS Handbook RE-4

G1-2-4e

Provide ramps or depressed curbs to facilitate moving lawn care equipment in/out of landscaped areas and Building and Grounds storage areas.

Avoid using wheel stops. Avoid using landscape islands with raised curbs where they can interfere with snow plowing.

1-2.4.3 Site Signage and Pavement Markings
(Also refer to USPS Handbook RE-4)

USPS Handbook RE-4

Provide traffic signs for control of all vehicles entering and exiting the site. Standard DOT traffic control signs are to be used for Stop, Yield, No Left Turn, One Way, etc. The project architect specifies the signs, and the local general contractor installs the signs. Locate painted arrows on paving to clearly identify ingress, egress, and circulation patterns. Stripe all parking spaces, including truck spaces.

Extend reflective paint stripes at dock and platform locations 50 ft. from the face of a high dock (over 2 ft. 6 in. high) and 30 ft. from the face of a low dock (2 ft. 6 in. or less). The stripe on the driver's side extends up the building face to the bottom edge of the door seal. All pavement markings must comply with Federal Specifications (FS TT-P-1952), Waterborne Traffic and Airfield Marking Paint. Paint retaining walls (or warped pavements) and highway guard rails between high and low dock aprons a safety reflective yellow.

Vehicles entering USPS property are subject to inspection by Postal Inspection Service (USPIS) as per CFR Title 39. Post a sign at gated employee parking entrances and truck entrances; see the signage catalog.

1-2.5 Stairs, Ramps, Walks, and Retaining Walls *(Also refer to Module 2A and USPS Handbook RE-4)*

USPS Handbook RE-4

Module 2A

Provide a slip-resistant surface on all stairs, ramps, and sidewalks. Provide accessible concrete sidewalk with curb ramps, connecting neighboring pedestrian walks to the designated building entrance. If snorkel lane drop boxes are required, provide a concrete pad for drop boxes connected by accessible concrete walks to the designated building entrance.

Provide guardrails at drops greater than 7 inches. At a site specific location, exceptions may be obtained from the responsible Facilities Team Manager. Comply with the most stringent provisions of applicable codes and standards for guardrails. If there is a change in the elevation of a walking surface, especially if the change is not obvious, consider painting the surface transition with a safety yellow stripe.

Retaining walls must be used only where essential to accommodate site grading requirements. Construct retaining walls with reinforced concrete. Other materials may be used with an approved deviation. Walls or warped pavements used to separate the grade difference between low and high dock aprons must be provided with properly designed highway type guard rails. Where warped pavement is used, provide guard rails on the high and low side. Minimize the length of walls by warping paving and adjusting grades where it is practical and safe.

1-2.6 Landscaping *(Also refer to Module 2A and USPS Handbook RE-5)*

USPS Handbook RE-5

Module 2A

Landscape design should reflect the existing site topography and may include terracing or other design features to integrate site conditions into built features. An environment that attracts and protects pollinators should be incorporated into the landscape design.

Use building orientation and landscaping to facilitate energy conservation to the greatest extent possible (e.g. natural cooling with shade trees; cooling of west-facing glass with evergreen trees and shrubs; wind protection with evergreen trees). For new construction, an orientation not optimized for

energy use is only allowed in cases where the geometry/topography of the lot precludes it. In all cases the A/E must document how building orientation was optimized and which, if any constraints exist that inhibited building orientation optimizations.

In the areas of the main entrance, low (36 inches maximum) planting is acceptable. Set trees back a minimum of 10 feet to center line of trunk from building face so as not block exterior camera views; depending on the growth pattern of the trees, this distance may need to be increased to 20 feet or more. Flowering plants that attract stinging pollinators should be kept a minimum of 15' from the main entrance.

Provide low-maintenance landscaping materials, indigenous to the locale, preferably with no irrigation requirements (known as Xeriscaping) and keep large expanses of grass and lawn areas to a minimum. The total area of irrigated grass/lawn can be no more than the minimum required to meet other design criteria requirements. Where possible in lieu of conventional sod use an eco-lawn blend or low growing groundcover species that will require less mowing, irrigation, and pesticide applications. As an added benefit, it will help shelter pollinators. Some types of eco-lawns will have flowers pollinators can feed from. Justification for any irrigation must be presented and approved by USPS project manager.

Provide irrigation systems only where required by local regulations. Required irrigation systems must be water-conserving drip type, except at lawns, ground cover and seasonal planting areas where drip type systems are impractical.

Preserve and protect existing vegetation and topsoil as much as possible during construction and use erosion control devices. Recognize habitat and pollinators on site and try to maintain existing habitat where possible. The A/E must comply with local regulations, including minimum landscaping requirements.

1-2.6.1 Soil Improvement

Analyze soils to determine the need for soil improvements to support indigenous plants, particularly where the site has already been filled. Improvements may include:

- Adding organic matter to enhance plant growth.
- Minimizing the use of chemical fertilizers. If fertilizer is needed, use a granular form, this will least affect pollinator populations.
- Adding inorganic materials (sand, gypsum, etc.) to improve workability and drainage capacity of soils.

1-2.6.2 Plant Selection

Use plant materials that are ornamental and tolerant of the site's existing soils and climate. Indigenous plants that do not require supplemental irrigation or excessive fertilization once established must be used to the extent possible. Plant selection should be chosen for a range of pollinator friendly plants preferably native species blooming at different times. Allow for a variety of flower types and colors to provide food sources for pollinators throughout the seasons. Also, include plants that provide shelter for pollinators and caterpillar host plants. Arrange flowering plants in groups for pollinator efficiency.

Limit the installation of planting materials and landscaping to public areas and the main street façade of the facility. Install only grass, groundcovers, mulches, stones and wood chips in all non-public areas.

The branching habit of all plants must be full form, free from disfigurements and conforming to the *American Standard for Nursery Stock* as published by the American Association of Nurserymen (ANSI Z60.1-1986, or later revision).

1-2.6.3 Mulches

Use mulches in appropriate areas to reduce weed growth, evaporation and erosion. Use organic mulches for erosion control and plant material establishment. Examples include: hydraulic mulch products with 100 percent post-consumer paper content and yard trimming composts and wood mulch from a properly permitted recycler of stump/tree parts. Inorganic mulches shall be used in unplanted areas (e.g. pea gravel or crushed granite). Use natural and organic mulches free of chemical treatments for ground nesting pollinators.

In the vicinity of outdoor break areas, avoid the use of organic mulches. Utilize inorganic mulches, such as pea gravel or crushed granite.

At feature landscape areas, provide non-woven polypropylene landscape fabric underneath mulches to control weed growth.

1-2.6.4 Sound and Visual Barriers

For sites located in noise sensitive areas (e.g. private residences, schools and religious buildings) design should minimize impacts for noise created by facility operations. Recommended abatement techniques include earth berms, barrier walls constructed of concrete or masonry with no openings, and buffer areas to increase distance from source to receiving sensitive areas. Coordinate requirements with local authorities.

Berms at the perimeter of the property are also acceptable as visual screening if necessary to mitigate aesthetic issues, or to meet local ordinances.

1-2.6.5 Landscaping at Signs

See Module 4C, Exterior Signage, for landscaping at signs. *(Also refer to Module 4C)*

Module 4C

1-2.6.6 Pollinators

Recognize habitat and native pollinators already on site. Pollinators include, bees, butterflies, moths, flies, beetles, bats, and birds.

Adapt current maintenance practices to avoid doing undue harm to pollinators already present.

Enhance, restore, and recreate habitat.

1-2.6.7 Maintenance for Pollinators

Reduce or eliminate pesticide and insecticide use, especially a class of insecticides called “neonicotinoids”. Accept some plant damage on plants meant to be habitat for moth and butterfly larvae. If pesticides and/or insecticides are needed use a granular form that will least impact pollinator communities. Application of pesticides should be when pollinators are inactive, such as, at night or during season where flowers are not present.

Utilize Integrated Pest Management (IPM) practices to address pest concerns.

Reduce frequency of mowing and/or raise cutting blade eight to allow for taller grass to support pollinators. Some non-invasive weeds can provide food and shelter for pollinators and are beneficial. Consider not removing these, but remove all noxious, highly invasive weeds.

1-2.7 Security Fencing *(Also refer to Module 2A and USPS Handbook RE-5)*

Module 2A

USPS Handbook RE-5

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Perimeter fencing is required for all facilities over 10,000 square feet, to separate public accessible areas i.e., customer/visitor parking, bulk mail entry unit (BMEU) from restricted USPS areas, unless directed otherwise by USPS. A deviation is required to install fencing if the facility is under 10,000 square feet. Provide 6-foot high chain link fencing with gate access as required.

A deviation is also needed for the following circumstances:

- Fencing over 6 feet in height and supported by an approved risk analysis.
- Use of barbed wire and supported by an approved risk analysis,
- Fence around employee parking when supported by an approved risk analysis,
- If opposed by citizens, a deviation request must be approved, including concurrence from the inspection services, before an agreement is made that modifies or eliminates the fencing.
- If local law or ordinance prohibits or modifies fencing, a deviation request must be approved, including concurrence from the inspection service, before an agreement is made that modifies or eliminates the fencing.

Installations may reduce the linear run of fence by shortcutting across USPS property, provided all stormwater management areas or other areas undesirable for public access are still contained within the fence line. Provide 6-foot high chain link fencing with 10-foot wide double swing gate around stormwater detention/retention areas over 4-foot deep. At Postal Inspector's entrance, the fence line shall not prevent the inspector's access to the building from the public side.

"No Trespassing" signs must be posted 5 feet above the ground, on or adjacent to, vehicle gates for best visibility from vehicles, and at 100-foot intervals on the fence. A "Subject to Inspection" sign must also be posted on, or adjacent to, vehicle gates. See USPS Direct Vendor Sign Catalog on the DVD for fence regulatory sign. For large sites with remaining undeveloped property, provide fencing around developed areas (buildings, postal operations, parking areas, etc.) only. If the entire site is not fenced, the perimeter of the unfenced portion must be posted with "No Trespassing" signs at 100-foot intervals.

The chain link must be 9-gauge minimum; provide vinyl coating if directed by the USPS Project Manager. For support, provide a tension wire along top of chain link, with a brace rail at base only. Gate installations may receive brace rails at both the top and base of gate. Gates shall be designed such that no object 4 inches or larger in height can pass underneath. Vehicle gates may be swinging, sliding, or a combination of the two. They should be sized to

accommodate the largest vehicles that are expected to use the entrance. Local topography and drive configuration may also impact gate size. To ensure proper clearance beneath the gates, the curb may need to be notched or a speed bump (hump) needs to be installed under the gate. Verify ground conditions at all points. Allow the fence to terminate on firm, compacted, non-shifting soil or on a paved surface.

1-2.8 Not Used

1-2.9 Construction Waste Disposition/Recycling

Where practical, recycle construction wastes to the greatest extent possible, including the material generated during clearing of the site, demolition of existing structures, and all other construction activities. Firms and facilities used for recycling and disposal must be appropriately permitted for the intended use, to the extent required by federal, state, and local regulations.

Develop a recycling plan and institute the plan prior to and during construction. The recycling plan must include at least the following:

- Identification of the types of materials to be recycled with corresponding names of properly permitted/registered haulers and recycling centers.
- Description of the specific approaches to be used in recycling various materials generated, including specification of areas and equipment to be used for processing, sorting, and temporary storage of construction and demolition wastes.
- All disposed materials, including anticipated hazardous and other regulated wastes, shall include names of haulers and disposal sites and copies of their permits/registrations.
- Identification and written justification for materials that cannot be recycled.

Materials which shall be considered for recycling include: stumps, lumber, brush, wallboard, asphalt, windows, doors, concrete, light fixtures, brick, carpeting, metals, roofing, glass, wiring, and cardboard.

Whether a specific material from a particular facility can be reasonably recycled will depend on such factors as the availability of viable markets, the condition of the material, and the ability to provide the material in a condition and quantity acceptable to available markets.

1-2.10 Safety

1-2.10.1 Site Access

Coordinate site entrance locations with the local authorities having jurisdiction. The need for deceleration and/or acceleration lanes into and out of the flow of traffic for facilities located adjacent to heavily traveled highways and streets shall be evaluated.

1-2.10.2 Fire Lanes

Provide fire lanes to comply with NFPA-1 or local requirements, whichever is more stringent. Lanes must be appropriately designated and wide enough to accommodate fire-fighting equipment used by local fire departments.

1-2.10.3 Parking

Parking areas must not encroach into fire hydrant zones, post indicator valves, approaches to corners, loading zones, or designated means of safe egress.

1-2.10.4 Flammable Outside Storage *(Also refer to Module 4D and Module 4E)*

The design and construction of both above-ground and underground storage tanks must comply with Module 4E – Storage Tank Standards.

Modules 4D, 4E

1-2.11 Off-Site Improvements *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

All off-site improvements necessary to construct a complete and usable facility (including any work necessary to restore areas disturbed by off-site construction) must be included in the design, unless otherwise directed by USPS. This work may include relocation and/or construction of accessible routes (per Handbook RE-4), streets, sidewalks, utilities, storm drainage systems, etc. The A/E contacts the appropriate authorities and secures the necessary permits prior to engagement in improvements outside the USPS property line.

1-2.12 Guardhouses *(Refer to Module 2A)*

Module 2A

Civil Design Checklists

Facility Name:

City, State, Zip:

Project Phase:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

NOTES:

1. This checklist shall be utilized for the design and construction of new Facilities or Repair & Alteration projects within existing facilities.
2. Design/Build entity shall submit completed checklist with each design submission. Solicitation A/E to review list submitted and return as part of the design review with comments or corrections. The design A/E for "Design-Bid-Build" projects shall submit completed checklist with each design submission.
3. Items not applicable to a specific facility or Repair & Alterations project shall be marked as "N/A".
4. Items identified with a "asterisk (*) are high priority in the early preliminary design review stages.

Civil Design Checklist – 10%

Section No.	✓	Priority	Item	Comment
			GENERAL	
		*	Is the name on the cover sheet the official USPS project name?	
1-1			**SITE INFORMATION**	
1-1.1			Existing conditions information has been verified and site orientation has been based on best available data, USPS Guidelines and Best Management Practices.	
1-1.4			Easements, zoning restrictions and/or property covenants have been identified in writing.	
1-2			**SITE DESIGN**	
1-2		*	Employee/USPS and visitor parking are properly designed in accordance with the Standard Site Plan.	
1-2		*	BMEU traffic will safely merge with truck traffic.	
1-2		*	Is BMEU entry, maneuvering area, and exit safe?	
1-2		*	Is BMEU easy for customers to find?	
1-2			Is the route to the food service entry safe and efficient?	
1-2		*	Employee vehicles have a safe and reasonably short route to enter or exit the site.	
1-2		*	Employees have a reasonably short and safe walk to single entry.	
1-2			Visitors have a safe and reasonably short route to enter or exit the site.	
1-2.4			Rejected trucks have access to a turnaround that follows Standard Detail P1-2-4a. (MPF only.)	

Civil Design Checklist – 30%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% submittal check lists been incorporated?	
		*	Do the location maps give clear directions to the site?	
1.1			**SITE INFORMATION**	
1-1.2			Subsurface investigation has been prepared, reviewed and coordinated.	
1.2			**SITE DESIGN**	
1-2			Facility is located on the site plan and tied to property lines/benchmarks.	
			Finished floor elevation is established.	
1-2		*	If guardhouse is shown, deviation request has been completed and submitted to USPS. (MPF only.)	
1-2		*	Does parking comply w/ RE-4?	
1-2		*	Is the IS covert entry properly hidden from view in accordance with design criteria?	
1-2			Finished floor elevation is established.	
1-2.1		*	Availability of utilities has been confirmed. Tie-ins are shown and coordinated with utility companies and respective A/E disciplines.	
1-2.1			Electrical platform located near utility lines	
1-2.2			A stormwater management plan is in place and has been approved by the appropriate governing agency prior to 30% design completion.	
1-2.4		*	Site design checked against 929 for compliance with parking requirements (number of spaces and sizes).	
1-2.4			Impervious paving is kept to a minimum.	
1-2.4		*	Concrete paving is used in appropriate locations.	
		*	Snow storage shown.	
1-2.4		*	Platform maneuvering area is properly sized.	
1-2.4		*	Is truck entry, maneuvering, and exit safe and logical?	
1-2.7		*	Is the BMEU outside of secure Postal compound?	

Civil Design Checklist – 70%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% and 30% submittal check lists been incorporated?	
1-1			**SITE INFORMATION**	
1-1.3			Environmental Assessment has been coordinated with design.	
1-2			**SITE DESIGN**	
1-2.3			Sediment/erosion control plan has been developed.	
1-2.4		*	Docks conform to 929 requirements.	
1-2.4			Paving slopes away from building, provides adequate drainage and sloped between 2% and 4%.	
1-2.4			Curbs used in accordance with the design criteria and only used when necessary for directing flow of water. Islands/wheelstops are not provided.	
1-2.4		*	Traffic signs are provided, parking spaces are clearly striped, and handicapped parking spaces are properly designated.	
1-2.4			Snorkel lanes are flat and designed for one-way traffic.	
1-2.5			Retaining walls are used only where essential to grading requirements.	
1-2.7		*	Fencing is used to separate USPS compound and is logical.	
1-2.8			Proper connection is made for wastewater disposal at vehicle washing areas (if provided).	
1-2.9			Has a practical, achievable construction waste disposition/recycling plan been developed.	
1-2.10		*	Need for acceleration/deceleration lanes has been evaluated, and is shown if required.	
1-2.10		*	Fire lanes are provided and comply with local code requirements.	
1-2.10			Parking areas do not encroach into fire hydrant or loading zones.	
1-2.10			When applicable, a diked area and drainage path for surface water and spilled flammables has been provided.	

Section No.	✓	Priority	Item	Comment
1-2.11			Permits have been secured for off-site improvements, if necessary.	
1-2-3		*	Are retention/detention pond(s) shown?	

Civil Design Checklist – 100%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10%, 30%, and 70% submittal check lists been incorporated?	
1-1			**SITE INFORMATION**	
1-1.2			Soils report included in final construction documents.	
1-2.4.3		*	Traffic arrows in employee parking are clearly marked.	
1-2.5			Slip resistant surfaces are specified at stairs, ramps and sidewalks.	
1-2.6		*	Landscaping is designed for low maintenance and water conservation. Specified plants are indigenous to locale.	
1-2.6			Requirements for drip irrigation are confirmed and system provided as required.	

Module 1 - General Criteria

Chapter 2 - Architectural

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2-1.2 Codes and Standards

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2-4.15 Hazardous Materials Area
2-4.16 Not Used

2-4.17 Supervisor, Distribution Operations
2-4.18 Contract Drivers Room
2-4.19 Stamp Distribution Office (SDO)
2-4.20 Not Used
2-4.21 Business Mail Entry Unit (BMEU)
2-4.22 Not Used
2-4.23 Consolidated Computer Room (CCR)
2-4.24 Time and Attendance Control System (TACS) Room
2-4.25 Not Used
2-4.26 Building and Grounds Storage
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Architectural Design Checklists

Chapter 2 - Architectural

2-1 Introduction

2-1.1 Scope

The basic functional components common to the primary USPS building types are workrooms, platforms, administrative and employee support areas.

These components should be reasonably expandable and adaptable without significant interruption to ongoing operations. The standard designs dictate layouts for each facility type with a varying degree of flexibility. Whether standard or custom designs are used, careful planning and development of the building layout, as well as the design of flexible interior spaces and support systems, is necessary. Use standard designs unless otherwise directed by USPS.

2-1.2 Codes and Standards

2-1.2.1 Building and Life Safety Codes

All facilities shall be designed in accordance with the requirements set forth by the applicable federal state and/or local codes enforced at the time of design. In addition, follow the USPS design criteria contained in this document. Where two or more codes, standards or USPS criteria are in conflict, the more stringent applies.

Refer to Standard Design Criteria, Introduction, Section 0-2 Codes and Standards, for more information.

2-1.2.2 Accessibility Standards *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Postal property is subject to the Architectural Barriers Act of 1968, as implemented in Handbook RE-4, Standards for Facility Accessibility by the Physically Handicapped. Existing leased facilities fall under the RE-4 Section F202.6 4.1.8 – Accessible Buildings: Leasing of Space in Accessible Buildings. In designing new postal facilities, pay attention to changes in the standards for building entrances and emergency exits that were incorporated in the 2005 edition of the Handbook. These changes include:

- Section F206.4.1 requires that at least 60% of "public entrances" be accessible to persons with disabilities. If a building has one or more "unrestricted" public entrances, at least 60% must connect with an accessible route.
- Normally, entrances used by postal employees are considered "restricted" entrances as defined by Handbook RE-4. Section F206.4.7 requires that at least one restricted entrance be accessible to persons with disabilities.
- Normally, fully accessible entrances can also serve as emergency "means of egress". RE-4 Section F207.1 identifies section 1003.2.13 of the International Building Code as the reference for applicable standards. RE-4 Section F210 references technical standards for stairs that are part of required emergency means of egress.

Vertical grab bars in the accessible toilet stall are not required by the RE-4 but may be required by state or local codes. They are considered good practice and should be provided, even if not required by state or local authorities. In addition to meeting the criteria of RE-4, all new construction must meet local codes and ordinances governing accessibility. The most stringent requirements of RE-4 or local ordinance is to be met.

Review alterations and additions to existing facilities in detail with Project Manager when local codes and ordinances are more stringent than RE-4.

Completing the New Construction RE-4 Checklist and Certificate of Accessibility (CoA) is a contract deliverable for every design project that has the potential to affect RE-4 compliance except repair projects. The Certificate of Accessibility is tied to the inspection checklist and the CoA is to be signed by the designer of record.

USPS Handbook RE-4

RE-4 Certificates of Accessibility (CoAs) and Facility Accessibility Survey Reports are required documents for Final Design submittal by Designer of Record. *(Also refer to USPS Handbook RE-4)*

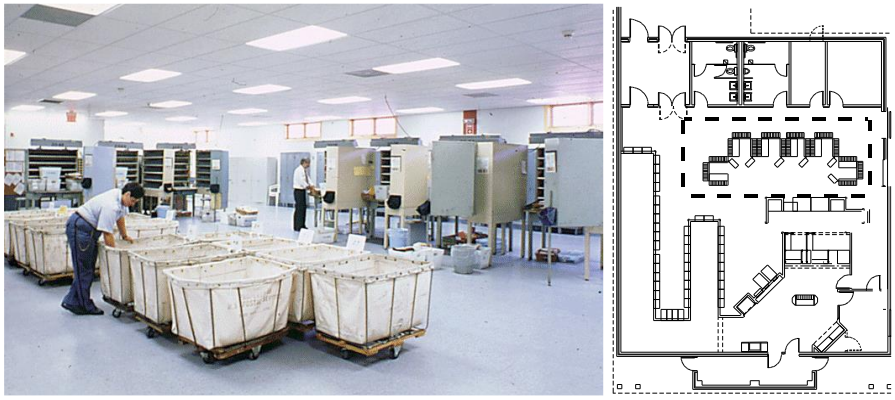
2-1.2.3 Occupational Safety Standards

All workroom aisle widths must be a minimum of 3 feet wider than the largest piece of equipment using the aisle.

2-2 Workrooms

The workroom (see Exhibit 2-2a) contains all of the mail staging, sorting, and distribution activities in a postal facility. The workroom is generally an open plan which must remain highly flexible to accommodate the changing needs of the various activities in the workroom. Many of these activities require the use of special casework, mechanization, and equipment to facilitate mail delivery. All aisles are to be laid out to be a minimum of 3 feet wider than the largest piece of equipment using the aisles in compliance with OSHA requirements.

Exhibit 2-2a
Typical Carrier Facility Workroom



2-2.1 Floors *(Refer to Module 2A, 2B, and 3)*

Module 2A, 2B, and 3

2-2.2 Wire Screen Enclosures

G2-2-2a-a1

Wire screen enclosures are required at Registry Cages, Satellite Maintenance areas, workroom side of parcel drops with openings 8 by 8 inches or larger, and within the Stamp Distribution Office (SDO). See USPS supplied Operational Space Layout (OSL) for locations of these spaces. Pre-manufactured cages meeting the below requirements are acceptable.

Where accountable paper and Registered Mail are stored, closures are required. Closures are to eliminate any spaces over ¼-inch through which mail could be passed, including, but not limited to, toe spaces and around gates.

Wire mesh consists of 10-gauge minimum woven diamond mesh steel wire with steel frames. Configure wire mesh to prevent the passage of a sphere 1-½ inches in diameter.

The finish of the mesh, posts and frames must be factory-applied gray powder coat finish. Bolts, fasteners and washers must be galvanized. Install a 2 x 3x ¼-inch angle closure between floor post supports. Paint angle gray to match mesh.

All cage partitions must extend full height to underside of structure above or be limited to a height of 9 feet with a wire screen ceiling of similar construction, and capable of supporting surface-mounted luminaires.

Registry Cage entry doors must be swing type, self-closing and self-locking with 4-foot opening. Secure doors with a self-locking mortised cylindrical lock that is only accessible by Registered Mail employees. All locks must be supplied with USPIS approved strike shrouds to prevent surreptitious entry. A 1/4-inch thick clear acrylic panel must be secured covering the entry/egress door to prevent access to the interior latch mechanism.

All entry/egress doors and door hardware must comply with requirements of RE-4 related to handicap accessibility and with applicable life-safety codes. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

In facilities that are planned to receive access control, or already have access control see Module 2A, Chapter 2-2.2 for further door hardware guidance. *(Also refer to Module 2A)*.

Module 2A

The preferred location of all Registered Mail cages is on the facility workroom floor away from public view and access, in close proximity to the inbound HCR and MVS trucks. When operationally necessary, and with USPIS approval, the Registry Cage may be located on an exterior wall, adjacent to the Mail Platform. In such an exterior wall location, a Bullet Resistant Screenline (BRS) service window and package exchange unit may be installed in the common wall, in direct line of sight of the loading docks.

A/E shall provide detailed floor plan of Registry Cages including indication of all furniture, fixtures, and equipment. Coordinate/submit preliminary design for approval by USPIS.

Registry Cages must not contain toilet facilities, storage closets or other similarly enclosed spaces, except for vaults, within the perimeter of the cage enclosure nor will such spaces be contiguous to any cage. Provide each Registered Mail Section with a logical and physical workflow system to

include verification, opening, distribution, dispatch and filing based on information in Handbook E-31 and according to the Standard Details.

In addition to compliance with the design requirements in the SDC, Registry Cage design and Standard Operating Procedures must comply with requirements of DM-901 and Handbook E-31.

2-2.3 Ceilings and Height Requirements

(Also refer to Module 2A)

Module 2A

Current Workroom ceiling standard for facilities less than 10,000 square feet is 2 foot x 4 foot acoustical ceiling tile (ACT); for new facilities over 10,000 square feet, no ceiling is required. For ceilings in existing Workrooms refer to Module 3.

The height of lighting fixtures in the Workroom of a CSF Medium building must be 11 feet above the finished floor to the bottom of the fixtures. The overall building roof height is established by taking into consideration the structural and HVAC systems required above 11feet. (See Module 2A for MPF requirements.)

2-2.4 Workroom Support Bay *(Refer to Module 2A)*

Module 2A

2-2.5 Mail Sorting Carrier Casework

Each postal mail carrier uses casework arranged in the workroom for mail sorting activities. Each workstation represents a postal delivery route for a particular zip code zone. Prior to space layout, the A/E reviews the Delivery Environment Matrix (see Exhibit 2-2b) and verifies the delivery environment to determine the appropriate carrier casework type and configuration. Workstations may be made up of as many as 3 Carrier Case components, most commonly PSINs 124. 143 and 144. Each route also has a corresponding canvas parcel bin (PSINs 1046, 1033 or equivalent) for packages larger than file size.

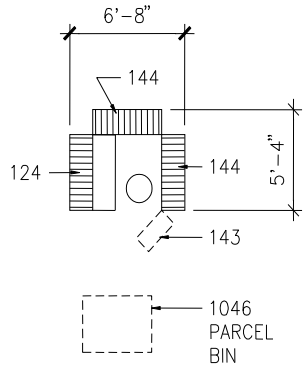


Exhibit 2-2b
Delivery Environment Matrix

Delivery Environment Matrix

Delivery Environment	PSIN 124	PSIN 144	PSIN 124c	PSIN 144c	PSIN 143c
City-FSS	X				
City- Non FSS	X	X			
Rural			X	Note 1	Note 1

Note 1- Rural routes could have either a supplemental 143c or 144c

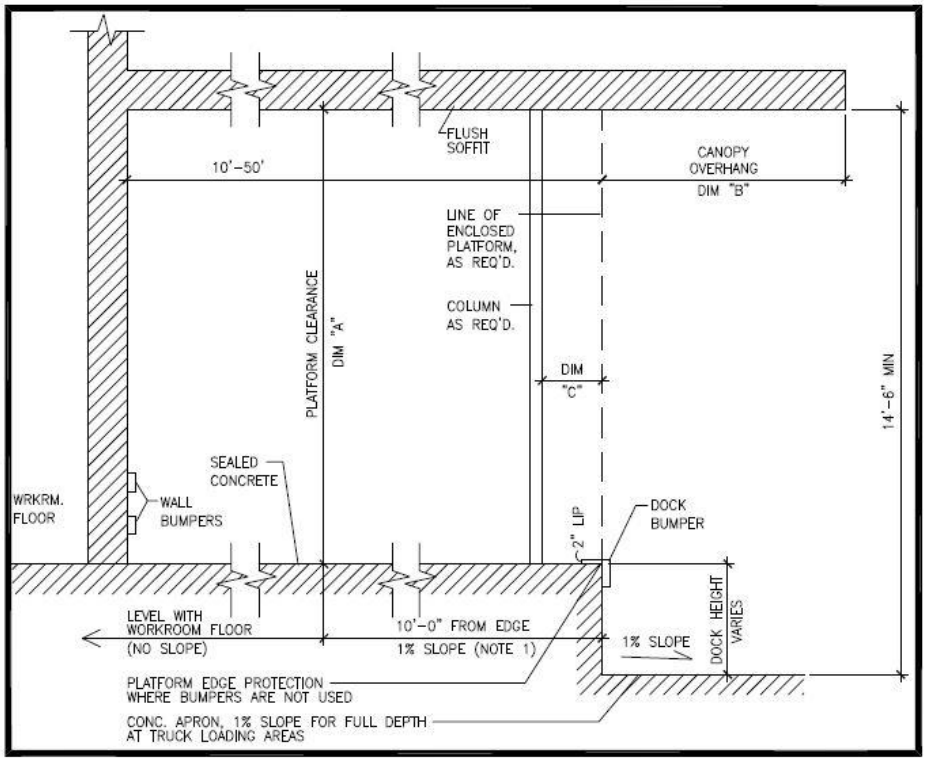
The A/E shall coordinate the layout of this USPS supplied equipment with USPS for adequate type, quantity, spacing, security sight lines and proper provision of power requirements for carrier case task lighting.

2-3 Platforms

Mail (open or enclosed) and carrier platforms serve as the principle areas for mail to arrive or depart from a USPS facility (see Exhibit 2-3a). These platforms receive a high volume of truck and rolled cart traffic and must be designed for utility, durability and ease of maintenance, materials such as EIFS are not allowed. Standard mail platform heights are 47 inches where tractor trailers are used, or 30 inches. However, specific height requirements must be coordinated with local postal management to fit local transportation operations.

Exhibit 2-3a

Typical Mail Platform Dimensions and Requirements



PLATFORM TYPE	DIM A	DIM B	DIM C
Open Mail Platforms (CSF)	10 feet (min.)	7 feet (for CSF Medium) See Standard plans for CSF Small	18 inches.
Enclosed Mail Platforms (CSF)	10 feet (min.)	3 feet 10 inches (for CSF Medium) See Standard plans for CSF Small	N/A
Enclosed Mail Platforms (MPF)	14 feet 6 inches (Note 2)	3 feet 10 inches	N/A

Keyed Notes:

1. 1% slope for front 10 feet of platform is for open platforms only. 0% slope for enclosed platforms.
2. Minimum height clearance to bottom of structure.

2-3.1 Open Mail Platforms

Open mail platforms (see Exhibit 2-3b) have a roof canopy, but no wall or overhead doors at the truck dock side. The platform is typically constructed of sealed concrete, poured level and at the same elevation as the workroom floor out to within 10 feet of the edge of the slab. The front 10 feet of the slab has a 1 percent slope to maintain drainage away from the building. A platform canopy, with flush soffit underneath, must extend a minimum of 7 feet beyond the outside face of the platform.

Exhibit 2-3b
Open Mail Platforms

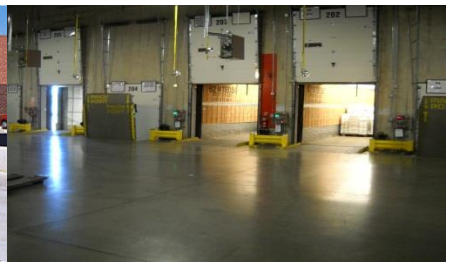
Open Mail Platform at CSF Medium Facilities

2-3.2 Enclosed Mail Platforms

Enclosed mail platforms (see Exhibit 2-3c) have a roof and exterior wall with overhead doors at the truck dock side. The full length of the platform slab must be level with the workroom floor. A platform canopy, with a flush soffit underneath, extends 3-foot 10 inches beyond the outside face of the platform. Vestibules are encouraged but not required between the workroom and any enclosed mail platform.

Exhibit 2-3c
Enclosed Mail Platforms

Enclosed Mail Platform at CSF Medium Facilities



Enclosed mail Platform at MPF Facilities

2-3.3 Carrier Platforms *(Refer to Module 2B)*

Module 2B

2-3.4 Trash and Recycling *(Refer to Modules 2A and 2B)*

Modules 2A, 2B

2-3.5 Columns *(Refer to Modules 2B)*

Module 2B

2-3.6 Ramps *(Refer to Modules 2A and 2B)*

Modules 2A, 2B

2-3.7 Stairs *(Refer to Modules 2A and 2B)*

Modules 2A, 2B

2-3.8 Dock Equipment *(Also refer to Modules 2A and 2B)*

Modules 2A, 2B

All dock equipment, including flip ramps, dock levelers, scissors lifts, door seals, truck shelters, truck restraints/chocks and bumpers must be coordinated with platform door sizes and applicable USPS truck fleet requirements. Provide protective barriers as required to protect such equipment and door tracks.

2-3.8.1 Flip Ramps

Provide electro-hydraulic, front-mounted adjustable flip ramps (also known as edge-of-dock levelers) in the quantity and locations required, including maintenance struts, as directed by USPS.

 G2-3-8d

2-3.8.2 Dock Levelers

Provide air-powered air bag type dock levelers as directed by USPS.

 G2-3-8e→e5

Levelers must have one center or two side maintenance struts (to support platform and lip), sized for 10,000 lbs. rollover. Strut(s) must be capable of accepting OSHA lockout/tagout locks and provide visual signal (above the leveler) that strut is in use.

Levelers must have freefall protection and safety legs (air bag type).

Dock levelers are typically recessed into concrete mail platforms and in a 2-foot deep pit.

See Module 2A for leveler sizes at mail processing facilities. See Module 2B for leveler sizes at customer service facilities.

Modules 2A, 2B

2-3.8.3 Scissors Lifts

 G2-3-8f1→f4

Provide electro-hydraulic scissor lift(s) in the quantity and locations required, as directed by USPS. Scissor lifts are to be 6 feet wide x 8 feet or 8 feet x 10 feet long based on USPS requirement.

2-3.8.4 Dock Door Seals

Provide door seals at all docks at enclosed platforms. Door seals must be heavy duty, have fixed headers with curtains, and be fabricated of compressible polyurethane covered with fabric. Reinforcing wire pads must have replaceable guide strips. The seals must have compression vents, drain holes and be secured to corrosion resistant metal or a pressure-treated wood frame. If inflatable units are used, the seals must be activated by the dock door position.

2-3.8.5 Bumpers

G2-3-8a→c1

Install dock bumpers continuously along the face of open mail platforms except at stairs, steps, ramp, dock levelers, flip ramps and/or scissors lifts. Bumpers must project 2 inches above the top of the dock. On open platforms install a 2 inches high section of steel channel or angle to keep equipment from rolling off sides of the platform.

2-3.9 Vestibules *(Refer to Module 2B)*

Module 2B

2-4 Support Areas

2-4.1 Employee Entrance

Provide only one designated employee entrance, centrally located, and directly accessible to employee parking.

2-4.2 Toilet Facilities

G2-4-2a→c1

Toilet facilities are to be provided for USPS employees only. Toilet facilities are not to be provided for customers, for reasons of safety and security.

The solicitation A/E shall calculate the toilet room fixture requirements. The number of toilet fixtures must comply with the more stringent of the state/local plumbing code or OSHA Section 1910.141. All fractions shall be rounded up to the next whole number.

Facilities that require less than a total of four water closets, calculated using the combined number of male and female peak hour employees, may provide up to three RE-4 compliant individual toilet rooms, each with one water closet and one lavatory, in lieu of two multi-fixture toilet rooms, one for each gender.

Locate toilet facilities near the employee entrance.

G2-4-3a→a1

The custodial products used by the USPS are available through a national strategic partnership (MLB-CO-01-012; National Sources for Custodial Products). As part of the agreement, the suppliers provide the dispenser along with the custodial product. This arrangement ensures compatibility of custodial products (paper towels, toilet tissue, soap, etc.) with the dispenser. Therefore, in lieu of including them in the project solicitation, the dispensers are to be provided by the custodial product supplier. On projects using the custodial products national agreement, the A/E will need to coordinate the selection and location of all toilet accessories (e.g. mirrors, soap dispensers, waste receptacles, and paper towel dispensers) with the Project Manager and edit the project specifications as appropriate.

For CSF Medium facilities the water closets must be wall mounted with reinforced hangers. Toilet partitions must be solid plastic and floor mounted.

2-4.3 Locker Areas *(Also refer to Module 2A)*

Module 2A

Locate locker areas near the toilet facilities and designated employee entrance. Locker rooms are to be open as shown on the standard plans and standard detail G-2-4-3b.

Use 12 inch wide x 15 inch deep x 36 inch high lockers or 7 ½ inch wide x 15 inch deep x 72 inch high lockers in Zones 1 through 5. Use 12 inch wide x 15 inch deep x 72 inch high lockers in Zones 6 and 7 (refer to the USPS Zone Map in Appendix M1-C). All lockers must have sloped tops and are to be provided with hasps to accept USPS supplied padlocks. The total number must be provided for the employee complement specified in the planning documents.

Locker areas shall be made accessible and be provided with accessible lockers as required by Handbook RE-4. The quantity of accessible lockers must be as required by Handbook RE-4, but in no case fewer than the number of accessible employee parking spaces. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

G2-4-4a→c

2-4.4 Lunchroom / Break Area

Locate the lunchroom for easy access from employee locker areas and design it with a generous amount of daylighting (use windows, do not use skylights) and landscaping in front of the windows. Base the design and layout of seating on the employee count in the planning documents and coordinate for use by USPS Purchasing.

Basic lunchroom requirements include:

- Sink with hot and cold water.
- Utility wall and base cabinets with laminated counter workspace.
- Electric outlets for refrigerator and microwave oven.
- Vending area. Provide floor drains and all utility hook-ups as required. Also provide secured vending storage near the lunchroom area.

Provide separate, built-in undercounter recycling bins (minimum 30-gallon capacity each) with labels for glass, aluminum, and plastic.

All machines must be integrated with wall design to appear to be built-in. Allow additional space as necessary for aisles and operating areas around the vending machines.

If directed to provide an outdoor break area by the Project Manager, it must consist of a slab on grade and chain link fencing.

G2-4-5a→b

2-4.5 Administrative Offices

Where applicable, provide a layout of open office systems furniture coordinated with telecommunications requirements, providing maximum flexibility for future modifications.

2-4.6 Custodial Storage Room

Provide mop sink, mop/broom holder, storage shelves and eye wash station (at rooms where chemicals will be mixed). Provide epoxy floor with painted epoxy walls at mop sink.

2-4.7 Janitor's Closet

Provide a mop sink, mop/broom holder, and storage shelves. Provide a 4-foot high fiberglass reinforced plastic (FRP) sheet wainscot at mop sink. The mop sink must be equipped with a backflow prevention device (e.g., vacuum breaker). The top, bottom, and side edges, intermediate joints, and corners must be continuously caulked.

2-4.8 Vault

Vaults may be poured in place or modular units which are site-assembled.

G2-4-8a→d

2-4.9 Outside Storage Area

Provide an outside storage area as directed by USPS.

2-4.10 Satellite Vending Machine Areas *(Refer to Module 2A)*

Module 2A

2-4.11 Not Used

2-4.12 Conference and Training Rooms *(Refer to Module 2A)*

Module 2A

2-4.13 Not Used

2-4.14 Battery Charging Area *(Refer to Module 2A)*

Module 2A

2-4.15 Hazardous Materials Area *(Refer to Module 2A)*

Module 2A

2-4.16 Not Used

2-4.17 Supervisor, Distribution Operations *(Refer to Module 2A)*

Module 2A

2-4.18 Contract Drivers Room *(Refer to Module 2A)*

Module 2A

2-4.19 Stamp Distribution Office (SDO) *(Refer to Module 2A)*

Module 2A

2-4.20 Not Used

2-4.21 Business Mail Entry Unit (BMEU) *(Also refer to Module 4B)*

Module 4B

The BMEU lobby, customer entrance, parking, truck maneuvering area, and loading dock must be totally separated from the Postal secured compound. However, when this cannot be achieved due to site constraints, the following general criteria must be followed:

- If the site does not allow for vehicle separation, place the BMEU at the end of the building closest to the public access.
- If a loading platform is shared between BMEU customer trucks and Postal trucks, it must be designed so there is no vehicular or pedestrian cross traffic.
- Shared platforms must have a fence, with a gate for the flow of mail, separating the customer and Postal areas.
- Shared platforms must also have a fixed CCTV camera observing the BMEU customer area.

For detailed criteria, refer to Module 4B.

2-4.22 Not Used

2-4.23 Consolidated Computer Room (CCR) *(Refer to Module 2A)*

Module 2A

2-4.24 Time and Attendance Control System (TACS) Room *(Refer to Module 2A)*

Module 2A

2-4.25 Not Used

2-4.26 Building and Grounds Storage *(Refer to Module 2A)*

Module 2A

2-4.27 Not Used

2-4.28 Carrier Annex – Mail Pick Up Lobby *(Refer to Module 2B)*

Module 2B

2-4.29 Not Used

2-4.30 Stockroom *(Refer to Module 2A and Module 4D, 2-8)*

Module 2A, Module 4D

2-4.31 Tools and Parts Room

2-4.32 Biohazard Detection System (BDS) *(Refer to Module 2A)*

Module 2A

2-4.33 Shop *(Refer to Module 2A)*

Module 2A

2-5 Retail Design Standards *(Refer to Module 4A)*

Module 4A

2-6 Exterior Envelope

Building appearance plays an important role in representing our organization, our employees, and our products and services. Our buildings must be friendly and easily identifiable, and portray an efficient, businesslike and professional image. Decision making factors include surrounding architectural environment, cost and maintenance. Security issues are also important in the design of a building's exterior.

The standard design programs do not dictate the external appearance of the building itself, nor do they impose the use of certain materials or architectural elements. However, the materials must be carefully selected with respect to reducing construction cost without negatively impacting building performance. For example, use of split-face block may be used in lieu of brick.

In design of CSF Small facilities, where wood frame construction is utilized, the design A/E must follow the U.S. Department of Energy criteria "Advanced Framing Techniques" where fully compliant with local structural code requirements.

The standard designs provide suggested elevations which may be used "as is" or with certain variations. The intent is not to dictate the exterior, but to

provide guidance on the general appearance expected. An A/E, in conjunction with the Postal Project Manager, must follow good design practice in deciding whether the default elevation will be used or new elevations will be developed. For some facilities, the standard designs may not be the most cost effective solution. These facilities may be better suited to a custom design or a pre-engineered building.

2-6.1 Walls and Windows

2-6.1.1 Materials

Exterior wall finishes must provide a durable, low maintenance, weather-tight enclosure with a minimum 30-year life span and be compatible with the local environment. Materials may vary depending on the type of construction.

Exterior building surfaces and materials must be compatible with the exterior signage programs. Avoid using strong colors, bold textures, patterns, and unusual surface treatments. Architectural reveal lines and physical surface patterns must work in harmony with wall attached sign elements.

Refer to Chapter 4-2.6 for building envelope U-Factors.

2-6.1.2 Windows

In addition to functional requirements, the use of windows is based on energy efficiency, and wall orientation considerations. Windows in the administrative offices and related support areas should generally not exceed 30 percent of the exterior wall area.

Baseline security for a building that does not have an IDS or is not a 24-hour operation, requires that all windows on the non-public side of the security wall have laminated insulating burglary-resistant glass units for new construction or security film for retrofits if they are located such that the sill is lower than 8 feet above grade or above any surface which could provide access from the exterior. The requirements for IDS are listed in Chapter 5-7.3. Based on their risk assessment, existing facilities without IDS may be required to have security film retrofits.

The Postal Service does not usually install operable windows; however, if they are used, a security key locking device must be provided. Operable windows must not open more than 4 inches. Neither glass bricks nor glass blocks are acceptable for lobby windows; however, glass block may be used in other locations provided that it does not cause glare for security cameras. If interior glass doors control access to the full-service counter area, vertical blinds or some other means must be installed to provide closeout security.

Baseline facility security discourages placing windows in storage rooms, equipment rooms, toilet rooms, locker rooms, or utility rooms.

When the Inspection Service has determined that high security measures are required, burglary resistant glazing must be used for windows in the security perimeter with the sill lower than 8 feet above grade or other adjacent surface. When ultra-high security measures are required, fixed burglary resistant glazing in a heavy metal frame must be used in all windows in the security perimeter. These windows must include mullions spaced at 8 inches OC or less, both horizontally and vertically, to prevent the passage of a person's body. Bullet-resistant glazing and stronger grades of burglary-resistant glazing are all ultra-high security devices and may be required in some situations.

Bullet-resistant, and/or blast-resistant glazing applications are only to be used when supported by an Inspection Service risk analysis and considerations such as location in a high crime area, a history of robbery and assaults, data from local law enforcement, and practices of surrounding businesses. These glazing measures require a deviation request to be sent to Headquarters for approval.

The contractor must provide a letter of certification from the glazing manufacturer or supplier, along with the shop drawings, to the Project Manager stating that standards for security window treatment have been met.

The design of the Retail Service Lobby, Self-Service area, Box Lobbies, and walk-up and drive-up windows must ensure that there is sufficient visibility from outside the building to discourage criminal activity within the building. The glass must have the following performance characteristics:

- Visible transmittance not less than 65 percent.
- Visible reflectance not greater than 15 percent.

Other glazing requirements are as follows:

- U-factor: See Section 4-2.6.
- Visible Transmittance/Shading Coefficient (VT/SC) Ratio must be greater than or equal to 1 when daylight is being used to reduce artificial lighting requirements.
- All glass must be double-glazed, low-E emissivity. In climates below 3000 HDD, the low-E coating must be placed on the second surface (inner side of outer pane); in climates above 3000 HDD, the low-E coating must be placed on the third surface (outer side of inner pane).
- Provide insulating frames and thermal breaks.
- Exterior glazed systems are permitted. Use safety glass where required by applicable codes and regulations.

2-6.2 Roof

2-6.2.1 General

G2-6-2a→c

All roof systems must comply with National Roofing Contractors Association (NRCA) and Factory Mutual Global (FMG) requirements, including fire certification and wind, uplift and blow-off protection. The A/E shall verify fire rating requirements for all roofing assemblies.

All flashing, coping, equipment curbs, joints, etc. must be approved by the system/roofing manufacturer and inspected with the roof.

Roofs must have a minimum pitch of 1/4 inch per foot (½ inch per foot for standing seam metal roofing). Dead level roofs are not acceptable. Pitch pockets are prohibited and keep roof penetrations to a minimum.

2-6.2.2 Roof Types

Roof types used on USPS facilities shall be built-up, modified bituminous, single-ply membrane, standing seam metal, or composite shingles (CSF Small only). The roof type must be selected based on specific project requirements and regional practice.

a. Built-up and Modified Bituminous Roofing

1.) General - The roofing system must meet the criteria described in 2-6.2.1. Further criteria are as follows:

a.) Gravel topped built-up roofing and mineral-cap sheet roofing are allowed.

b.) Asphalt must be applied at the manufacturer's recommended equiviscous temperature (the temperature at which bitumen attains the proper viscosity for built-up membrane application to ensure proper workability and adhesion).

2.) Built-up Roof (BUR)

a.) Description: Consists of multiple plies of fiberglass asphalt saturated felts laminated together with interply asphalt bitumen. A gravel surface coat is then applied on a liquid asphalt flood coat. It is ideally applied over a two-ply vapor barrier and closed cell foam insulation system with a roof board cover.

b.) A vapor barrier (if required) will protect the insulation system from building moisture, as well as, adding a degree of additional leak protection. The vapor barrier is applied directly on concrete deck surfaces or over gypsum board on wood and metal deck roofing systems.

c.) The glass fiber reinforcement of the felts provides strength to the roofing system. As described below, 4 plies are preferred on critical applications, but 3 plies could be used on non-critical facilities where cost containment is a primary concern.

d.) The interply mopping of asphalt between the felt provides the required adhesion, as well as the water proofing.

e.) Roof board is applied over wood and metal decks and over the insulation systems. The roof board over the insulation system allows future re-cover operations without damaging the insulation system which remains in place. See re-cover definitions for more information.

f.) The gravel surface coat protects the asphalt flood coat and membrane from UV damage.

g.) Typical components for a BUR include:

- Vapor Barrier: Two plies of Type IV felt in Type III mopped asphalt or self-adhering base sheet.
- Insulation: Polyisocyanurate. Typically, two layers mopped in place with Type III asphalt. (Tapered type if needed to provide minimum slope).
- Roof board over insulation: ¼ inch minimum thickness high-density polyisocyanurate board, ¼ inch minimum thickness gypsum board, or ¼ inch minimum thickness wood fiber board are allowed. Secure with hot asphalt or low rise polyurethane foam.

- Flashing: Elastomeric granule surfaced modified bitumen flashing over 2 plies of type IV felt.
- Membrane: 4 plies of Type VI asphalt impregnated glass felt or a high performance base sheet and 3 plies of type VI asphalt impregnated glass felt.
- Interply Mopping: Type II, III, or IV asphalt meeting the roofing system manufacturer's published specifications for ambient condition at the site.
- Sealer: Two-part pourable sealer meeting roofing systems manufacturer's published specifications.
- Surfacing: Mineral Aggregate-Gravel or slag over Type II or III asphalt or asphalt cut-back flood coat on cold applied systems. An SBS surfacing sheet may also be used as a cover ply.
- Accessories to meet roof manufacturer’s requirements.

3.) Modified Bitumen (MB)

a.) Description: MB roof is built in a similar fashion to BUR but uses asphalt bitumen that includes modifiers that give it rubber like properties. Sequenced Butadiene Styrene (SBS) is the generally preferred modifier because it is more flexible in lower temperatures than Amorphic Polypropylene (APP) modifiers. APP is preferred in warmer, sun-belt climates. MB sheets are much thicker than other membranes, by as much as 3 times. A typical MB roof system uses a single base sheet and a granular cap sheet over an insulation system.

b.) A vapor barrier (if required) will protect the insulation system from building moisture, as well as, adding a degree of additional leak protection. The vapor barrier is applied directly on concrete deck surfaces or over gypsum board on wood and metal deck roofing systems.

c.) Gypsum board is mechanically fastened to wood, metal, and lightweight concrete surfaces.

d.) A single base sheet is typically used. Although multiple base sheets can be applied, the added cost is not warranted and installation is slowed to allow curing time between layers. (Curing between layers is needed to prevent foot traffic damage during installation.)

e.) Base sheets, made with a variety of reinforcement and thicknesses, are impregnated/saturated with SBS modified bitumen. Torchable grades are thicker as they have an asphalt layer that is heated with a torch to provide adhesion between layers.

f.) Mopping Asphalt: Sequenced Ethylene-Butylene-Styrene (SEBS) mopping asphalt in colder climates or Type II or III asphalt in warmer climates.

g.) Membranes can be hot asphalt applied, torch applied, or cold process applied. Torch application is required with polyethylene backed APP bitumen. Sand and talc backed APP can be set in cold adhesive or torch applied.

h.) SBS membranes can be applied on slopes up to 3 inches per foot.

i.) The cap sheet (also called finish ply) can be made with a variety of reinforcement and thicknesses and is impregnated/saturated with SBS modified bitumen, then

coated with mineral granules that both protect the sheet from ultra-violet damage and provide a reflectance factor.

j.) Typical components for MB roofs and requirements include:
- System compliance with ASTM 6164 Type II, 6162 Type III or 6222 Type II.
- Vapor Barrier: (If Applicable) Two plies of type IV felt in type III mopped asphalt or self-adhering base sheet.
- Insulation: Polyisocyanurate. Typically, two layers adhered with type III asphalt over concrete deck or underlayment. Low rise polyurethane adhesive may also be used to adhere insulation. Bottom layer in mechanically attached over steel and wood decks. (Tapered type is also used, if needed to provide minimum roof slope).
- Roof board over insulation: ¼ inch minimum thickness high-density polyisocyanurate board, ¼ inch minimum thickness gypsum board, or ¼ inch minimum thickness wood fiber board are allowed. Secure with hot asphalt or low rise polyurethane foam.
- Base Sheet: 115 mil (ASTM 6164 Type II, 6162 Type III or 6222 Type II) thick, modified bitumen base sheet
- Cap Sheet: 130 mil (ASTM 6164 Type II, 6162 Type III or 6222 Type II) thick, modified bitumen granular coated cap sheet
- Interply Moppings: mopping asphalt, Type II or III asphalt or cold adhesive meeting roofing systems manufacturer's published specifications.
- Flashing sheets: Two-layer flashing system should be from the same material as the base ply and cap sheet.
- Accessories to meet roof manufacturer’s requirements.

b. Single-Ply Membrane Roofing

1.) General: The membrane roofing system must meet the criteria described in 2-6.2.1 above. Further membrane roofing criteria are as follows:

a.) Single-ply membranes can have high reflectivity values. This may be required for compliance with local energy codes where high reflectivity helps reduce the urban heat sink.

b.) Where single ply membranes are employed in high traffic areas, the thickest available membrane should be used. It is acceptable to apply different thickness membranes to different areas of the roof to accommodate various conditions. For example 60 mil EPDM membrane may be used at flashing locations as the 90 mil is difficult to shape and form at these vertical transitions.

c.) Attachment: Single-ply membranes can be fully adhered or mechanically fastened (in high wind areas). Fully adhered systems are preferred on single ply membranes on USPS properties. Site conditions will dictate the design solution which may include one or a combination of systems. Single-ply membranes are installed quickly and minimize exposure to the facility.

d.) Solvent barriers may be required where the insulation system in not compatible with solvent based adhesives.

e.) Manufacturer requirements vary and must be complied with to obtain the desired warranty.

f.) Provide continuous pavers where heavy roof traffic is anticipated.
g.) Provide control or contraction joints every 100 to 200 feet depending on local climate conditions. These joints must not restrict the flow of water.

2.) Ethylene-Propylene-Diene-Monomer (EPDM)

a.) Description: Single ply non-reflective membrane that comes in various thickness (45, 60 or 90 mil).
b.) Membrane: 60 mil and 90 mil EPDM are standard thicknesses on USPS facilities. Use non-reinforced EPDM on fully adhered applications. Use of reinforced EPDM may be required by local codes that require mechanical fastening to provide additional wind lift resistance in locations that a subject to hurricanes.
c.) Vapor barriers, insulation systems, and roof board requirements are the same as for asphalt roofing systems. An alternate vapor barrier is described within item 2-6.4.2.A.3 for use of EPDM on critical facilities where hot mopping a 2-ply vapor barrier is not practical.
d.) Adhesives: Solvent based adhesive; water based adhesive, self-vulcanizing adhesive tape (EPDM), or combination of methods. A two-part adhesive is used to adhere the insulation system to the base layer (vapor barrier) because penetration of the vapor barrier with mechanical fasteners is not allowed

3.) Polyvinyl Chloride (PVC)

a.) Description: Single ply reflective membrane that comes in various colors and thicknesses.
b.) 60 mil and 80 mil are the recommended thicknesses for reinforced PVC.
c.) A fleece backed PVC sheet may be used for certain applications.
d.) PVC membranes must meet requirements established by ASTM D 4434.
e.) Thermoplastic vinyl quality is influenced greatly by the use of virgin plasticizers. Lower quality PVC products use recycled product that results in inconsistent, often inferior quality membranes.

c. Structural Standing Seam Metal Roofing

1.) General: The structural standing seam metal roofing system must meet the criteria described in 2-6.2.1 above. Further criteria are as follows:

a.) SSMR must be manufactured of preformed metal panels. USPS preference is Kynar coated 24-gauge galvanized steel or .040 aluminum. Other materials including copper, zinc, or terne will stand-up to sea salt in coastal areas better than steel. Terne is carbon steel or stainless steel coated with a zinc/tin alloy and is corrosion resistant.
b.) To determine the load carrying capacity, test the system in accordance with the U.S. Army Corps of Engineers "Standard Test Method for Structural Performance of SSMRs by Uniform Static Air Pressure Difference" described in the Corps of Engineers Guide Specifications (CEGS).
c.) Details must be designed to accommodate movement of the roof under thermal loading to assure weather tightness and

structural integrity. Roof panels should be free to move (without detrimental effect) in response to the expansion and contraction forces resulting from a total 100o temperature difference between the inside structural framework and the temperature of the roof panel.

d.) Metal roofing details must be designed to eliminate heat loss caused by compression of the blanket insulation between purlins and roof panels.

e.) In regions where sliding snow or ice is a potential hazard, provide snow guards; however, mechanical fasteners that penetrate the metal roof must not be used to install the guards. Snow guards must be of a material compatible with the roofing material.

f.) Roof panels must be fastened to framing members with concealed fastening clips or other concealed devices.

g.) Factory finish on metal roofing panels must be guaranteed by the manufacturer for 20 years against fading, chalking, blistering, peeling and chipping.

h.) Provide a minimum pitch of ½-inch per foot.

2.) Critical facility applications will require a substrate membrane of smooth surface adhering underlayment. A slip sheet is required between the metal and the adhering underlayment. High temperature adhering underlayment should be used in hotter, Sun Belt climate zones. Non-critical applications can employ asphalt felt substrate or similar water proof substrate.

3.) Metal roofs are a good option for sloped roofs on critical facilities where multiple ply roofs are not an option and on non-critical facilities that have an acceptable substrate. Metal roof installations include metal roofing accessories like soffits, ridge caps, vents, etc., which are typically provided by the same manufacturer.

d. Composite Shingle

1.) General: The roofing system must meet the criteria described in 2-6.2.1 above except that minimum slope of roof is to be 5 in 12. Further criteria are as follows:

a.) Roof shingles must be listed on the DOE ENERGY STAR roof products qualified products list.

b.) Tall shingles to be installed over a 15 # unperforated asphalt saturated felt underlayment.

2.) Description: Fiberglass mat-based asphalt product with granular coating that is available in a large variety of shapes, sizes and colors. Shingles are nailed to a wood substrate on sloped roofs over an asphalt saturated felt membrane. Adhered ice and water shields are required in cold weather climates (non-slip surface).

3.) Shingle roofs can be used on adequately sloped roofs on non-critical facilities and critical facilities with wood fiber roof board decks where; multiple ply roofing systems cannot be applied, or where communities (architectural committees) may require a USPS facility to blend with the surrounding structures which employ shingled roofs.

4.) Dimensional shingles that meet the ASTM 3462 requirements are preferred and 3-Tab Shingles allowed on case by case basis. Six fasteners per shingle are required for all slopes.

5.) Insulation on sloped composite shingled roofs is typically installed within the attic space.

6.) Underlayment: self-adhering underlayment is typically applied on sloped shingled roofs at the eave, rake edges and valleys.

7.) Proper ventilation is required for a good performing shingle roof system.

2-6.2.3 Roof Components

a. Insulation

General:

In selection of insulation, U-Factors must meet or exceed those required by the current version of ASHRAE 90.1 based on the geographic zone and construction method for roofs.

The A/E shall provide a study to justify the actual U-Factors used in the design. Roofs should be designed to provide a maximum overall U-Factor. R value of insulation shall be based on diminished thermal performance as the insulation ages.

1.) Batt Insulation. If installed under the roof deck, batt insulation must have a vapor barrier on the interior side of the insulation. Provide vented air space between insulation and roof structure.

2.) Rigid Insulation. Rigid insulation provided on top of roof decks shall be installed in a minimum number of layers and include separation board as required by NRCA. Provide rigid urethane roof insulation on metal decks with 1/2-inch layer of fiberboard on the deck and on top of the urethane to receive the built-up roofing (if applicable).

3.) Crickets. Provide crickets as required to prevent ponding at roof-mounted equipment, skylights, smoke vents and along roof edge or valleys. Place crickets under the roof insulation when the two are made of different materials.

4.) Fastening. Install built-up roof insulation per roofing membrane manufacturer's recommendations.

5.) Ozone Depleting Potential (ODP). Building insulation must not be manufactured with CFCs or HCFCs. The only exceptions are extruded polystyrene insulation with HCFCs, which may be used where moisture-resistant rigid board insulation is required, and polyisocyanurate with HCFCs. Extruded polystyrene insulation manufactured with CFCs is prohibited.

6.) Urea Formaldehyde Foam Insulation is prohibited in all new postal construction.

b. Vapor Retarders

Vapor retarders for built-up roofs on metal decks are discouraged, except over interior spaces with high humidity uses, such as vehicle wash bays.

c. Roof Drains

For low slope roofs primary roof drainage shall be provided by interior roof drains. Locate roof drains away from flashings and at the mid-span of the structure rather than at columns or along parapet walls to avoid

ponding at the flashings and to ensure positive drainage. Provide overflow drainage protection by using dual drains, overflow type drains, scuppers or gutters. Where scuppers drain onto a lower roof provide concrete splash block.

d. Walkways

Provide an appropriate walking surface to provide a direct route to and around all roof-mounted equipment. Design walking surfaces so as not to restrict drainage and provide at all sides of equipment (4-foot minimum width). If rooftop equipment will require maintenance work within 10 feet of the edge of the roof, provide 3-foot 6-inch high parapet or railing.

e. Rooftop Equipment

Mount equipment to roof curbs. Provide a minimum of 12 inches below curb-mounted equipment to facilitate roof maintenance and repair. Where possible locate all rooftop equipment in one area.

f. Roof Hatches

Select roof hatches for weatherproofness, energy efficiency that meets or exceeds the current version of ASHRAE 90.1, security and applicable design to facilitate personnel and equipment to roof surface.

Provide a minimum of 12 inch vertical distance from top of hatch to roof surface. Locate hatches as close as possible to roof top equipment.

g. Heat and Smoke Vents

Where heat and smoke vents are required by the building code, provide hatch-type vents with 12 inch high insulated aluminum curb, welded or sealed mechanical corners and integral condensation gutter and flashing. Fabricate with automatic opening double glazed acrylic or polycarbonate dome type lids. Provide units which have been tested and are UL listed and FMG approved. Gravity or drop-out vents which function by heat melting the acrylic dome are not acceptable. Provide white or frosted domes to prevent glare. Domes must provide a minimum 60% light transmission. Coordinate location of vents with ducts, utilities, etc. to avoid obstructing daylight. Provide fall protection screens, railings or grilles at all roof openings to satisfy OSHA Standard 1910.23 and local regulations.

h. Skylights

Do not use roof skylights in new construction. Skylights increase both roof maintenance costs and the potential for roof leaks. In regard to compliance with energy requirements, utilize the performance or calculated path under ASHRAE 90.1 using design strategies that avoid the use of skylights. Refer to Standard Design Criteria, Section 0-2.2 Compliance with Energy Requirements, for details.

i. Burglary Protection

In non-24-hour facilities, openings (such as skylights and duct penetrations) larger than 8 inches by 8 inches require security grilles or similar Inspection Service approved device, coordinate entry protection with local inspector. Note that security grilles may also satisfy fall-protection requirements. Refer to Appendix M1-F Buildings and Site Security Requirements, 3-3.4 Security of Roof.

j. Roof Warranties

Standard warranty is a two-year contractor guarantee, as detailed in the applicable specification sections. Request an add-alternate price for a manufacturer's 20-year total system warranty, covering labor and material, as also detailed in the specifications.

k. Roof Inspection

The USPS encourages the use of full-time roof inspection during roof construction to ensure professional workmanship and full compliance with the specifications.

2-6.2.4 Roof Selection

a. Roofing System Facility Matrix

1.) Use the ***Roofing System Facility Matrix*** that follows as a quick reference guide that indicates which roof type is recommended, acceptable, or not acceptable for each USPS facility type. The first choice must always be the recommended type (i.e., R). Site conditions, life cycle cost, rooftop traffic, HVAC maintenance and building occupancy, are among the criteria that must be weighed against each other to select the most appropriate roof system.

Roofing System Facility Matrix

BLDG Designation	Critical or Non-Critical	4-Ply BUR W/Gravel	3-Ply BUR W/Cap Sheet	2-ply Modified Bitumen	60 mil EPDM	90 mil EPDM	60 mil PVC/45 mil KEE	80 mil PVC/50 mil XT KEE	Metal 24 Ga. Min.	Fiberglass Asphalt or Concrete Shingle, Tile
P & DC	**C**	A	A	R	NA	R	NA	R	R	A
NDC	**C**	A	A	R	NA	R	NA	R	R	A
GMFs	**C**	A	A	R	NA	R	NA	R	R	A
Main Post Offices	**NC**	A	A	R	A	A	R	A	R	A
Carrier Annexes	**NC**	A	A	R	A	A	R	A	R	A
Stations & Branches	**NC**	A	A	R	A	A	R	A	R	A
Retail Location	**NC**	A	A	R	A	A	R	A	R	A
VMF	**NC**	A	A	R	A	A	R	A	R	A

Key	
C	**Critical Facility**
NC	**Non Critical Facility**
R	Recommended Roof System
A	Acceptable Roof System
NA	Not Acceptable

General Notes:

- Local Codes may cause certain roof types to not be acceptable on certain facilities.
- USPS does not accept TPO, PIB, CPE, or White EPDM membranes.
- For all roof system Types - Energy Star (or similar system as dictated by region) rated roof systems are required for ASHRAE zones 1, 2, 3 and 4. A white granule cap sheet with a reflectivity rating of .26 or greater may be utilized in lieu of an Energy Star roof system in ASHRAE zones 5, 6, and 7.
- Black EPDM may only be used in ASHRAE zones 5, 6, and 7.
- Recommended membrane thicknesses are minimums - thicker membranes may be required, based on site specific conditions (i.e. wind, hail, traffic).
- Metal roofs w/concealed fasteners and tile roofs must have a secondary roof system self-adhering underlayment. Include a slip sheet over the self-adhering underlayment below metal roofs. Shingle roofs must have self-adhering underlayment at perimeter edges and valleys, and other locations stated in the project specifications.

b. Roof Selection Considerations:

1.) Current and anticipated/potential future use of the space.

2.) Leased facilities may vary from the standards due to USPS responsibility, term of lease, long term strategy for building or requirement to replace with like kind system.

3.) Deck Type:

a.) Poured-in-place (monolithic) concrete
b.) Pre-cast concrete
c.) Gypsum concrete
d.) Light weight insulating concrete over other substrate
- Perlite or vermiculite aggregate base
- Gypsum based

e.) Metal deck
f.) Wood deck
g.) Thermosetting insulating fill: Poured in place perlite aggregate in an asphalt binder. This material would not likely be used in construction today, but may be encountered in very old roofs to provide roof slope on flat substrates.
h.) Cementitious wood fiber (Tectum): Used for acoustical control and wouldn't have an application in a typical USPS facility but may be encountered in older roofs.

4.) Wind Design

Install roofing systems in a manner that has been successfully tested by a qualified testing and inspecting agency such as FM Global, Florida Building Code or Miami-Dade County. Roof systems must resist uplift pressures calculated according to ASCE 7 for the field, perimeters and corners. The specified approval rating must incorporate a safety factor of 2 over the maximum calculated uplift pressure in inch-pound units.

5.) Fire Resistance

Re-cover applications must carefully consider fire resistance compliance. Addition of insulation on top of other roof systems may violate the UL Class A rating.

6.) Hail Resistance

a.) Hail resistance requirements will vary with the geographic location. Hail can be encountered at most any location. East coast, west coast and mid-America states, and mountainous areas could experience smaller/softer (less damaging) hail. Larger, more damaging hail can be anticipated in a wide swath

from Austin, Texas up through the western plains including Kansas, Oklahoma, Nebraska, eastern Colorado, and the Dakotas.

b.) Roofing system tolerance to hail varies. If damaging hail is a common occurrence at the site in question, then a hail resistant roofing system should be considered. Warranty or approval from the manufacturer for hail may be desired for these sites.

c.) Many roofing manufacturers specifically exclude hail damage in their warranties.

7.) Expansion / Contraction

a.) Expansion and contraction of roofing systems is expected with changes in ambient temperature. Roof system tolerance to expansion and contraction is a factor in determining the most appropriate roof selection.

b.) Roofing membranes typically have reinforcement such as fiberglass or polyester to resist the forces of expansion and contraction as well as providing puncture resistance.

c.) Roofing systems can include area dividers (control joints) to minimize the effect of expansion and contraction and to facilitate drainage management.

d.) Roof deck types and change in direction have bearing on expansion and contraction considerations.

8.) Slope/Drainage

a.) Minimum slope may be dictated by roofing type or manufacturer and by building code. USPS requires ¼ inch per foot slope minimum, unless site conditions require exceptions. Greater roof slopes ensure that water is more quickly removed from the roof, minimizing the opportunity for water to deteriorate the roofing system.

b.) Maximum slope options can be dictated by site conditions such as parapet heights, doors etc. Modifications to parapets, thresholds, etc. may be required to attain required sloping.

c.) Locate roof drains at the low point of the roof when maximum deflection from live load is anticipated (if any). Roofs near support columns will not deflect appreciably and are generally a poor location for roof drains.

d.) Locate roof drains in sumps. Insulation around the roof drain, in cold climates, must be thin enough to allow building heat to prevent freezing at the drain inlet.

e.) Give consideration to site drainage conditions to ensure that drainage is properly discharged away from the building and property.

f.) Do not locate roof drains and horizontal drain leader piping over critical equipment. If unavoidable, drain pans under the piping is required. Drains from these pans must be installed and discharged to a safe location. (i.e. vertical downspout piping or floor drain.)

9.) Walk Pads/Pavers

a.) Walk pads are required at entry points, at the base of downspouts and beneath equipment and equipment supports set on the roof membrane surface.

b.) Medium traffic areas would include roofs with some serviceable equipment. Use of walk pads or heavy weight

concrete pavers arranged in direct line to mechanical equipment from roof access doors/hatches, to minimize foot contact to roof surface, should be employed.

c.) High traffic: Use walk pads or pavers arranged as described for medium traffic areas or completely covered with pavers.

d.) Concrete roof pavers (heavy and light weight) are specifically manufactured to be freeze/thaw resistant. Lightweight pavers are designed to be interlocked and can reduce the structural requirement of the building, where used as ballast.

e.) Walkway pads must be adhered to the single-ply membrane or include a mopped-in granular pad on built-up and modified bitumen roof systems.

f.) Also see Wind Design Criteria.

10.) Solar Reflectivity

a.) USPS requires that all low sloped roofs in ASHRAE zones 1, 2, 3, and 4 comply with DOE Energy Star requirements. The initial Solar Reflectance must be greater than or equal to 0.65.

b.) USPS requires that all steep sloped roofs in ASHRAE zones 1, 2, 3, and 4 comply with DOE Energy Star requirements. The initial Solar Reflectance must be greater than or equal to 0.25. A deviation letter may be issued to eliminate the use of the Energy Star rated shingle if a Hail impact shingle with a UL Class 4 rating is required.

c.) DOE Energy Star requirements are not mandated on steep slope roofs located in ASHRAE zones 5, 6 and 7.

d.) Modified Bitumen and BUR roofs in ASHRAE zones 5, 6, and 7 may utilize a white granule cap sheet with a reflectivity rating of .26 or greater in lieu of an Energy Star system. Use of reflective membranes may be mandated by local jurisdictions (example Chicago and California).

11.) Aesthetics (Color)

a.) Coordinate with building finishes where appropriate and economical.

b.) Comply with local/community ordinance where dictated.

12.) Owned vs. Leased Facilities

a.) Length of lease agreement and likelihood of lease renewal could have bearing on the desired roof quality, cost, and warranty needs for new roofing.

b.) Owned properties are candidates for higher quality roofs with lower total life cycle costs.

13.) Cost Factors

a.) It is the general corporate goal to install an appropriate quality roof with the lowest life cycle cost. First cost is not to be used as sole criteria. It is difficult to identify exact market conditions that affect roofing system costs for several reasons including:

b.) Oil prices affect the cost of all membranes, especially asphaltic based types such as BUR, and MB roofs and mopped two-ply vapor barriers. Wide swings can be expected.

c.) Certified vendors for specific roof types may be hard to find in certain geographic areas. Cost for travel, room and board for installers coming from outside the geographic area can make a particular roof type cost prohibitive.

d.) The Project Manager must explain what criteria were used to select a roofing system that is not the (R) recommended preference in the Roofing System Facility Matrix. Deviation from the preferred roof systems requires written authorization from the USPS roofing subject matter expert.

c. Bidding Strategy

1.) The anticipated best value recommended roofing system (i.e. R) listed in the ***Roofing System Facility Matrix*** (after qualified vendor availability has been evaluated), should always be the "base bid" roofing system.

2.) After consideration of all roof selection criteria, go forward with the highest appropriate priority roofing system listed on the ***Roofing System Facility Matrix***, as the base bid for the project. Alternate pricing methods include:

a.) Add Alternate – Use this method when the alternate roof system is suspected to be a higher initial cost alternate.
b.) Deductive Alternate - Use this method when the alternate roof system is suspected to be a lower cost initial alternate.
c.) Bid evaluation must consider total life cycle cost over initial cost.

2-6.3 Energy Conservation

2-6.3.1 Conservation/Environmental Policies and Goals

The Energy Policy Act of 2005 (EPAct05) and the Energy Independence and Security Act of 2007 (EISA) mandate energy conservation measures that must be considered. These laws require the incorporation of energy efficiency and sustainability measures into federal agency facility operations. Facility energy intensity (British Thermal Units/gross square foot) must be reduced by 25 percent by 2025, compared to a 2015 baseline. The purchase of bio-based and recycled content based products is required (in place of conventional products) when they are available and cost effective. The laws further require the expanded use of products made of recyclable materials (those in the upper 20 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets Federal standards).

USPS organizational goals include reducing energy, water, and waste in our facilities and supporting the overall corporate mission and objectives with the lowest possible facility-related energy cost and impact to the environment. These objectives benefit the USPS by minimizing energy-related expenses, maximizing return on energy investments, and complying with federal energy mandates.

2-6.3.2 Conservation/Environmental Measures

All new construction and energy impacting R&A projects are to be as energy efficient as life cycle cost effective, and all new construction is to improve upon the current version of ASHRAE 90.1 by at least 30%, or the largest amount practicable.

To meet the explicit requirements to maximize energy-efficiency and minimize life-cycle costs, multiple alternative designs **must** be considered in order to justify a 'best' final selection.

To meet the overall energy reduction goals, the design must incorporate the following:

- Evaluate and determine if the installation of standardized HVAC systems to allow remote management and control in CSF buildings greater than or equal to 15,000 square feet is cost effective. Install systems as determined by evaluation to be cost effective.
- Detailing of building envelope must avoid thermal bridging, including window and door frames.
- Orient building to minimize wind pressure at platforms, wherever site allows.
- Orient platforms to the south to minimize snow and ice build-up in cold climates.
- Utilize entry vestibules based upon climate zone requirements.
- Low-infiltration windows and doors.
- Provide rigid roof insulation in two (2) layers with staggered joints.
- Energy Star certification where possible.

The A/E must consider the following energy conservation measures:

- High mass for exterior wall systems.
- Textured exterior wall finishes that increase surface air film coefficient.
- Minimal paving adjacent to buildings in warm climates (to reduce reflected heat).
- Overhangs to increase wall surface shading in warm climates.
- Low absorption roof CSF Medium.
- Orient building to minimize wind pressure at entrances, without restricting visibility.
- Air-infiltration barriers within exterior walls and ceilings (CSF Small).
- Triple glazing in severe climates.

The USPS Building Design Standards incorporate sustainable building design concepts and construction practices to provide environmentally conscious facilities for our employees and our customers. When these design requirements and construction practices are applied to new construction projects, those projects qualify for LEED certification, but actual qualification is dependent on many project specific factors. While it is not USPS policy to attain LEED certification, project teams are encouraged to seek opportunities to implement life cycle cost-effective sustainability best practices.

Both repair and alteration and new construction projects must take advantage *of state and local government and* local utility incentive, grant, and rebate programs. The design/build entity and/or A/E provides documentation to the USPS Project Manager that demonstrates a reasonable effort to research and use these programs.

Refer also to Introduction, Section 0-2.2 Compliance with Energy Requirements.

G2-7-0d

2-7 Miscellaneous Building Components

2-7.1 Interior Partitions

2-7.1.1 Partition Types

a. Security Walls

G2-7-1a2→1r1

Interior security walls that separate public areas from USPS work areas must be framed with either wood or metal studs placed no more than 16-inches on center, and a minimum of one layer of minimum 5/8-inch gypsum wallboard on both the outside surface and inside surface of the studs. Studs must have nominal cross-section dimensions of 2 inches by 4 inches at a minimum, be placed vertically, oriented with the 2-inch sides against the gypsum wallboard or plywood, and be securely anchored to the structure at the top and bottom. Steel studs shall be a minimum of 20 gauge.

As an alternative, wood or metal studs may be spaced greater than 16 inches on center, but no greater than 24 inches on center, if the secure (Workroom) side has a minimum of one layer of minimum 5/8-inch gypsum wallboard, and the unsecure (public lobby) side of the studs has one of the following:

- A layer of 5/8-inch plywood under a layer of minimum 5/8 gypsum wallboard
- A layer of number 13 cold-rolled expanded metal mesh under a layer of minimum 5/8-inch gypsum wallboard
- A layer of 22-gauge cold-rolled steel sheet under a layer of minimum 5/8-inch gypsum wallboard

Interior security walls must be constructed uniformly above and below openings in the wall, including doors or grilles and continuously from the floor to the underside of the roof deck or a security ceiling, including between and around horizontal structural members.

Tenant separation walls in a multi-tenant location may be brick masonry, concrete block, or poured concrete. Framed tenant separation walls may also be wood or metal studs 16 inches on center, but no greater than 24 inches on center, and both surfaces must have one of the following:

- A layer of 5/8-inch plywood
- A layer of number 13 cold-rolled expanded metal mesh under a layer of 5/8-inch minimum gypsum wallboard
- A layer of 22-gauge cold-rolled steel sheet under a layer of 5/8-inch minimum gypsum wallboard

Tenant separation walls must be constructed uniformly above and below openings in the wall, including doors or grilles and continuously from the floor to the underside of the roof deck or a security ceiling, including between and around horizontal structural members.

The local Inspector may recommend upgrades to the construction of security walls in certain areas of the wall, or to the entire wall of a minor nature, without a Design Deviation if the recommendation is supported by a Risk Assessment. Major changes to security wall construction requires an approved Design Deviation supported by a Risk Assessment.

b. Security Ceilings

Interior security ceilings are a part of the security envelope and are constructed below the roof structure. They may be used to enclose and separate the interior public space in lieu of extending interior security walls to the roof structure. A suspended tile ceiling may be installed under the security ceiling.

Interior security ceilings must be framed with either wood or metal joists placed no more than 16-inches on center, and a minimum of one layer of minimum 5/8-inch gypsum wallboard on the unsecure (bottom) surface of the joists. The joists must have nominal cross-section dimensions of 2 inches by 4 inches at a minimum, be oriented with the 2-inch side against the gypsum wallboard or plywood, and be securely anchored to the structure at both ends. Steel studs must be 20-gauge minimum.

As an alternative, wood or metal studs may be spaced greater than 16 inches on center, but no greater than 24 inches on center, but the inside surface must have one of the following:

- A layer of 5/8-inch plywood
- A layer of number 13 cold-rolled expanded metal mesh under a layer of minimum 5/8-inch gypsum wallboard
- A layer of 22-gauge cold-rolled steel sheet under a layer of minimum 5/8-inch gypsum wallboard

c. Temporary Barriers

Temporary barriers are used in renovation, alteration, remodeling, or expansion projects. Temporary walls are to be constructed using a minimum of 5/8-inch plywood or OSB secured to studs spaced at 16 to 24 inches OC from the floor to the underside of the permanent structural members above (joists, beams, and/or trusses).

For expansion projects, temporary walls must be constructed in a manner such that interior temperature and existing security are maintained.

At the direction of the Project Manager, the height of an interior temporary wall can be limited to 12 feet above finished floor (AFF) in 24-hour facilities. The wall may be constructed of the same materials mentioned in the previous paragraph, or of 9-gauge woven wire mesh panels secured with non-removable fasteners.

d. Partitions - General

USPS has developed standard details for approximately fifty partition types (see the G2-7-1 and S2-7-1 series of details) that should cover any wall condition in a Postal facility, security and non-security. If working with USPS prototype plans, the partition types will be indicated on the standard drawings.

2-7.1.2 Sound Transmission

Provide sound transmission control between spaces as shown in Exhibit 2-7a.

Exhibit 2-7a
Sound Transmission Class

SPACE	ADJACENT SPACE	MINIMUM STC RATING
Offices	Other Offices, Toilet Rooms,	42
	Hall, Lobby, Workroom,	
	Mech. Room	
Investigative Office	Workroom, Offices, Mech. Room	45 for walls 45 for windows, ceilings, and floors if applicable
Non-Domicile Inspection Office	Hall, Workroom, Mech. Room	45 for walls 45 for windows, ceilings, and floors if applicable
Data Processing	Hall, Workroom, Mech. Room	42
Counselors (EAP, Credit Union, etc.) and Medical Offices	Other counseling offices and all surrounding spaces	47
Conference Room	Offices, Lobby, Corridors	42
	Toilet Rooms,	47
	Workroom, Mech. Room	

Noise levels must not exceed 80 decibels (dBA) at task location in occupied spaces when measured on the “A” scale of a standard sound level meter at slow response in accordance with OSHA. Refer to 4-4.4 Sound and Vibration Control in Chapter 4 Mechanical for additional recommended noise levels in various facility spaces.

2-7.2 Doors and Hardware

G2-7-2a

2-7.2.1 Doors

G2-7-2d-2d3

All hollow-metal doors other than storefront doors must be 18-gauge steel with 16 gauge steel frames.

a. Building Entrances

Design all building entrances to promote maximum energy efficiency, so as not to excessively waste heating or cooling resources. Further, in areas of poor air quality (non-attainment areas as defined by the Clean Air Act), similar considerations must be made to ensure that excess outside air is not unnecessarily brought into the building.

b. Sectional Overhead Doors

At CSF Platform positions with dock levelers or flip ramps, 7 feet wide x 8 feet high (7 feet wide x 10 feet high at CSF Platform positions with scissor lifts) overhead doors are typically required. Overhead doors at Platform spaces without dock equipment may use 6 feet wide x 8 feet high doors. At MPF facilities, doors are typically 8 feet wide x 10 feet

high with one of the doors being 10 feet wide x 10 feet high (to facilitate equipment movement). All doors must be manufactured as a sandwich of galvanized steel panels with an insulation core, weather sealed with two secure vision panels. Except for certain overhead doors on VMFs (see Module 4D), all sectional overhead doors must be manually operated and lockable.

Provide knockout panel doors in facilities where fork lifts or other Powered Industrial Trucks (PIT) operate on Platforms.

Place 6 inch diameter steel concrete filled bollards at base to a height of 4 feet above the finished floor and metal fabricated frames at head to protect doors from damage.

c. Toilet Room Doors

If approved by USPS, doors may not be required when proper visual screening can be provided. If doors are provided, they must swing out from the toilet room and be recessed into an alcove or have guard rails or bollards provided to prevent accidents.

d. Wicket Doors

G2-7-2b

Provide wicket doors in the public lobby as required by the Retail Design Standards. Wicket doors may be either 18 GA steel or 1-3/4 inch structural composite lumber (SCL) with 16 GA frames.

e. Automatic Doors

Use automatic doors at the main customer entry of all new construction customer service facilities 4,000 square feet and greater. Both push-button and sensor type operators are acceptable. The customer entry doors are automatic bi-parting sliding doors. Automatic high-energy swinging doors are optional; however guide rails must be provided to prevent accidents. If recommended by the operator manufacturer, provide guiderails on the swing side of such doors to prevent accidents and design for child safety. If automatic doors are used at facilities where the lobby is not open 24 hours a day, provide a key switch and/or timer to shut off power after-hours.

f. Wire Mesh Doors

Provide standard size door levers at wire mesh doors, where provided.

g. Exit Doors

Provide tactile signs as required by RE-4. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

2-7.2.2 Hardware *(Also refer to Module 2A and Module 2B*

Modules 2A, 2B

a. General

Hardware selections are based on ANSI series standards and functions.

All door handles are lever type.

Provide push-pull hardware on all multiple fixture toilet and locker room doors.

All doors designated emergency exit only must have the following features:

- No exterior hardware allowing entry from the outside.
- Local alarm powered by a 110V source with battery back-up and 110dBA horn with strobe light above the door.
- Security butt hinges with non-removable pins.
- Security viewer, if required.
- UL-rated security exit device.
- A sign stating 'Emergency Exit Only – Re-entry Prohibited' and alarm will sound if door is opened.

In facilities equipped with an Enterprise Physical Access Control System (ePACS), the exit door alarm is to be rated at 12~~24~~ VDC and provided by the ePACS integrator. Refer to Module 2A, 5-7.6 for further details.

b. Security

Provide access control system as designated in Appendix M1-F: Building and Site Security Requirements by Type of Facility and Square Footage, which has specific requirements dependent on type of facility and net square footage.

Administrative offices (which includes Facilities Field offices, Inspection Services offices, office of Inspector General (OIG) offices, National Law Enforcement Command Centers, Computer Data Centers, area offices, etc.) will have level of security determined by occupants with concurrence of Inspection Services. OIG will determine their own level of control and security. Provide deadbolt/mortise lock at all exterior doors and doors leading from public space(s) to the workroom, or other approved Inspection Service door locks.

All doors that have lock cylinders exposed to the public, as well as entry doors to designated secured rooms, must have lock cylinder security collars.

All doors with hinges exposed to the public, as well as designated secured room doors that swing outward, must have security hinges.

Install extended metal door shoes (without weather stripping), metal C-channels, or similar devices on all doors in the security envelope, including wicket doors, so that the clear space between the bottom of the door and the floor or threshold does not exceed 1/8 inch.

If removable core locks are used, equip the lock cylinder with a security collar to prevent cylinder removal when the door is closed.

Delayed-exiting devices are not authorized for use in Postal facilities.

Consult with the local postal inspector for hardware security requirements beyond those described above.

c. Keying

Door hardware must be keyed with the following considerations:

- Incorporate in the locks a security system to assure that keys used during construction will not open doors after USPS occupancy.
- Grand master keying is prohibited.
- Position the key side of all locks on doors adjacent to public spaces on the public side.

- All locks must be keyed differently except within individual groups/functions (as applicable), which will be keyed alike as indicated below:
  - Mechanical and Electrical Equipment Rooms.
  - Custodial Storage and Custodial/Janitor's Closets.
  - Bulletin boards and directories.
  - Electrical panelboards.
  - Telecommunications Closets

Individual keying is mandatory for all areas requiring individual accountability, such as stamp storage rooms, personnel records rooms and Postal Retail Stores.

Typically, only Postmasters may carry a master key. This master key, however, is not a grand master key, which would open all doors in the facility.

A lockable key cabinet must be provided and sized to hold all keys for the facility. Fire Department lock boxes are discouraged and can only be provided with an approved deviation.

d. Wicket Doors

Wicket doors require a hotel type hardware set, a security viewer and if required, an extended metal door shoe to prohibit manipulation of the hardware set. Provide a doorbell for customers to signal need for assistance.

e. Vestibule Impact Doors

Vestibule impact doors require a 1-5/8 inch (inside diameter) chain hole and either cane bolts (top and bottom) or slide bars for daytime security. If the slide bar option is implemented, the bar must be ½ inch x 2 inches (minimum) hot rolled steel. The length will vary depending on the door thickness. The bar must be lockable when in the secured position.

f. Building and Grounds Room

When double doors are used, provide a three-point locking system. The inactive leaf must have 1 inch steel pins at the door head and at the floor (set in a concrete sleeve). Hinges are security type with non-removable pins.

g. Roof Hatch

Provide a hasp for padlock (padlock by USPS) at the roof hatch, installed from the inside of the building.

2-7.3 Vertical Circulation

G2-7-3a→a2

Provide permanent and safe means of access to all mechanical equipment, including roof-mounted equipment (if applicable) requiring maintenance.

2-7.3.1 Elevators

Elevators in new construction must comply as far as is applicable with the requirements in Appendix M3-C Elevator Replacement/Upgrade Design Guide.

2-7.3.2 Stairs and Ladders

Provide permanent, safe, OSHA and code compliant means of access to the roof (including roofs at differing heights) and all mechanical equipment requiring maintenance.

Locate access to the roof in the Buildings and Grounds Room by means of either an alternating rung or ship's ladder. Note that OSHA requires fall protection on fixed ladders of 24 feet or taller installed on or after November 19, 2018. Refer to Module 2A for MPF requirements.

2-7.4 Protective Barriers

Protect walls, partitions, and columns in workrooms, platforms, loading docks, mailing vestibules, carrier vestibules, and other locations that will be subject to damage from MTE, fork-lifts, PITs, and AGVs. Wherever possible, walls that will be subject to heavy impacts should be constructed of concrete masonry units or cast concrete and have at least a double row of plastic lumber bumpers.

G2-7-4a→g

Protect framed walls covered with gypsum board or plaster in accordance with the expected impact protection that will be needed:

- At a minimum, cover the walls with fiberglass reinforced plastic (FRP) panels and two rows of plastic lumber bumpers.
- For locations subject to increased abuse, use 1/16-inch aluminum flat sheets and multiple rows of bumpers at heights that correspond to the MTE expected to be in the area.
- For walls that may be subject to high levels of impact, use 1/8-inch aluminum diamond plate sheets and multiple rows of bumpers.

Aluminum angle corners guards should also be used in areas subject to high impact. Wall corners in office and retail areas that require protection should use surface mount corner guards with a continuous aluminum retainer and a snap-on plastic cover.

All the products indicated above are specified in the MPF and CSF versions of BDS Section 102600 - Wall and Door Protection. Wall details illustrating various types of wall protection are available in the BDS Standard Detail Library.

Recess items such as electrical panels, water coolers, conduits, switch boxes, outlets, storm drain leaders, and fire sprinkler risers to prevent damage by postal traffic and to eliminate unsafe obstructions or wall projections. When recessing is not feasible, provide protective barriers, bollards, or pipe rails. Where possible, locate fire extinguishers inside the flanges of columns for protection. Protect platform stair railings with bollards. Note that floor-bolted bollards are not to be used in areas where MTE, fork-lifts, PITs, and AGVs may be present.

The use of wood products as a protective barrier, such as plywood for wall protection and dimensional lumber as bumpers, is not permitted, as these materials can splinter when impacted and create a hazardous condition.

See Module 2A for protective barriers required for Mail Processing Facilities.

Module 2A

See Module 2B for protective barriers specific to Customer Service Facilities.

Module 2B

See Module 3 for the protective barrier requirements in Repair and Alteration projects.

Module 3

2-7.5 Building Identification and Signage

All room identification signs and signs at exit doors must be tactile signs, with raised characters and Braille.

G2-7-5a→m1

2-7.5.1 Exterior Signage

A sign with the building address number should only be provided if requested by the local authorities. If one is provided, then its size and design must be in character with the building design.

G2-7-5a→d1; G2-7-5h→y1

For detailed criteria, refer to Module 4C, Exterior Signage.

Module 4C

2-7.5.2 Retail Areas

For detailed criteria, refer to Module 4A, Retail Design Standards.

Module 4A

2-7.5.3 Workroom

Provide emergency exit signs with directional arrows to points of egress. Mount signs at a height that will prevent damage from rolling equipment.

Paint designated numbers on workroom columns, visible from a minimum distance of 50 feet and placed at a height of 8 to 10 feet above the floor.

2-7.5.4 Platforms

Identify platform truck dock positions with consecutive numbers on both the exterior and interior of the platform wall. Make the numbers visible if doors are open or closed and make visible at night.

2-7.5.5 Administrative Support and Other Non-Retail Areas *(Also refer to USPS Handbook RE-4)*

Identify rooms with signs indicating room title and number as requested by USPS. Design the sign to have removable inserts for easy replacement.

USPS Handbook RE-4

G2-7-5z→z3

2-7.5.6 Flagpole

According to the United States Code, Title 4, Chapter 1, the US flag and the POW/MIA flag are to be flown at every federal facility. The POW/MIA flag is to be flown immediately below or adjacent to the flag of the United States as second in order of precedence. Provide a single, seamless tapered aluminum or anodized flagpole with an internal halyard, complete with all accessories. The flag is furnished by the facility head. Locate the pole to the left of the principal entrance as one faces the building and ground it for lightning protection. The minimum height of the flagpole, whether ground-mounted, must be 22 feet above grade. When determining the actual height to be specified, consider the height of the flagpole in relationship to the height of the building. Also, keep in mind that the internal halyard mechanism must be readily accessible since the flag must be occasionally lowered to half-mast and regularly replaced. If there are utility lines nearby, check with the utility company regarding the minimum distance between the pole and the overhead lines. The flag must be displayed from sunrise to sunset, however, based on the operational hours of the facility, if the flag will be displayed after dark, or twenty-fours a day, provide proper illumination during the hours of darkness.

2-7.5.7 Building Dedication Signage

The Administrative Support Manual (ASM) authorizes only three types of dedicatory plaques to be installed in Postal facilities: a Standard Building Dedication Plaque, a Congressional Plaque, and a Historic Building Dedication Plaque. Such plaques must be displayed in a prominent, well-secured place within the lobby of the building. A suggested location would be immediately inside the front entrance. Plaques should never be displayed outside the building.

a. Standard Building Dedication Plaque

When the Postal Service constructs or purchases a new Postal facility, the acquisition must be acknowledged by installing a Dedication Plaque in the Building. This plaque is 11 inches wide by 14 inches tall, and based on Standard Detail G2-7-5d3, which incorporates the specific inscription called for by the ASM. It will be available through Gable Signs. It would typically be furnished and installed by the GC.

b. Congressional Plaque

When a Postal Service building is designated by an Act of Congress to honor a person (or persons), Government Relations will notify the District Manager and provide a copy of the legislation. The District will obtain the plaque by following local procurement procedures. (It will also be available via eBuy2 from Gable Signs.) This plaque is 11 inches wide by 14 inches tall, and based on Standard Detail G2-7-5d4. For new construction, it can be installed by the GC if provided prior to building occupancy. For existing buildings, the District will arrange for installation.

c. Historic Building Designation Plaque

The placement of such plaques and memorials on Postal-owned property is limited to those buildings in the National Register of Historic Places. Refer all inquiries or requests for Historic Building Designation plaques to the USPS Federal Preservation Officer (FPO).

2-7.6 Building Materials / Interior Finishes

Building material selection and specification should consider the impact on human health and natural environment over the full life cycle of the building material or product. Consider materials with recycled content. Improve the indoor air quality by limiting the amount of VOCs and considering materials free from urea formaldehyde. Materials which have water-based formulations are preferred over solvent based materials.

Use of green or sustainable products should not be considered if the product is inferior to commonly used products or has not been tested or proven in its application.

Use of lead-based paint is prohibited in the design and construction of USPS facilities. Use of asbestos-containing materials in excess of one percent as defined by applicable EPA regulations, is prohibited in the design and construction of USPS facilities.

Standard floor, base, wall and ceiling finishes for most Postal spaces are listed in Appendix M1-D. Confirm that subfloors will be suitable for the intended finishes. If conditions are such that moisture may be a continuing problem for the standard finish, submit a Deviation Request to use another more appropriate finish, in a similar color. See Module 3, 2-7 for repair and

alteration floor finishes and replacement products. Asphalt plank is no longer manufactured and must be repaired or replaced as directed in Module 3,

New facilities built in Alaska with raised floors on wood structure/subfloor, are allowed to utilize aluminum diamond plate floor surface in Box Lobbies and Customer Lobbies.

The steel roof structure must be primed but not painted. The interior side of the steel roof decking must be galvanized and not be primed or painted.

2-7.7 Not Used

2-8 Fire Protection

The use of halon or carbon dioxide extinguishing systems in new construction projects is strictly prohibited. In lieu of halon or carbon dioxide, automatic sprinkler protection is recommended. In order to minimize damage to computers or other equipment located in sprinkler protected areas, NFPA 75 requires a disconnect means to interrupt the power to all electronic equipment in the computer room. Fire wall separations are also recommended as a means to control and limit damage.

The design of computer room fire suppression systems should consider an on-off sprinkler (pre-action) system using smoke/heat detectors.

2-8.1 Occupancy/Hazard Ratings

Exhibit 2-8a indicates minimum requirements only. Local codes govern where more stringent.

Exhibit 2-8a
Occupancy/Hazard Ratings

SPACE [3]	NFPA 13 OCCUPANCY [1]
Workroom & Platform	Ordinary Hazard, Group 2
Lobbies and Support Areas	Ordinary Hazard, Group 2
Office/Admin. Areas	Ordinary Hazard, Group 1 [2]

Keyed Notes:

1. Exhibit 2-8a is applicable to one story facilities only. For two story facilities, refer to the local building code.
2. Requires fire-rated separation from the Workroom and other Group 2 areas. Otherwise Ordinary Hazard Group 2 is required.
3. All facilities are deemed "Class B" per OSHA classification criteria.

2-8.1.1 Workrooms

Follow code requirements based on occupancy, size of facility, and construction type for installation of a fire sprinkler suppression system. Carefully review system design in areas of mechanization and equipment installations to provide full coverage. Evaluate other factors such as fire zone, accessibility for firefighting equipment, and distance from other structures, etc. are also to be evaluated to assure compliance with NFPA 101 and national and local codes.

2-8.1.2 Lobbies and Support Areas

These areas will generally have the same classification as the Workroom. Where the support areas have contents of higher hazard, such areas must be separately classified and isolated from the workroom with fire-rated enclosures.

2-8.2 Fire Extinguishers

G2-8-2a

Fire extinguishers must comply with NFPA 10, “Portable Fire Extinguishers”, and be the approved ABC, multipurpose dry chemical type (10-pound minimum capacity). Use of portable halon fire extinguishers containing CFCs is prohibited.

Maximum travel distance to extinguishers is 50 feet. Coordinate the placement of extinguishers with USPS Safety. When located in public lobbies, locate fire extinguishers in lockable, break-glass cabinets.

Fire extinguisher cabinets must be recessed so that the outside frame of the cabinets is flush with the wall at all locations except workroom/platform, where fire extinguisher cabinets may be surface-mounted.

Refer to Module 2A, 2-4.23 and 2-4.23.1 for fire extinguisher requirement for Consolidated Computer Room (CCR) and Telecommunications Room (TR) and Module 2B, 2-4.23 for Telecommunications Equipment Room (ER). All such spaces shall be provided halocarbon clean agent extinguishers.

2-8.3 Sprayed-on Fire Protection

All materials for sprayed-on fire protection must be either 1) factory mixed cementitious materials having a minimum applied dry density of 18 pounds per cubic foot, or 2) factory mixed mineral fibers with integral inorganic binders having a minimum applied dry density of 15 pounds per cubic foot. Asbestos is not permitted.

The bonding adhesive for fibrous fire protection materials must be as recommended and supplied by the fire protection material manufacturer. The adhesive may be an integral part of the material or applied separately to the surface receiving fire protection.

The sealer for fibrous materials must be as recommended and supplied by the fire protection material manufacturer. The sealer is an integral part of the material or applied separately to the exposed surface. It must be fungus resistant and have fire hazard classifications as follows:

- Flame Spread: 25 or less
- Fuel Contributed: 50 or less
- Smoke Developed: 50 or less

When firestopping materials, such as sealants are used, they are to be paintable type and be painted.

Do not paint firestop materials that are used above ceiling or in concealed locations. Stencil fire rating of wall above ceiling at 5 feet on center.

2-9 Criminal Investigative Systems

Criminal Investigative Systems (CIS) may include video surveillance cameras with a Criminal Investigative Office (CIO). These Investigative components are used exclusively by the Inspection Service and the Office of the Inspector General (OIG), in the performance of their investigative missions.

Specific requirements for USPIS and OIG office spaces can be found on the PS Form 929.

The following facilities require a Criminal Investigative System:

- Carrier Annexes 6,500 square feet and smaller when the 10-year projected complement exceeds 28 carrier routes.
- Carrier Annexes 6,501 to 10,000 square feet when the 10-year projected complement exceeds 28 carrier routes.
- Carrier Annexes over 10,000 square feet.

Refer to Module 2A Chapter 2, 2-9 Criminal Investigative Systems for Mail Processing Facility requirements.

Refer to Module 2B Chapter 2, 2-9 Criminal Investigative Systems for Customer Service Facilities requirements.

Also refer to Appendix M1-F: Building and Site Security Requirements by Type of Facility and Square Footage.

The CIS cameras and associated cabling are provided under the general construction contract.

Refer to Chapter 5 Electrical for electrical design criteria for Investigative CCTV Systems.

2-9.1 Criminal Investigative Office

The CIO houses the CCTV console, equipment, and controls. Provide a covert entrance to the CIO for use by the Inspection Service and OIG in an area remote from the primary employee entrance, and it should be either recessed into the building or screened with a privacy wall to match the building envelope.

Provide a breakout door into the workroom/platform from the CIO. Breakout doors shall swing in and be provided with a 10 inch x 10 inch one-way viewing window with a blackout curtain, secured with hook and loop fasteners at top and sides. The outside of the breakout door should have a decal, referred to as “Label 1” that warns against blocking the door.

The CIO occupies approximately 200 square feet of the Workroom. The standard layout does not include a toilet.

The finished floor of the CIO is at the same level as the Workroom floor. A finished ceiling is required in the office. Extend walls to the underside of the structure above and maintain an STC of 45. Paint the walls and ceiling of the office eggshell black and the floor surface shall be dark grey or black Resilient Quartz Flooring.

When determined to be required in a CSF Small facility, refer to CSF Small Plan 100C for sizing and layout.

2-10 Safety

2-10.1 Egress

G2-7-z3

Facility mailing vestibule doors, if applicable, are for transporting mail to and from the loading docks. These vestibule doors are not an approved means of egress and must be designated and/or identified with a 'NOT AN EMERGENCY EXIT' sign.

Provide no fewer than two means of egress from the building complying with the more stringent requirements of NFPA 101 or other applicable codes. Refer to Introduction Module, 0-2.1, Compliance with Building Codes and Standards.

Review the final facility floor plan from the perspective of a visitor not familiar with the facility. Identify doors that might reasonably be construed by a stranger to be an exit and call for "Not an Exit" signage to be installed at that location.

All egress routes must lead to exits that discharge to open space that allows for safe access to a public way.

2-10.2 Walking Surfaces

Provide slip-resistant walking surfaces on stairs, in locker rooms; and on toilet and customer lobby floors. Steel-troweled concrete with a light broom finish is required on platforms, ramps, and platform and carrier vestibules.

Architectural Design Checklists

Facility Name:

City, State, Zip:

Project Phase:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

NOTES:

1. This checklist shall be utilized for the design and construction of new Facilities or Repair & Alteration projects within existing facilities.
2. Design/Build entity shall submit completed checklist with each design submission. Solicitation A/E to review list submitted and return as part of the design review with comments or corrections. The design A/E for “Design-Bid-Build” projects shall submit completed checklist with each design submission.
3. Items not applicable to a specific facilities or Repair & Alterations project shall be marked as “N/A”.
4. Items identified with an “asterisk (*)” are high priority in the early preliminary design review stages.

Architectural Design Checklist – 10%

Section No.	✓	Priority	Item	Comment
2-1			**INTRODUCTION**	
2-1		*	Official USPS and PS 929 names are used and appear on Floor Plans.	
2-2			**WORKROOMS**	
2-2		*	Workroom layout is near to standard ratio as reasonable.	
2-2		*	For MPFs, workroom clear aisle width is as indicated in Module 2A, 2-2.	
2-2		*	There is secure separation of public spaces from the rest of the facility.	
2-3			**PLATFORMS**	
2-2.3		*	Workroom height complies with criteria.	
2-3			Required dock types conform to PS Form 929.	
2-3			Platform heights are 47” (with some 30” in the BMEU).	
2-3.3			Carrier platforms meet dimensional criteria.	
2-4			**SUPPORT AREAS**	
2-4.1		*	Employees have clear secure route to employee areas or administrative area.	
2-4.1		*	TACS is located at entry foyer. (MPF only.)	
2-4.1		*	Employees have a direct route from entry to lockers and lunchroom before workroom.	
2-4.2			Toilet fixture counts comply with criteria.	
2-4.4.1		*	Two outdoor break areas have been provided.	
2-4.9			Requirement for outside storage area has been verified with USPS. If required, the design complies with criteria.	
2.4.21			BMEU is adjacent to the Collection Mail Operations.	
2-6			**EXTERIOR ENVELOPE**	
2-6.3		*	Platform faces South for solar gain in winter.	
2-6.3		*	Platform faces away from prevailing winds and storms.	

Section No.	✓	Priority	Item	Comment
2-7			**MISCELLANEOUS BUILDING COMPONENTS**	
2-7.2.1		*	Building entrance is located and designed to avoid prevailing winds and storms.	

Architectural Design Checklist – 30%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% submittal check lists been incorporated?	
2-2			**WORKROOMS**	
2-2			Mechanization/automation equipment is coordinated for space requirements and location. (MPF only.)	
2-3			**PLATFORMS**	
2-3.4			Compactor and baler requirements have been verified with USPS.	
2-3.5			Columns are set back 1'-6" from edge of platform(s) and protected	
2-3.6		*	Ramps are provided to allow access to Workroom and comply with Handbook RE-4. Also, ramp is in accordance with Standard Details.	
2-4			**SUPPORT AREAS**	
2-4.4.1		*	Outdoor break areas are shielded from sun, prevailing winds, and noise.	
2-4.14			Battery charging area complies with the Standard Design Criteria.	
2-6			**EXTERIOR ENVELOPE**	
2-6.1.2			Windows at administrative and related support offices (if provided) do not exceed 30% of exterior wall area.	
2-7			**MISCELLANEOUS BUILDING COMPONENTS**	
2-7.2.1b			Mail and carrier vestibules are coordinated for door swing direction and door protection (bollards, overhead stops), hardware and signage.	
2-7.2.1d			Provide proper visual screening at toilet rooms. Do doors swing out and are they recessed in alcove?	
2-8			**FIRE PROTECTION**	
2-8			Requirement for pre-action sprinkler system in computer rooms has been verified with USPS.	
2-9			**INVESTIGATIVE SYSTEMS**	
2-9		*	A Criminal Investigative System, consisting of CCTV cameras, CIO and Remote Breakout in large facilities, is provided.	

Section No.	✓	Priority	Item	Comment
2-9.1		*	Convert entrance is provided to the Criminal Investigative Office and Remote Breakout. Entrance is shielded in accordance with Standard Detail.	
2-9.1			Criminal Investigative Office complies with design criteria.	

Architectural Design Checklist – 70%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% and 30% submittal check lists been incorporated?	
2-1			**INTRODUCTION**	
2-1.1		*	For MPFs, note that the interior finishes and colors are per the Finish Schedule in Appendix M1-D.	
2-2			**WORKROOMS**	
2-2			Workroom roof deck is galvanized and left unpainted.	
2-2			Workroom roof structure is primed and not painted.	
2-2.1			Casework conforms to Standards and is from national supplier.	
2-2.1			Wire screen enclosures comply with criteria. Sides and top are secure.	
2-3			**PLATFORMS**	
2-3.7			Stairs comply with Standard Design Criteria.	
2-8.8.5			Exterior bumpers are provided at mail platforms. (No open platforms). Bumpers are provided at mail and elevated carrier platforms. Steel channel is provided at open carrier platforms.	
2-4			**SUPPORT AREAS**	
2-4.3			Locker area requirements comply with PS Form 929 and criteria.	
2-4.5			Open office systems furniture to be provided by national buying contract and coordinated with building design, including electrical and structured wiring.	
2-4.8			Vault(s) are located per criteria and are either poured in place or modular.	
2-6			**EXTERIOR ENVELOPE**	
2-6.1		*	Insulation levels comply with the Standard Design Criteria.	
2-6-1.2			Materials are low-maintenance and compatible with regional design and construction.	
2-6.1.2			Windows meet glazing and security requirements per Standards.	
2-6.2.2b		*	Roof is low-absorption and high reflectivity.	

Section No.	✓	Priority	Item	Comment
2-6.2.3d			Walkways are provided to all roof mounted equipment.	
2-6.3			Energy conservation measures have been considered.	
2-7			**MISCELLANEOUS BUILDING COMPONENTS**	
2-7.2.2			Hardware is in compliance with Standards.	
2-7.3			Permanent, sale access is provided to all mechanical equipment.	
2-7.4			Protective barriers are provided per criteria. FRP wall protection is provided at workroom.	
2-7.5			Exterior signage designed by National Supplier.	
2-8			**FIRE PROTECTION**	
2-8.2			Maximum travel distance to fire extinguishers is 50 ft.	

Architectural Design Checklist – 100%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10%, 30% and 70% submittal check lists been incorporated?	
2-3			**PLATFORMS**	
2-3.8			All dock equipment is coordinated dimensionally and for power requirements.	
2-3.8.1			Electro-hydraulic, front-mounted adjustable flip ramps are provided at 30” docks.	
2-3.8.2			Air powered pit style dock levelers are provided at all 47” docks.	
2-3.8.4			Scissors lifts are provided in accordance with PS 919/929.	
2-4			**SUPPORT AREAS**	
2-4.2		*	Do toilet accessories conform to the National Buying Agreement?	
2-4.2			Fixtures/partitions are properly mounted per criteria/code.	
2-4.4			Floor drains are provided at vending areas.	
2-7			**MISCELLANEOUS BUILDING COMPONENTS**	
2-7.1.2			STC ratings complies with design standards.	
2-7.5.3			Workroom columns have designated numbers per criteria.	
2-7.5.4			Truck dock positions are numbered, inside and out.	
2-7.5.5			Interior signage complies with Handbook RE-4 and is coordinated with USPS.	
2-7.5.6			Flagpole complies with criteria.	
2-7.6			Products with recycled content have been considered.	
2-7.6			Asbestos containing materials are not specified.	
2-8			**Fire protection**	
2-8			Halon/carbon dioxide extinguishing systems are not specified.	
2.10			**SAFETY**	
2-10.1			Vestibule doors at loading docks are identified with a “NO EXIT” sign.	

Section No.	✓	Priority	Item	Comment
2-10.2			Slip resistant and troweled concrete surfaces are provided per the criteria.	

Module 1 - General Criteria

Chapter 3 - Structural

3-1 Introduction
3-1.1 Codes and Standards

3-2 Design
3-2.1 Geographic Considerations
3-2.2 Foundations
3-2.3 Design Loads
3-2.4 Column Design/Framing Systems
3-2.5 Exterior Wall Systems
3-2.6 Rooftop Photovoltaic Panel Systems

3-3 Computations

Structural Design Checklists

Chapter 3 - Structural

3-1 Introduction

3-1.1 Codes and Standards

All facilities must be designed in accordance with the requirements set forth by the applicable state and/or local codes and construction material codes in force at the time of design. Refer to the Introduction Module, Section 0-2, Codes and Standards, for more details. Where two or more codes, standards or USPS criteria are in conflict, the more stringent ones apply.

3-2 Design

3-2.1 Geographic Considerations

All appropriate building systems shall be designed in accordance with site specific local requirements for snow, wind, frost depth and seismic zone. Follow the seismic provisions of the model code (i.e., IBC) commonly adopted in the area where the facility will be located or provisions of the local code, whichever is more stringent.

3-2.2 Foundations

Foundation and ground floor slab design must be based on site-specific geotechnical evaluation and recommendations. The design engineer considers the full effects of differential settlement when designing foundations. The geotechnical engineer develops the foundation system recommendations so as to limit differential settlement between columns as follows (S = span in feet between columns):

Facilities without fixed mechanization $= \frac{S(12)\text{ in.}}{1000}$

Facilities with fixed mechanization $= \frac{S(12)\text{ in.}}{1500}$

For example, a facility (without fixed mechanization) with a 50 ft. x 50 ft. bay size should be designed for a maximum differential settlement of (50)(12)/1000 = 0.60 in. between column foundations.

Where compacted controlled fill is utilized, spread footings must not be supported on deep (in excess of 3 ft. 0 in.) structural soil fill due to problems experienced with compaction and differential settlement. Place all compacted structural fill, when required, under the direction of a qualified geotechnical engineer and have the contractor submit certified compaction results. These requirements may be waived by the USPS when the A/E provides full justification for their use, accompanied by a detailed description of quality control procedures.

3-2.3 Design Loads

3-2.3.1 Minimum Design Loads

Calculate design dead loads based on minimum code requirements or actual weights of the material specified, whichever is greater. Include weight of snow (including drift), and other equipment, utilities and services in seismic calculations where required by applicable codes.

Design live loads, including wind and snow loads, must be in accordance with all applicable codes or with those shown in Exhibit 3-2a whichever is more stringent:

Exhibit 3-2.3.1a
Minimum Design Loads

LOCATION	MINIMUM DESIGN LIVE LOAD (PSF)
Workroom Floor	150[1]
Platform, Support Areas and Retail Store Floors	150[1]
Mechanical Room Floor	150[3]
Roof	20[4]
Building Utilities/Services (Hanging Load) above Mechanical Equipment Rooms	30[3]
Building Utilities/Services (Hanging Load) above all rooms other than Mechanical Equipment Rooms	5[2, 3]
Rooftop mounted photovoltaic panel systems, including rack support	6[5]
Compact Buildings	50

Keyed Notes:

1. Floors in workrooms, platforms, storage rooms and all other spaces accessible to forklift traffic shall be designed for the live load indicated or for the effects of a fully loaded 3000 lb. capacity forklift (8,400 lb. axle load), or for the mechanization loads given below, whichever is more stringent.

   Where floor supported mechanization is used, if the floor can be used for mail storage below the mechanization equipment then the uniform load used shall be 150 psf plus the actual mechanization load, otherwise the uniform load used shall be the larger of the 150 psf or the actual mechanization load.

   Verify floor load requirements for RCS (Robotic Containerization System).
2. Add 3 psf or actual ceiling loading, whichever is greater, where ceilings are required.
3. Or actual equipment and services, whichever is greater. At mechanical room floors, consider concrete housekeeping pads as additional dead load, not to be included in the live load allowance.
4. Plus hanging loads indicated. In regions where snow load is less than 20 psf, reduction in general roof live load below 20 psf may be made only where permitted by all applicable Codes.
5. For ballasted installation, may reduce to 4 psf for non-ballasted installation where approved by the USPS.

3-2.3.2 Not Used

3-2.3.3 Contract Drawings

Include the following structural criteria on the contract drawings as a minimum:

- Listing of applicable building codes.
- Tabulation of zones, exposure categories and calculated basic loading values for wind, snow and seismic loads.
- Design dead and live load key plan and schedule, with separate entries for (1) beams, (2) girders and (3) columns and foundations where appropriate.
- Snow drift and wind uplift loading diagrams.
- The dead load of rooftop mounted photovoltaic panel systems, including rack support systems, shall be indicated on the construction documents.

3-2.4 Column Design/Framing Systems

3-2.4.1 Column Design and Bay Sizes

All columns must be designed to support roof-supported mechanization (if applicable). Locate columns to minimize effect on Postal operations.

Bay sizes must be as large as practical to maximize clear floor space within the facility workroom and retail space. The sizes listed in Exhibit 3-2b are typical bay sizes for postal facilities.

Exhibit 3-2a
Minimum Design Loads

FACILITY TYPE	BAY SIZE (ft.)
CSF Medium	20 x 40
CSF Small	See Standard plans
P&DC	56 x 56
All Other MPF	52 x 52[1]

Note:

1. Coordinate with OSL for specific project**.**

3-2.4.2 Roof Systems/Deflection

Design all roof framing to support roof-supported mechanization (if applicable). Design roofs with a minimum pitch of ¼ in. per ft. (½ in. per ft. for standing seam metal roofs) and maximum live load deflection of L/360, with a maximum total load deflection of L/240.

Standing seam metal roofing (SSMR) panel deflection under full dead and live and/or wind load must not exceed 1/180 times the span between supports.

Consider all live and dead load deflection that the structural systems may be subjected to, such as mechanical, electrical and architectural features that are supported by and or fastened to the structure in addition to allowing for positive drainage of the roof system.

3.2.4.3 Structural Wood Systems

Structural wood systems are permissible, if approved by USPS. Design trusses by the most economical method, e.g. two parts with a center support (if a clear span is not essential), shorter lengths to avoid special shipping permits, etc.

3-2.5 Exterior Wall Systems

Design provisions must be made for connection of the wall system to the primary structural system with full consideration of the serviceability requirements of the wall type selected.

3-2.6 Rooftop Photovoltaic Panel Systems

When applicable, roof structural systems are to be designed to accommodate rooftop mounted photovoltaic panel systems with ballasted attachment. Include the additional dead load and wind load in the structural calculations.

3-3 Computations

In accordance with Handbook AS-506, Architect/Engineer Project Requirements, structural computations are to be provided for all MPF and CSF Medium Design-Bid-Build projects, for new construction, as well as for building additions. For Design-Build projects, including CSF Small plans, and R&A projects, the USPS Project Manager will determine whether structural computations are required, based on the scope and magnitude of the project. (If A/E services are being provided under an indefinite-quantity contract Work Order, structural computations must be included in the A/E fee proposal and spelled out in the Work Order.)

Provide structural computations for all load carrying members, in a neat, orderly and understandable manner. They must be complete with appropriate references and sources of design input and shall be submitted for review along with the scheduled design submittals.

Provide a table of contents with the computations. Computations must be signed and sealed by a professional engineer licensed in the state where the project is located.

Structural Design Checklists

Facility Name:

City, State, Zip:

Project Phase:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

NOTES:

1. This checklist shall be utilized for the design and construction of new Facilities or Repair & Alteration projects within existing facilities.
2. Design/Build entity shall submit completed checklist with each design submission. Solicitation A/E to review list submitted and return as part of the design review with comments or corrections. The design A/E for “Design-Bid-Build” projects shall submit completed checklist with each design submission.
3. Items not applicable to a specific facility or Repair & Alterations project shall be marked as “N/A”.
4. Items identified with a “asterisk (*) are high priority in the early preliminary design review stages.

Structural Design Checklist – 10%

Section No.	✓	Priority	Item	Comment
3-2			**DESIGN**	
3-2.4.1			Column bay spacing, sizing, orientation and numbering are coordinated with the architectural plans.	

Structural Design Checklist – 30%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% submittal check lists been incorporated?	
3-2			**DESIGN**	
3-2.1			Structural systems comply with site specific requirements (snow, wind, frost depth, seismic), as applicable.	
3-2.3			Design live/dead loads comply with criteria/local codes.	
3-2.3		*	Increase roof structure load capacity only where required to support mechanization.	
			Column spacing follows design criteria.	

Structural Design Checklist – 70%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10% and 30% submittal check lists been incorporated?	
3-2			**DESIGN**	
3-2.2			Foundation/floor slab design is based on geotechnical recommendations.	
3-2.2			If identified by geotechnical report, surface/subsurface conditions affecting design, such as high moisture content in surface soils, unsuitable fill, buried trash, presence of perched or high groundwater levels, etc. have been evaluated.	
3-2.2			Foundation system and retaining wall (if applicable) are designed according to geotechnical recommendations; differential settlement analysis has been performed.	
3-2.2			If site requires controlled compacted structural fill under building foundations, the fill depth does not exceed 3'-0".	
3-2.4.2			Structural systems comply with deflection criteria.	
3-2.5			Exterior wall system is connected to primary structural system, allowing for differential movement.	
3-3			**COMPUTATIONS**	
3-3			Structural computations have been prepared and submitted for all load carrying members, complete with code references to sources of design input.	

Structural Design Checklist – 100%

Section No.	✓	Priority	Item	Comment
			GENERAL	
			Have all items from 10%, 30% AND 100% submittal check lists been incorporated?	
3-2			**DESIGN**	
3-2.5			Exterior wall sections are dimensionally coordinated with architectural and structural details, showing clearances and support requirements.	

Module 1 - General Criteria

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope
4-1.2 Codes and Standards
4-1.3 Mechanical Commissioning
4-1.4 Mechanical Measurement and Verification (M&V)

4-2 HVAC

4-2.1 Energy Conservation
4-2.2 Equipment Selection
4-2.3 Outside Design
4-2.4 Inside Design
4-2.5 Space Specific Requirements
4-2.6 Design Loads
4-2.7 Thermal Transmittance (U-Factors)
4-2.8 Computations
4-2.9 Zoning
4-2.10 HVAC Controls
4-2.11 Central Heating Systems
4-2.12 Air Handling Systems
4-2.13 Building Pressurization
4-2.14 Advanced Metering
4-2.15 Miscellaneous HVAC Requirements

4-3 Plumbing

4-3.1 Water Supply Systems
4-3.2 Sanitary Drainage Systems
4-3.3 Plumbing Fixtures
4-3.4 Storm Drainage
4-3.5 Fuel Systems
4-3.6 Compressed Air Systems
4-3.7 Miscellaneous Plumbing Requirements
4-3.8 Computations
4-3.9 Storage Tanks

4-4 Miscellaneous HVAC/Plumbing Components

4-4.1 Motors and Controllers
4-4.2 Pumps, Piping and Fittings
4-4.3 Insulation
4-4.4 Sound and Vibration Control

4-5 Fire Protection

4-5.1 Sprinkler Systems
4-5.2 Standpipe and Hose Systems
4-5.3 Duct Mounted Smoke Detectors

4-6 Construction Closeout

Mechanical Design Checklists

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope

The design criteria within this document specify mechanical requirements for design and construction of USPS Facilities. The mechanical systems must provide year-round control of temperature, humidity, air circulation, ventilation, and air cleaning to the degree required to ensure the safe and efficient use of space by occupants and equipment.

4-1.2 Codes and Standards

Whenever unique problems or conditions not covered herein are encountered, the A/E/Designer must follow generally accepted industry practices as reflected in the latest issue of the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) handbooks and the National Institute for Occupational Safety and Health (NIOSH) Criteria for a Recommended Standard for Occupational Exposure to Hot Environments. Refer potential solutions and their recommendations to USPS Design and Construction (D&C) Authority for final approval.

The A/E must provide a complete mechanical, plumbing, and fire protection design for the facility in accordance with the issuance of site specific program requirements. The A/E is responsible for the complete performance and installation of all systems; the provided systems must be fully coordinated between disciplines, trades and existing conditions, functional, and consistent with the architectural design developed for the building along with site-specific facility functional requirements.

Buildings must be designed in accordance with the requirements set forth by the applicable national, state and/or local codes and standards enforced at the time of design. In addition, the design criteria contained in this document must be followed. Where two or more codes, standards or USPS criteria are in conflict, the more stringent applies.

The A/E submits the documentation listed below with the 30% and 100% design levels as a minimum, and as specified by the Contracting Officer. Forms and drawings submitted must be stamped by a Professional Engineer.

a. Performance Rating Report.**
b. Building Envelope Compliance Documentation. **
c. HVAC Mandatory Provisions.**
d. Service Water Heating Compliance Documentation.**
e. Equipment selections and alternatives documented in a Life Cycle Cost Analysis (LCCA)*. The LCCA must use the:
    1. Latest edition of NIST Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program.
    2. Current USPS economic factors. These factors can be obtained from the USPS Intranet and will be provided by the USPS (USPS

Memorandum titled “Decision Analysis Report Factors/Cost of Borrowing/New Facility Start-up Costs Update”).

f. Building heating and cooling load calculation summary output from the load simulation program.

g. Provide an electronic archive of the building models from the software system used to perform the simulations along with a brief description of the software and release version used to perform the simulation.

* Available from the Facilities Program Management, Energy/Standards Team Leader.

** ASHRAE 90.1 Appendix G Compliance Forms are available at *www.ashrae.org/standards-research--technology/standards-forms--procedures.*

Energy consumption for the purposes of calculating the 30 percent savings must include space heating, space cooling, ventilation, service water heating, lighting, and all other energy consuming systems normally specified as part of the building design except for receptacle and process loads.

These requirements apply to all new construction and additions greater than 15,000 SF.

The energy consumption levels for both the baseline building and proposed building must be determined by using the Performance Rating Method found in Appendix G of the current version of ASHRAE 90.1 except the formula for calculating the Performance Rating in paragraph G1.2 must be modified regarding exclusion of receptacle and process loads to read as follows:

a. Percent improvement = $100 \times [(B_1 - P_1)/ B_1]$ where

b. B_1 = Baseline building consumption (w/o receptacle and process loads).

c. P_1 = Proposed building consumption (w/o receptacle and process loads).

Materials, equipment, and systems must be designed and installed to comply with the EPA Safe Drinking Water Act.

Where required by the building code, provide seismic bracing and anchors. Comply with SMACNA Seismic Restraint Manual.

4-1.2.1 Clarification of HVAC Refrigerant and Equipment Selection for USPS Facilities

As the USPS continues at the forefront of facilities environmental stewardship, this clarification refines requirements for heating, ventilation and air conditioning (HVAC) refrigerant, and equipment selection. The following requirements are to be implemented on all USPS projects where construction contracts have not been awarded. For projects where construction has been awarded, the new requirements must be incorporated to the fullest extent possible.

In order to provide a sound business decision, HVAC refrigerant and equipment is to be selected based on life cycle cost, federal guidelines, and operational needs. Only select hydro fluorocarbon (HFC) refrigerants and alternative substitute refrigerants/blends that are listed as either "acceptable alternatives" or "subject to use conditions" in the U.S. EPA's Significant New Alternatives Policy (SNAP) Program are allowed to be selected for new construction or replacement systems. The Postal Service prohibits procurement of systems containing any chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) refrigerants and/or HFC refrigerants that are listed as "unacceptable". This allows USPS to remain at the forefront of environmental compliance.

Under the Clean Air Act, CFC refrigerants (e.g., R-11, R-12, R-111, R-115, and R-502) were phased out and banned from production by 1996. A phase out of HCFC refrigerants (e.g., R-22, R-123, R-221, and R-401a) will be complete by 2030. Previously acceptable HFCs, such as R-134a and R-410a, are currently being re-evaluated for environmental impacts and will be slated for phase out. Phase out of targeted HFCs will be accomplished through the prohibition of manufacturing refrigerant equipment utilizing the targeted HFC, rather than by a direct ban of the HFC itself. For example, beginning in 2024, chillers will not be allowed to be manufactured or imported that contain/utilize R-134a or R-410a. When purchasing new refrigerant equipment in the future, the Postal Service must procure systems using refrigerants deemed acceptable under the EPA's SNAP Program, that are not scheduled for phase out. Acceptable refrigerants will shift over time from HFCs to new alternative substitute refrigerants and blends.

The USPS follows these transition steps regarding refrigerant equipment containing CFCs, HCFCs, and HFCs:

- Recover, store, and reuse refrigerants to service existing refrigeration equipment.
- Retrofit existing equipment (and supporting components) to use an approved substitute refrigerant under the EPA's Significant New Alternatives Policy (SNAP) Program.
- Remove from service ("retire") equipment where refrigerant, retrofit, or energy costs are prohibitive, and/or operational needs or federal/state requirements are not attainable.
- As needed, purchase replacement or new equipment that utilizes an approved substitute refrigerant and meets energy efficiency standards.

All packaged and split systems and chillers purchased for new construction or replacement must use SNAP-approved alternative refrigerants. Selection is to be based on life cycle cost which is to include first cost, energy costs, maintenance, and refrigerant replacement costs.

All equipment is to be selected based on life cycle cost and compliance with local or federal guidelines, whichever is more stringent. Refer to Standard Design Criteria, 0-2.2 for Compliance with Energy Requirement for new construction. As a result, it will be necessary to install very high-efficiency HVAC equipment and systems which may exceed the criteria established below.

The HVAC industry continues to evolve and develop new technologies that provide better operating efficiencies and less impact on the environment. The USPS will continue to monitor these trends and revise our established policies when necessary to take advantage of the changes. The criteria used for HVAC refrigerant and equipment selection will be reviewed on an annual basis.

4-1.3 Mechanical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services.

The basic purpose behind commissioning mechanical systems for the USPS is to confirm that the functionality of the new equipment meets the original design intent, operates efficiently, and demonstrates that all the required features of the new system are functioning as specified in the design documents.

The development of the project-specific Commissioning Plan and the Commissioning Requirements for mechanical systems are discussed in Paragraph 4-1.3 of Modules 2A, 2B, and 3.

If a project is to include mechanical commissioning, then the appropriate USPS specifications sections, i.e. “019113 - General Commissioning Requirements”, “220800 - Commissioning of Plumbing”, “230800 - Commissioning of HVAC”, and “250804 - Building Automation System (BAS) Commissioning”, must be included in the project manual.

4-1.3.1 Observation and Testing Requirements

The below sampling rates are to be used for all building and project types.

Equipment or Systems	Sampling Rate
HVAC Systems	
Chillers	100%
Cooling Towers/Evaporative Fluid Cooler	100%
Boilers and Associated Equipment	100%
Heating Heat Exchangers	25%
Pumps	50%
Air Handling Units	25%
Exhaust Fan Systems	25%
Ventilation Fans	25%
VFDs	25%
Air Terminal Units	25%
Ductwork	20%
Piping	25%
Temperature Control	25%
Ventilation Control	25%
Building Automation Systems	
Temperature/Humidity Sensors	25%
Pressure Sensors and Controllers	25%
Sequence of Operation (all different sequences)	100%
Airflow Stations	25%
Damper/Valve Actuators	25%
Plumbing and Fire Protection Systems	
Plumbing Equipment	25%
Plumbing Fixtures	25%
Plumbing Piping Systems	25%
Effluent Decontamination System	25%
Fire Pump	100%

4-1.4 Mechanical Measurement and Verification (M&V)

All significant energy-saving projects being performed with the primary objective of reducing energy consumption must be measured and verified to determine actual energy savings performance at construction completion. Measurement and Verification must use an International Performance Measurement and Verification Protocol (IPMVP) option that focuses on short term, post-installation measurements, where applicable, that validate the performance estimates projected by the modeling simulation. In some cases, verification utilizing Option A can be accomplished by point source measurement of individual pieces of equipment with the stipulation that

secondary impacts determined by the building energy model are realistic and achievable.

The FEMP (Federal Energy Management Program) Guidelines are an application of the International Performance Measurement and Verification Protocol (IPMVP). Refer to the FEMP document for determining the level of M&V needed and the methodologies required for the general categories, or options, outlined in Table 4-1 “Overview of M&V Options A, B, C, and D”. Confer with the USPS Facilities Program Management, Energy/Standards Team Leader for application of the specific M&V Options. A copy of the guideline can be found in BDS Folder G2, and is available online at: http://energy.gov/eere/femp/downloads/mvguidelines- measurement-and-verification-federal-energy-projects-version-30

For specific project requirements for Mechanical M&V, see Paragraph 4-1.4 in Modules 2A, 2B, and 3.

4-2 HVAC

4-2.1 Energy Conservation

The Postal Service prohibits the procurement of any refrigerant system that contains CFC (chlorofluorocarbon) or HCFC (hydrochlorofluorocarbon) refrigerants. Procurement of any refrigerant system containing HFC (hydrofluorocarbon) refrigerants that are listed as "unacceptable" under EPA's SNAP Program is also prohibited.

All packaged and split systems purchased for new construction or replacement must use SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends.

Refer to Standard Design Criteria, Introduction Module, Section 0-2.2 Energy Conservation, for detailed energy mandate statement. See also Appendix M1-E, ASHRAE 90.1 HVAC Minimum Efficiency Requirements.

Appendix M1-E

4-2.1.1 Conservation/Environmental Measures

When applicable, the designers must adhere to the following measures when designing systems and selecting equipment:

- Cooling equipment, heating equipment, and domestic water heaters must carry the Energy Star label.
- Systems must not be oversized because such systems are neither energy efficient nor cost-effective.
- Part load performance must be analyzed and kept as high as practical. To keep part load efficiencies high, while providing redundancy, multiple smaller systems are used. Analysis demonstrating this part load performance must be provided to the USPS.
- Block loads (building heating and cooling requirements) should reflect the basic building requirements without adding safety factors and must use peak coincident loads to take into account plant/system diversity. The designer is responsible for determining the appropriate diversity factor for load calculations.
- Provide systems that avoid reheating and/or re-cooling for humidity control.

- Provide automatic controls to de-energize heating, cooling, and fan equipment when not needed.
- Provide heat pumps in lieu of resistance heat. Straight resistance heat may be used only if proven cost-effective.
- Provide the most efficient heating and cooling systems available considering the building operation and local weather conditions, e.g., evaporative cooling or precooling systems in dry weather conditions. Also, consider air-air heat exchangers or heat wheels for preheating or pre-cooling ventilation air requirements.
- Do not use exterior snow melt systems for roofs and parking.
- Consider energy recovery ventilators to reduce the cost of outside air.
- Consider Demand Control Ventilation with CO_2 monitors, see section 4-2.15.10.
- Consider geothermal heat pumps.
- Consider renewable energy systems.

When applicable and proven cost effective, the following additional energy conservation measures must also be considered:

- In colder climates, consider heat exchangers, heat wheels, etc. to preheat makeup air.
- Provide automatic blowdown controls in the boiler plants to avoid continuous blowdown, which is very wasteful.
- Provide a boiler blow down, waste heat recovery heat exchanger system to preheat boiler feed water.
- Provide a variable frequency drive at one of the centrifugal chillers in the plant to improve the chiller part load efficiency.
- Limit the chiller pressure drop through condenser and evaporator bundles to no higher than 10 feet of water column.

4-2.1.2 Equipment Performance

Select HVAC equipment efficiencies based on Exhibit 4-2.1.2a or the current edition of ASHRAE 90.1. When there is a conflict, use the stricter of the two.

Exhibit 4-2.1.2a
HVAC Equipment Efficiencies

UNIT SIZE	SPLIT SYSTEM EFFICIENCY STD. (including heat pumps)	PACKAGED SYSTEM EFFICIENCY STD. (including heat pumps)
< 5 tons	15.00 SEER	14.00 SEER
≥ 5 Tons < 10 tons	11.00 EER	11.00 EER
≥ 10 Tons < 20 tons	11.00 EER	11.00 EER
≥ 20 Tons	10.00 EER	10.00 EER

For locations or areas where coil corrosion can occur (i.e., airports, industrial areas, and seacoasts), condenser coils must be coated to increase equipment life and reduce maintenance requirements.

4-2.2 Equipment Selection

Packaged HVAC equipment [roof top units (RTUs) and/or split systems (SS)] shall be used for all new construction. Individual units must be of no larger than 50 tons capacity, or sized to cover an area no larger than 25,000 square feet. Workrooms larger than 20,000 square feet shall be supplied with at least 2 RTUs or SS serving different areas of the work floor. Boilers & chillers may be used in new MPFs only with an approved Deviation that demonstrates that they are essential to meet federal energy requirements, to meet USPS energy conservation goals as spelled out in SDC Introduction Module, Section 0-2.2 – Compliance with Energy Requirements, or they provide a substantial economic benefit compared to packaged equipment.

The selection of packaged HVAC units must be based on a project specific 20 year life cycle cost (LCC) comparison. This LCC analysis must use standard efficiency roof top units (RTUs) (having the minimum efficiencies provided in SDC Module 1, Section 4-2.1.2) as the base case. Alternatives in the LCC analysis should consider varying the size/number of RTUs and/or split systems (SS), as well as units with higher efficiencies. A central plant (boilers, chillers, AHUs) may also be included as an alternative in the LCC comparison. The A/E must perform this analysis.

The analysis must consider (for the RTUs, SS, and any central plant equipment) the following costs: first cost, additional mechanical room space, additional plant and equipment, major pumps, piping and duct work, cooling tower(s), maintenance and operating costs, end-of-life replacement costs, and energy costs/savings.

The USPS Project Manager will obtain the USPS Discount Rate from USPS Finance and USPS Labor Rates from Engineering for HVAC maintenance.

The requirements for roof top units and split systems are as follows:

- Heating and ventilation only units must consist of supply air fan, variable frequency drives, gas heating, return/exhaust fan, air filter and economizer/ intake-mixing section, and a Demand Control Ventilation (DCV) circuit. See Section 4-2.15.6 for economizer and DCV applications. Units must be high quality light industrial grade equipment.
- Heating and cooling units must consist of supply air fan, variable frequency drives, cooling coil (DX), gas heating, return/exhaust fan, air filter, enthalpy economizer/ intake-mixing section, refrigeration compressors, air-cooled condensers sections, and a Demand Control Ventilation (DCV) circuit. See Section 4-2.15.6 for economizer and DCV applications. Units must be high quality light industrial grade equipment.
- Cooling only units must consist of supply air fan, variable frequency drive, cooling coil (DX), return/exhaust fan, air filter enthalpy, economizer/intake-mixing section, and refrigeration compressors. Units must be high quality light industrial grade equipment.
- Provide units with fully compliant BACnet controls. Mount the units on roof curbs. Give careful consideration to prevention of water leakage through curbs and air inlet/outlet openings of the units. All parts of the units must be completely accessible for maintenance and repairs.
- Provide access and maintenance space to comply with the National Electric Code, OSHA requirements, and manufacturer's Installation and Operating Instructions.
- Units must be capable of providing net positive air pressure in the building.
- The cooling coil face velocity must not exceed 550 fpm except for humid climate locations.
- Locate outside air intakes of the unit away from the prevailing wind direction.

- Evaporative cooling may be used in dry climates.
- Filters must have a Minimum Efficiency Reporting Value (MERV) of 5 for prefilters and 11 for final filters, as defined in ASHRAE 52.
- Provide condensate lines to the nearest roof drain while minimizing tripping hazards. A/E must evaluate providing insulated copper condensate piping down into the facility with connection to the storm drain piping to prevent excess rooftop piping. Final determination will be made by the Project Manager. If run inside the facility, route lines to avoid running over the top of equipment and systems that could become damaged.
- Follow applicable standards and codes regarding flexible relief fittings of gas piping.
- Place gas lines inside building in Climate Zone 7 & 8 only.
- Solicitation A/E must develop roof top piping management plan to assure efficiency of future removal and transport of heavy objects.
- Provide one weather-proof GFI convenience outlet mounted to the exterior of each RTU.
- Mechanical equipment, appliances, and supports that are exposed to wind shall be designed and installed to resist the wind pressures determined in accordance with the local Building Code.
- For High-Velocity Hurricane Zones, all rooftop equipment and supports shall be secured to the structure in compliance with the loading requirements of the local Building Code.

4-2.3 Outside Design

The design must be based on weather data provided in the current edition of the ASHRAE Fundamentals Handbook based upon information shown in Exhibit 4-2.3a.

Exhibit 4-2.3a
Weather Data

SEASON	BASIS
Summer	1% column for Cooling DB/MCWB 1% column for Dehumidification DP/MCDB
Winter	99% column for Humidification DP/MCDB 99% column heating DB

General Notes:

DB is Dry Bulb Temperature.
MCWB is Mean Coincident Wet Bulb Temperature.
DP is Dew Point Temperature.
MCDB is Mean Coincident Dry Bulb Temperature.

For locations not listed in the ASHRAE Fundamentals Handbook, design must be based on local climatological data obtained from the U.S. Department of Commerce, Environmental Science Services Administration, or from Air Force, Army and Navy Manual AFM 88-29, Engineering Weather Data.

4-2.4 Inside Design *(These requirements apply to all buildings. Refer to Module 2A and Module 2B for additional material that applies only to those specific building types)*

Modules 2A, 2B

Unless noted otherwise in Exhibit 4-2.4a below, if the indoor relative humidity within a facility generally cannot be maintained naturally at a minimum of 20% RH in the winter, humidification must be provided for the occupied spaces. In those cases, humidification systems must be designed to maintain a 20% relative humidity. Include water filtration if required by the humidifier manufacturer when the local water source is considered too "hard" or the mineral content would cause system maintenance issues.

Design conditions for spaces must be in accordance with Exhibit 4-2.4a, where applicable.

Exhibit 4-2.4a

Inside Design Space and Temperature Conditions

SPACE[4]	SUMMER[2]	WINTER[2]
Administrative Offices[3]	78°F DB[5]	65°F DB
Employee Support Areas	78°F DB[5]	65°F DB
Corridors	(See note 1)	(See note 1)
Custodial Closets	(See note 1)	(See note 1)
Electrical Rooms	Ventilation	55°F DB
Mechanical Rooms	Ventilation	55°F DB
Toilet Rooms	(See note 1)	(See note 1)
Trash and Recycling Area	Ventilation	No Heating[6]
Vestibules	No Cooling	55°F DB

Keyed Notes:

1. Maintain conditions required for the area where the corridor or room is located. Use transferred air from other spaces to the extent possible.
2. DB = Dry Bulb temperature.
3. When unoccupied, setback inside design conditions to heating of 55°F and cooling to 85°F and with no humidity control.
4. The operating hours, conditions, and population at various times of the Facility used for analysis must be developed in conjunction with Plant personnel. These assumptions must be stated in reports to USPS.
5. The design of the HVAC system should provide a Leaving Air Temperature (LAT) to maintain the stated design temperature and a maximum 50% Relative Humidity.
6. When located on or adjacent to an enclosed mail platform, match the temperature requirements of the enclosed mail platform.

4-2.5 Space Specific Requirements

4-2.5.1 Non-Heated Spaces

Prevent freezing of piping located in non-heated spaces by providing minimum heating or heat trace.

4-2.5.2 Toilets

Mechanically exhaust directly to the outside as required per ASHRAE. Utilize occupancy control whenever possible.

4-2.5.3 Telecommunication Equipment Room

The Solicitation A/E must provide anticipated USPS equipment loads (UPS, servers, switches, lighting, etc.) in the space based upon input from USPS personnel. The A/E must use this information along with specific location weather data and other appropriate air-conditioning load information to determine the air-conditioning loads to the space.

Provide a separate means of control of the Telecom Room to maintain space temperature and humidity at 75ºF with a low end humidity level of 20% RH, respectively (with the ability to be controlled at a temperature of 77°F degrees and 40-50% RH by the user). If sufficient data is provided regarding the temperature and humidity level requirements of the equipment in the space that differ significantly with the values above, then those values can be used after notifying the Solicitation A/E and USPS. The A/E must use psychrometric analysis in addition to load analysis to properly size the equipment taking into account necessary part-load (compressor staging, variable refrigerant flow, variable speed fans, hot gas bypass, etc.) performance to provide equipment that will operate most efficiently and effectively during all load conditions.

Where 24/7 operation of a facility allows use of the buildings normal air-conditioning system(s) to be utilized, separate systems would not be required provided that separate temperature control is provided and load analysis indicates that the environmental requirements necessary for the equipment are met.

The A/E must use equipment which is highly energy efficient due to the 24-hour operation of the space and the controls must be provided such that the availability of setback temperatures for low heat load capabilities can be applied to increase long term energy savings. The systems must use environmentally friendly SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends. Design of the air distribution (ductwork, air devices, etc.) for the air-conditioning system, where applicable, must be such that hot aisle return and cold aisle supply methods are utilized to maximize cooling efficiency and system effectiveness. The A/E must reduce air bypass (recirculating hot air or loss of cold air) by coordinating with USPS operational personnel to utilize rack system blank-off panels, cable cutout fill in systems or other appropriate methods.

4-2.5.4 Locker Areas

Mechanical exhaust directly to the outside as required per ASHRAE. Utilize occupancy control whenever possible.

4-2.6 Design Loads

4-2.6.1 Heat Gain From Equipment

Base heat gains from the lighting systems and automation/mechanization equipment on the actual loads released to the space.

4-2.6.2 Heat Gain from Occupants

Heat gain from occupants must be as shown in Exhibit 4-2.6.2a.

Exhibit 4-2.6.2a
Heat Gain From Occupants

HEAT GAIN FROM OCCUPANTS	WORKROOM	OFFICE
Sensible Heat Gain (BTU/hour/person)	345	230
Latent Heat Gain (BTU/hour/person)	435	190

4-2.6.3 Occupancy Ratios

When actual occupancies of spaces are not known, base calculations on amounts shown in Exhibit 4-2.6.3a of net floor area per occupant.

Exhibit 4-2.6.3a
Occupancy Ratios

SPACE	SF/OCCUPANT
Office Area	150[1]
Workroom	300
Conference Room	15
Lunchroom	15

Keyed Notes:

1. Include one personal computer per employee in calculations.

4-2.7 Thermal Transmittance (U-Factor)

U-factors for all buildings must be taken from the current version of ASHRAE 90.1 based on the geographic zone and construction method for the roof, walls, glazing, and floor.

To cost-effectively meet the energy conservation requirements (refer to 4-2.1 Energy Conservation), it may be necessary for the A/E to recommend U-factors lower (i.e., – higher R-value) than those listed in the current version of ASHRAE 90.1. The A/E must provide a study to justify the actual U-factors used in the design. Walls, roofs, glass, floors, and other building components including HVAC and lighting systems must be designed to provide a

maximum overall U-factor (maximum heat loss coefficient). U-factors must be provided to assure thermal comfort of occupants and account for radiant temperature losses. R-value of insulation must be based on diminished thermal performance as the insulation ages.

4-2.8 Computations

Provide the following computations as well as any other applicable computations as required for proper sizing of the systems to USPS for review:

a. Heating Capacity Sizing: The heating capacity must be based on maximum instantaneous overall building envelope (block) heating load. Design engineers should utilize quantity of heating boilers for redundancy where loss of one heating boiler allows no more than 75% of the maximum peak heating load being met by the plant.

b. Cooling Capacity Sizing: The cooling capacity must be based on maximum instantaneous overall building envelope (block) cooling load. Design engineers should utilize quantity of cooling equipment for redundancy where loss of one chiller allows no more than 75% of the maximum peak cooling load being met by the plant.

c. Individual Zone Heating and Cooling Loads: The individual zone loads must be based on the time of day which its individual peak occurs.

d. Ventilation: Provide minimum and maximum ventilation requirements for the total building. Provide a slightly positive building pressurization for administration and office spaces during all operational conditions to prevent excess intrusion of unconditioned air. Design workrooms for a neutral pressurization. Assume fully closed doors when calculating for pressurization requirements.

e. Static Pressure Drop: Provide static pressure drop calculations for fans and air handling units.

f. Expansion Tank Sizing

g. Psychrometric Analysis: Prepare a psychrometric chart study for each type of air handling unit. The study must include the following, if applicable:
    1. Outside and inside design temperatures.
    2. Temperature rise caused by return-air.
    3. Temperature rise caused by fans.
    4. Return and outside air mixture conditions.
    5. Coil exiting conditions.
    6. Bypass and exiting air mixture conditions.
    7. Space sensible heat factor lines.
    8. Air volumes (supply, return, exhaust, etc.)

h. Completion of ECC-S form.

4-2.9 Zoning

Arrange zoning according to occupancy, hours of operation, mechanization, lighting heat gains, exposure, etc., so as to affect maximum comfort, efficiency, energy conservation, and economy operation for the total system.

Avoid reheat or supplement cooling coils because of their high-energy consumption.

System design and zoning must be such that simultaneous operations of both heating and cooling plants must be avoided.

4-2.10 HVAC Controls

4-2.10.1 General Requirements

The Building Automation System (BAS) must communicate using certified BACnet protocols and network standards and be designed to comply with the requirements of ANSI/ASHRAE Standard 135-2016 “BACnet - A Data Communication Protocol for Building Automation and Control Networks”, including all published addenda. The BAS must be designed to control space conditions, monitor and maintain heating, ventilation and air-conditioning systems, and to conserve energy. Manufacturer’s proprietary communication protocols will not be accepted, without an approved deviation. The individual products used must conform, at a minimum, to the requirements for BACnet Operator Workstations (B-OWS), BACnet Building Controllers (B-BC), BACnet Advanced Application Controllers (B-AAC) and BACnet Application Specific Controllers (B-ASC) as specified in ANSI/ASHRAE 135-2016, BACnet Annex L. Both web servers and operator work stations must meet the B-OWS requirements.

The Enterprise Energy Management System (EEMS) provides the ability to remotely monitor energy consuming facility-level equipment (e.g, HVAC, lighting, and compressed air) in USPS buildings, including building utilities. The primary interface between the EEMS and the building is through the facility’s Building Automation System via the USPS network, accessible through a web connection on any computer, inside or outside the postal network. Following the BAS and EEMS specifications of the BDS will ensure compatibility.

Other features include the following:

a. The objective for the building automation system’s network of controllers is that they be manufactured by the same supplier to simplify troubleshooting and maintenance over the life of the system.
b. The A/E must submit Protocol Implementation Conformance Statements (PICS) for each controller, Operator Workstation and Web server (WEBS) used.
c. No gateways must be used for communication to controllers installed. BACnet-compliant hardware and software must be provided to meet the BAS functional specifications.
d. Non-BACnet-compliant or proprietary equipment or systems for use as part of the BAS are not acceptable and are prohibited.
e. BACnet communication gateways between separate non-compliant BAS systems and the BAS (computer room unit’s manufacturer’s controllers, energy monitoring equipment, etc.) are allowed.

f. Native BACnet communication buses serve WEBS, B-OWS, B-BC, B-AAC, and B-ASC.

g. Implement time synchronization via BACnet time synchronization services.

h. Configure alarm prioritization in accordance to the applicable categories as specified in ANSI/ASHRAE 135-2016, BACnet Annex M. Notification classes must be configured in a manner that distinguishes between the facilities involved and to meet any other operational needs requested by the USPS.

i. Alarms must be BACnet alarm objects and use BACnet alarm services.

j. Additional site-specific BACnet requirements will be provided in the Solicitation.

k. BAS communication with the Enterprise Energy Management System (EEMS) must be established and demonstrated.

l. New, upgraded, or replacement BAS's must comply with the following Specification Sections:

- Section 250504 – Building Automation System (BAS) General.
- Section 251105 – Meter and Submeter Devices.
- Section 251404 – BAS Equipment, Software, and Programming.
- Section 250804 – Building Automation System Commissioning.

The equipment supplier will provide a complete set of as-installed schematic diagrams, diagnostic, and trouble-shooting software and a complete parts listing.

Remote field panels must be furnished as required to meet system requirements and to minimize the length of wiring runs from sensors and actuators. All remote field panels must be able to handle start/stop commands, control point adjustments, damper positioning, digital alarm and status inputs, and any intermix of analog inputs such as temperature, humidity, pressure, etc. required for a complete system.

Rooftop Air Handling Units and any packaged equipment must include BACnet compatible controllers at the I/O level with all necessary sensors, controllers, and actuators. The designer must limit the number of points monitored in accordance with USPS specifications, unless otherwise specified by the Project Manager. Locate space sensors in the spaces served and provide them with tamper proof covers.

The BAS must have the capability of using the USPS Wide Area Network (WAN) to allow remote monitoring, adjustment and management from a centrally located EEMS monitoring station. This functionality must be provided using a WEB Server that allows interaction with the building's BAS by a standard WEB browser using standard TCP/IP communications. A computer, through a WEB browser, would function as an Operator Workstation.

For administrative areas, provide wall-mounted thermostats with tamperproof covers for zone VAV terminals.

Control diagrams with sequence of operation and point listings for all systems must be prepared and placed on contract drawings.

The control system must monitor the facility energy demand (kW) and energy consumption (kWh). The control system shall include demand limiting and demand shedding capabilities designed to limit the facility peak demand by

reducing facility cooling levels. Sequences of operation must be designed to be in compliance with the requirements of the current version of ASHRAE 90.1, “Energy Standard for Buildings Except Low-Rise Residential Buildings.”

The system must contain pre-programmed algorithms in an open architecture environment to control and monitor all of the following equipment applications and control strategies:

- Unitary heating systems.
- Unitary cooling systems.
- Boilers.
- Dampers.
- Valves.
- Filters.
- Heat pumps.
- Air handling systems.
- Steam, hot water, and chilled water systems.
- Pressure independent variable air volume systems and terminal units.
- Circulating pumps.
- Variable volume pumping systems.
- Ventilation units, including energy recovery systems.
- Unit heaters.
- Optimum start/stop control.
- Demand limiting control.
- Time of day scheduling.
- Calendar scheduling.
- Heating plant optimization.
- Cooling plant optimization.
- Night set back.
- Ventilation control.
- Indoor Air Quality (IAQ) control.
- Comparative enthalpy control.
- Pressure/Flow control.
- Provide power monitoring for main building service entrance.

Outside air introduced to the space must be through the air-handling units where it can be effectively controlled. Use airflow monitoring devices on VAV systems to monitor and control the flow of outside air into the building. The amount of outside air must vary to match the building occupancy throughout the day while maintaining proper building pressurization. Design Sequences of Operation to comply with the requirements of the current edition of ASHRAE 62.1, “Ventilation for Acceptable Indoor Air Quality”.

Locate the EEMS system head end equipment in the proximity of the Manager, Maintenance, and Supervisor, Maintenance Operations. The exact location is to be determined by local staff.

4-2.11 Central Heating Systems

4-2.11.1 Boilers

Heat-generating equipment must be the highest efficiency equipment available that is proven to meet ASME CSD-1 for boilers in the size range of 400,000 BTUH input to 12,000,000 BTUH input. For boiler systems under 400,000 BTUH, coordinate with the USPS Project Manager for CSD-1 requirements. The use of multiple, smaller, condensing boilers is recommended.

Select boilers based on part load requirements of the building and provide staging controls to minimize the number of operating boilers while maintaining space comfort. Boiler plants must be sized to meet the heating load requirement of building as defined by computerized load calculations. Avoid redundant boilers and limit the quantity to three or four maximum at the boiler plant. Loss of a single boiler should be able to still provide up to 75% of the peak heating load for typical USPS facilities. Plant redundancy is provided by the number of boilers and not excess capacity.

Elect primarily 2-way control valves to allow variable speed pump control, matching flow rate delivered with building demand and number of boilers in operation. Ensure that minimum pump flow is maintained to prevent dead-head pump operation. Module 3, Appendix 3-A contains the Boiler Replacement Guide, which should be used for boiler replacement projects.

4-2.11.2 Unit Heaters

Use thermostatically controlled propeller-fan-type unit heaters or radiant heaters for the heating of areas that are listed to be heated but not air conditioned, or where quick response is required to compensate for the opening and closing of doors in cold climate areas. The heater type (i.e., electric, gas fired, or hot water) for each application must be selected based a Life Cycle Cost Analysis that consider such factors as on the initial cost and the annual energy consumption.

Provide gas-fired unit or radiant heaters in mechanical rooms, loading docks and similar areas. Provide cabinet type electric heaters for entryways and vestibules.

4-2.12 Air Handling Systems

4-2.12.1 Air Distribution System

Design all ductwork in accordance with the latest ASHRAE and SMACNA criteria. The design analysis submitted must include complete calculations for all duct runs, pressure losses, volume control devices, and air diffusers.

Insulate ductwork only as necessary to avoid condensation. Install insulation on the exterior of the ductwork.

All Low-Pressure ductwork must be designed using the “equal friction” method with friction loss rate of 0.08 inch water column per 100 feet of duct

Ductwork in workroom areas may be exposed, but must be installed as high as is practical. It must be run above the ceiling whenever suspended ceilings are used.

To minimize the installation of return ductwork, use corridors or common spaces to the maximum extent for transmitting return air where permitted by code.

When return air path is obstructed by physical barriers, extend return air ducting around such obstructions a minimum of 2 feet, so as to minimize their effect on air circulation.

Coordinate ceiling diffusers with light fixtures and a modular arrangement must be considered in administrative areas. Mount diffusers adjacent to pendant-mounted lamp fixtures at the same height as the lights. Light troffers for supply air distribution are not acceptable, however, they may be used for return air.

Ductwork at the fan outlet must be sized to the fan outlet area for at least one duct diameter. Duct transitions between fan outlet and the duct distribution system must be a maximum of 15º. No elbows are to be used within 3 wheel diameters of the fan outlet.

Use flex duct only for the final connection of branch to diffuser and it cannot exceed five feet in length.

Per Handbook RE-5 Section 3-1.2, all openings in the security envelope through which a sphere of 8 inches in diameter can pass must be protected by a security grille, unless the window meets the standards outlined in RE-5 Section 3-1.3. Exterior openings for the HVAC system and all ductwork passing through the security envelope must also meet the standards in RE-5 Section 3-1.3. Refer to RE-5 Section 3-1.2 for additional information.

4-2.13 Building Pressurization

Building pressurization design must consider the two primary occupancy categories encountered in a postal facility, administrative/office, and workroom areas. USPS operation policy is to keep dock doors closed except during loading and unloading. Traditional methods of introducing large volumes of conditioned outdoor air for pressurization in a workroom and dock environment is not cost effective and must be avoided.

4-2.14 Advanced Metering

Electric, Gas and Water Metering

Provide advanced electric, gas, and water metering in every new building, and it must be of the “pulse count/pulse initiator” type metering. The pulse technology consists of a set of dry contacts that open and close with the rotation of the dial set on the utility’s mechanical meter. This type of metering is installed by the gas or water utility company and must be the first option considered. It is a low-cost approach with revenue grade accuracy. In the event this approach is not available, other options may be considered and implemented, if specifically required by the Project Manager.

Water Metering

Install building level water meters to track and continuously optimize indoor potable water use, including detection of leaks.

Metering Other Fuels

Buildings that use fuel oil and steam must incorporate advanced metering into the design. Meter data must report to the building automation system.

4-2.15 Miscellaneous HVAC Requirements

4-2.15.1 Room Air Quantities

Base the primary air supply to individual rooms or spaces on the room heat load and the supply air temperature differential. Establish room air requirements in accordance with the current version of ASHRAE 90.1.

4-2.15.2 Minimum Outside Air

Base outside air (OA) on the requirements of ASHRAE 62.1. If demand controlled ventilation (DCV) is used, dampers must be closed except for exhaust air replacement and pressurization losses. Utilize occupancy schedule to minimize OA during unoccupied periods.

4-2.15.3 Indoor Air Quality Standards

These standards encompass control technologies that provide for the health and safety of building occupants by controlling thermal conditions and contaminant levels in the building interior. Since each building is unique in location and use, various methods of maintaining indoor air quality must be examined to select the best plan for the building. At a minimum, the following considerations must be made when planning a system:

- Design shall be guided by site characteristics including, but not limited to, ambient air quality, temperature and humidity, exterior air quality contaminants (e.g., auto/truck exhaust, in loading platforms and parking areas, power generation, hydrocarbon exhausts, nearby sources), soil gas contamination, building operations, occupancy levels, and site location.
- Plans and Specifications at a minimum must be based on the latest published ASHRAE standards, specifically Standards: 52 (for filtration); 55 (for thermal comfort); and 62 (for ventilation).

The ventilation system design must, at a minimum, incorporate:

- Ventilation, outside air, and re-circulation rates per ASHRAE 62.1 utilizing actual anticipated occupant densities and not occupancy based on code default values, if allowed by code or the Authority Having Jurisdiction. This will limit the requirement for excess ventilation air and will reduce the size of equipment required to properly condition excess ventilation air.

In order to allow for initial off-gassing of the facility, project specifications must require that significantly greater levels of air distribution and fresh air intake and exhaust during installation of interior finishes and during initial occupancy be attained. Further, the HVAC system must be continuously operated for one (1) week prior to occupancy with maximized use of outside air while maintaining the indoor design conditions inside the space. After construction, testing and balancing of the HVAC system must be done to ensure peak performance.

Keep contaminants generated during construction to a minimum to eliminate their accumulation in building materials and release into the building after occupancy. As per NIST and EPA guidelines, the building must be continually vented with a minimum of 10 percent outdoor air during construction. Where possible, install a temporary exhaust air system on each floor. Temporary ventilation systems must be fitted with the appropriate filter for the existing conditions. Change filters as specified by the manufacturer. Finally, protect all building air movement equipment and ductwork from

contaminants during the construction process. These activities must be documented as part of maintenance program requirements.

For indoor parking and maneuvering areas, install CO/CO_2 alarm detection systems.

4-2.15.4 Flammable Materials Storage

Store flammable materials in NFPA-approved cabinets. Cabinets are to be provided by USPS. Provide supplemental ventilation in accordance with OSHA and NFPA-30.

Exhaust systems emissions must comply with local, state, and Federal clean air regulations. Verify local requirements for regulation of emissions and advise the project manager of any permits and equipment requirements. Project specification must require the A/E to file all required applications with appropriate agencies. Required final permits must be obtained and submitted by the A/E to the Project Manager prior to the installation of plant equipment. The design must include all required monitoring equipment.

4-2.15.5 Equipment Location

All mechanical equipment must be designed, specified, and suitably located to assure accessibility for safe and efficient operation and maintenance (e.g., chillers, boilers, condensing units, pumps, air handling units, fans, filters, dampers, intakes, coils, fan coil units, VAV boxes, as applicable).

Ceiling-mounted equipment (except dust collectors) inside the workroom is not acceptable because of access and maintenance limitations and objectionable noise.

Locate equipment to avoid the use of prime floor space, to prevent objectionable noise in the occupied spaces, and to maintain satisfactory exterior appearance of the building.

4-2.15.6 Control

Provide a motorized outside air damper to close when the building is not occupied.

4-2.15.7 Intake Location

Install outside air intakes away from pollutant exhaust sources (boiler stacks, toilet room exhaust, vehicle exhausts, etc.).

Secure outside air intakes from potential tampering. Locate intakes as high as feasible; air intakes located less than 15 feet above grade must be fenced off from public access.

Return air grilles in publicly accessible areas must not be located in walls, so as to reduce the potential for tampering.

4-2.15.8 Demand Control Ventilation and Economizers

Demand Control Ventilation (DCV) regulates fresh air for occupants in a building by measuring the CO_2 levels inside the space then adjusting the amount of fresh air that gets delivered to the space. The advantage that DCV controls offer is that many times the fresh air requirement is adequately met by normal daily building activity such as dock doors opening and closing, air infiltration thru cracks and seals, etc. Under those conditions unconditioned

outside fresh air is not needed, which reduces energy costs if the DCV damper is closed.

If DCV is recommended, the A/E must demonstrate the benefits when applied to the typical USPS mail carrier environment.

Whether or not DCV is utilized, outside air brought in by the HVAC system on to the workroom floor/dock areas must take into account all sources of natural air infiltration when determining OA damper settings.

If justifiable, through life-cycle cost analysis, Demand Control Ventilation must be applied to a facility based on the current version of ASHRAE 62.1 “Ventilation for Acceptable Indoor Air Quality”.

An economizer is a controls logic that opens outside air dampers to allow a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather, usually in the spring and fall. Economizers should be evaluated and utilized whenever cost effective.

Economizers must be specified in an HVAC design in accordance with the current version of ASHRAE 90.1 geographic zones.

4-2.15.9 Evaporative Cooling

In hot, dry climates, evaporative cooling systems must be evaluated and implemented to provide cooling for the Workroom/platform when justified by life cycle cost analysis.

4-2.15.10 Testing and Balancing

Replace air filters with new air filters. Balance, test, and adjust air conditioning systems prior to occupancy of the building. Test reports indicating compliance with the design documents must be provided to the USPS Project Manager prior to the final acceptance inspection.
Prior to commencing air and water balancing (if applicable), the testing organization must have been approved by the Project Manager and must be a certified member of the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

4-2.15.11 Construction Ventilation

Contaminants generated during construction must be kept to a minimum to eliminate their accumulation in building materials and release into the building after occupancy. As per NIST and EPA guidelines, the building must be continually vented with a minimum of 1/2 air change per hour during construction. This procedure must be excluded in humid areas of the Southeast, where high outdoor air humidity would adversely impact porous building materials. In these cases, the air-conditioning systems with ventilation air must be operated for at least two (2) weeks prior to building occupancy. Where possible, a temporary exhaust air system must be installed. Temporary ventilation systems must be fitted with the appropriate filter for the existing conditions. Change filters as specified by the manufacturer. Finally, protect all building air movement equipment and ductwork from contaminants during the construction process. These activities must be documented as part of maintenance program requirements.

4-2.15.12 Post Construction Ventilation

In order to allow for initial off-gassing of the facility, project specifications must require significantly greater levels of fresh air intake and exhaust during installation of interior finishes, caulking, and other products that generate

odors or fumes. Further, the HVAC system must be continuously operated for one week prior to occupancy with maximum outdoor air setting while maintaining the design conditions inside the space. After construction, testing and balancing of the HVAC system must be done to ensure peak performance. One week prior to planned facility acceptance, replace air handling unit filters.

4-2.15.13 Personnel Cooling Fans

Ceiling, wall-mounted, and column-mounted fans may be used in manual distribution operations, docks, trailers, workrooms, and administrative offices.

The feed sections on the following types of equipment have some form of pinch belt where bio-hazards could likely escape from either letters or flats. To lower potential exposure or spread of air-borne contamination in areas where individual letters are processed, do not provide fans directed at the feed sections of the following equipment:

- AFCS
- AFCS 200
- DBCS
- DIOSS
- CIOSS
- AFSM 100
- FSM 1000 (once the AFF/OCR is installed)
- FSS
- Flats Cancellers

Ceiling, wall-mounted, and column-mounted fans may be used in delivery units, mail processing facilities, and elevated keying areas, except near the induction area for the following equipment where they are used for Revenue Protection, since air movement across the scales will adversely affect the operation of the scale. Other areas of the machine may have fans mounted nearby as long as they do not adversely affect the scale.

- ADUS
- APBS
- APPS
- EPPS
- HDUS
- HTPS
- SPSS
- SDUS
- USS

4-3 Plumbing

4-3.1 Water Supply Systems

4-3.1.1 General Requirements

Confirm availability of adequate municipal water service pressure. If water pressure is not sufficient to meet the water supply system requirements,

provide a triplex booster pump package with each pump sized for 50 percent of calculated peak demand.

Chemical analysis and water treatment (if required) must be provided to ensure compliance with all applicable codes.

Provide the potable water distribution system with backflow preventers as required by codes and local authorities to protect against the back flow of water or other liquids from all sources.

4-3.1.2 Drinking Water

All potable water piping, fittings, fixtures and solder used for connections must be lead free in accordance with EPA, state, and local codes.

Provide electric water coolers throughout the facility, generally located in readily accessible open areas no farther than 100 feet (walking distance, not straight line) from any workstation. Water coolers must be lead free. Recess coolers into walls or alcoves wherever possible. Water coolers must not protrude into aisles. Provide dual height water coolers. See Handbook RE-4 for accessibility requirements. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Provide electric water coolers at the following locations where applicable:

- In workrooms and platforms.
- Near toilet rooms.
- In lunchrooms and cafeteria rooms.

The solicitation A/E must determine locations of all water coolers.

4-3.1.3 Water Outlets

Provide valved and capped domestic cold water outlets, all with backflow prevention, with minimum 1/2-inch pipe at the following locations where applicable:

- Vending machine areas.
- Lunchroom/Cafeterias.

At a minimum, the following spaces inside the building must be provided with hose bibbs (where applicable):

- Trash areas.
- Building and Grounds Room.
- Recycling Areas.

Exterior hose bibbs must be non-freeze type (depending on outdoor conditions) and must be protected from physical damage as required. Provide hose bibbs at the following areas (where applicable):

- One every 100 feet around the periphery of the building.
- One in the vicinity of the cooling tower.
- One close to the trash compactor.
- At each exterior break area.
- For the maintenance of rooftop HVAC units, provide a hose bib within 75 feet of all units.

4-3.1.4 Domestic Water Heaters

Locate high-efficiency type water heaters near the area served, but they may also be wall-mounted in custodial closets to increase usable floor area.

Avoid long hot water runs and hot water re-circulation systems to the extent possible. If long runs are required, hot water re-circulation systems must not be used for pipe runs shorter than 100 feet. A larger quantity of small point-of-use tank systems is preferred to a single system with long pipe runouts and the requirement for a recirculating system because higher energy usage due to line losses can be avoided.

Use point-of-use electric water heaters for lavatories and hand sinks located away from the domestic hot water mains in the building, if an evaluation shows that they are equal to or more efficient than using a hot water recirculation system.

Use electric tank type water heaters, unless proven more economical to use gas fired type water heaters for the facility.

Exhibit 4-3.1.4a must be used as a guide in selecting water heaters.

Exhibit 4-3.1.4a
Water Heaters

NO. OF LAVATORIES	GAS		ELECTRIC		INSTANTANEOUS COIL-GPH
	Tank Storage Gallons	Recovery Rate GPH	Tank Storage Gallon	Heater	
2	--	--	5	1@ 1.5 KW	240
3-5	30	30	40	2@ 2.5 KW	240
6-12	40	40	40	2@ 5.0 KW	300
13-20	60	60	60	3@ 5.0 KW	360
21-28	80	80	80	3@ 5.0 KW	420
39-36	100	100	100	6@ 5.0 KW	480
37-43	120	120	120	6@ 5.0 KW	540

General Notes:

1. Capacity. This table indicates the storage and recovery capacities, at 100°F temperature rise. Adjust the requirements as needed based upon the actual temperature rise for the particular geographical location.
2. Temperature Requirements. The domestic water heating equipment must be automatically controlled and have sufficient capacity to deliver 105°F water at all times.
3. This table does not apply to the facilities with a kitchen or cafeteria. Larger storage and recovery capacities, as well as a separate 180°F supply water for cafeteria equipment are required in these facilities.
4. Water heaters must carry the Energy Star label.

4-3.1.5 Water Conservation

If available, use Water Sense qualified fixtures. If not, the following water-efficiency standards are required unless more restrictive values are required by codes:

- The maximum water use allowed for a lavatory is 0.5 gal/min, kitchen faucets and showerheads is 1.5 gal/min.
- The maximum water use allowed in gallons per flush for any of the following water closets and urinals is as show in Exhibit 4-3.1.5a.

Exhibit 4-3.1.5a

Maximum Flush for Toilets and Urinals

FIXTURE	GALLONS OF WATER/ FLUSH
Gravity tank-type toilets	1.28
Pressure-Assist tank-type toilets	1.1
Electromechanical hydraulic toilets	1.1
Flush valve toilets	1.28
Urinals	0.13

4-3.1.6 Emergency Showers and Eye-wash

Provide emergency combination deluge shower and eye wash fountain for battery charging areas with lead acid batteries. The local plant will provide portable eyewash fountains for battery charging areas with sealed gel batteries.

Provide emergency combination deluge shower and eye wash fountain for Hazmat area.

The A/E must evaluate if tempered water is required to be provided at these fixtures based upon local climate conditions and OSHA requirements.

4-3.2 Sanitary Drainage Systems

4-3.2.1 General Requirements

Configure and size sanitary sewer piping to accommodate initial building needs.

Do not combine sanitary sewer piping with storm sewer piping within the site boundary, even if the local jurisdiction will allow them to be combined. Provide adequate venting and cleanouts.

Floor cleanouts must be strong enough to safely carry the loads of anticipated traffic and be of adjustable type to insure flush installation with finished floor. For foot and light vehicular traffic, use heavy duty nickel bronze tops. For heavy vehicular traffic (including all areas subject to forklift traffic), use round, heavy duty cast iron tops with non-tilt tractor-type covers.

Where possible, drain the sanitary system to the public sewer or private sewage disposal system by gravity. Where gravity drainage is not possible, provide duplex sewage ejectors with each pump sized for 100% of system requirements. Pump control must provide for single and two pump operation.

Run horizontal drainage piping at a uniform pitch of not less than 1/4 inches per foot. Where it is impractical to obtain a ¼ inches per foot slope due to elevation of street sewer, or structural features, piping 4 inches and larger may be uniformly pitched at not less than 1/8 inch per foot.

Provide cellular foam insulation for any horizontal run or offset of sanitary drainage originating from a mechanical equipment room that passes over a finished ceiling, workroom area, or dock platform.

4-3.2.3 Floor Drains

Floor slope must be 1 foot in 50 feet, or 2%, to drains in each room or area with a floor drain. Provide floor drains as follows:

a. Provide three inch diameter drains (as applicable):
    1. Toilet rooms with 2 or more toilet fixtures (i.e. water closets and urinals).
    2. Scale pits.
    3. Vending machine rooms.
    4. Lift pits.
    5. Rewrap room.
    6. Adjacent to all air handlers.
    7. Adjacent to any air compressors with an external condensate drain..
    8. Recycling Areas.
b. Provide four-inch diameter drains (as applicable):
    1. Enclosed carrier loading, vehicle parking, and storage areas.
    2. Sumps:
    3. For adjacent elevator and lift pits, connect the floor drains to a common sump. For nonadjacent elevator and lift pits, provide individual sumps. It must be covered level with the pit floor. The sump must have a warning device to indicate when liquid is present or be equipped with a sump pump. The sump pump must discharge into open air holding reservoir outside the pit and hoistway and not be connected to any drain.

4-3.3 Plumbing Fixtures

4-3.3.1 General Requirements

The minimum number of toilet plumbing fixtures of each type must be provided as indicated in Chapter 2 Architectural, Section 2-4.2 Toilet Facilities.

4-3.3.2 Fixture Types

a. Water Closets: White vitreous china office and industrial type with elongated bowl, exposed large diaphragm top supply flush-o-meter with side oscillating handle, siphon jet wall outlet, wall hung on heavy-duty chair carrier, and white open front molded plastic seat.

b. Urinals: White vitreous china, bowl type with integral flush distribution, wall hung with integral trap and extended shields, blowout or siphon jet flushing action, large exposed diaphragm handle operated flush-o-meter.

c. Lavatories: White vitreous china straight back with single center set compression faucets, strainer drain, angle stops, complete with adjustable type P-trap with separate long tube to wall.

d. Mop Basins: In custodial closets and custodial storage, provide floor receptor type sinks, complete with faucet.

e. Kitchen Sinks: Corrosion-resisting formed steel, complete with faucets, stopper type drain, and P-traps.

f. Emergency Shower and Eyewash: Provide tepid water to both the shower and eyewash system in accordance with the most current ANSI standard.

4-3.4 Storm Drainage

Design storm drainage to prevent accumulation of water which can form icy patches in freezing weather on parking lots, walkways, or other paved areas.

4-3.5 Fuel Systems

4-3.5.1 Natural Gas

Natural gas is the preferred fuel for heating systems. Natural gas piping systems must conform to the National Fuel Gas Code, NFPA 54, International Fuel Gas Code, and applicable local codes. Do not locate gas piping and valves in confined spaces where leaking gas might collect and cause an explosion.

Use natural gas for unit heaters, duct furnaces at air handling units and for domestic water heaters if proven to be more economical than electric.

4-3.5.2 Propane

When natural gas is not available at the site, propane may be used to provide heating for the facility. Fuel storage tanks shall be above ground. Tanks shall be sized for 30 days of consumption during the month having the highest demand.

4-3.5.3 Heating Fuel Oil

Fuel oil systems must include above ground tanks, pumps, piping accessories, and all required controls. The system must conform to all applicable requirements of USPS standards, NFPA 30, NFPA 31, and all applicable local, state, and national codes. *(Also refer to Module 4E)*

4-3.6 Compressed Air Systems

The solicitation A/E must determine all compressed air requirements, volumes and pressures for mechanization and automation processing equipment, the CFS, and the VMF if included in the project (see “Automation Equipment Power & Air Requirements” for planning data).

The A/E must complete a life cycle cost effective compressed air system for mechanization and automation processing equipment and the CFS and the VMF if included in the project. The A/E must verify volumes and pressures with USPS and/or equipment vendors (see “Automation Equipment Power & Air Requirements” for planning data).

Design the compressed air system to adjust pressures and air flows based on demand using automated digital controls. Compressors selected must have high part-load efficiency. All compressors supplying building air and/or mechanization air must operate as one system using a centralized control. Each compressor in the compressor group must energize/de-energize as needed based on the demand present.

Locate compressor rooms and areas on an exterior wall, and they must be mechanically ventilated to provide make up air and dissipate heat generated by equipment. Arrange compressors so that heat discharge from the air dryer

of one unit does not feed the air intake of adjacent units. Provide sufficient space for servicing of the individual units in compliance with manufacturers guidelines.

Install two air compressors, two tanks, and two refrigerated air dryers, each sized for 100 percent of the total required capacity (including spare capacity).

Air receivers must be ASME certified and stamped for appropriate psi working pressures. Size air receivers to provide one minute minimum storage of the total required capacity. For facilities with Workrooms 500,000 SF and larger, receiver may be sized for 30 seconds minimum storage. Receivers must meet the requirements of ASME Boiler & Pressure Vessel Code Section VIII for unfired pressure vessels and must contain the appropriate ASME code stamp.

Locate compressed air outlets for equipment adjacent to the equipment served so as not to require hose extensions. Compressed air drops to outlets must be sized as required to supply equipment served, but shall not be less than ¾-inch.

Outlets must be served by a looped air main sized to limit the pressure drop to 5 psi maximum for system discharge at the most remote outlet.

Provide isolation valves to isolate sections of the system. This is to assure parts of the system can be isolated while the rest of the system is back fed and the system remains operational. Provide a minimum of one isolation valve on each corner of the main loop. Also provide intermediate valves a minimum of one per 150 feet. Provide a manifold that connects compressors, dryers and oil water separators. Also isolate compressors, dyers and oil separators so if any one fails it can be repaired while air is passed through the other components. If the system has only one air receiver, provide a bypass.

Provide sufficient floor drains in the compressor room for condensate.

Design acoustics so that sound from the compressed air system must not exceed 80 dbA in any location.

4-3.7 Miscellaneous Plumbing Requirements

Completely conceal all piping, except fixture runouts, in finished spaces such as offices, office corridors, lobbies, toilet rooms, and locker rooms (if applicable).

Fixture runouts must be kept to a minimum and must be chrome-plated.

Piping in work areas must be protected.

4-3.8 Computations

Computations shall include but not be limited to the following:

- Domestic Water System: Friction loss computations, based on actual piping layout, to determine whether or not a booster pump is required to meet the pressure requirements given in Section 4-3.1.1. A booster pump should only be provided where absolutely necessary. Larger pipe size, to reduce pressure losses, is preferred to smaller pipes and the use of a booster system.
- Compressed Air System: Compressor sizing and pipe friction loss computations to properly size the compressors, tanks, piping, and branches.

4-3.9 Storage Tanks

Refer to the Storage Tank Standards in Module 4E for all matters pertaining to Storage Tanks.

4-4 Miscellaneous HVAC/Plumbing Components

4-4.1 Motors and Controllers

Motors must be of sufficient capacity to operate the driven equipment through its total range without exceeding the motor capacity. Motors 1 hp or greater in continuous service must be premium efficiency type as listed in NEMA MG-1 Standards. Care must be taken to prevent over-sizing of motors. Motors connected to variable frequency drives must be inverter rated. Shaft grounding rings shall be incorporated into motors 10HP and higher to prevent electrically induced bearing damage (EIBD) when VFDs are used on larger pump and fan motors.

Use sealed ball bearings to reduce maintenance frequency and discourage over-greasing.

Control and protect building equipment motors by a combination fused circuit breaker switch type motor starters installed in motor control centers, except when design and economic considerations dictate the use of individual motor starters. Control voltages must not exceed 120 volt to ground. Provide a three-phase running overcurrent protection and supply each starter with a hands-off-automatic (HOA) switch.

Generally, design larger motors above 1/2 HP for 208 Volt or 480 Volt, single phase or 3-phase power, unless otherwise noted for specific equipment. Motors 1/2 HP and smaller must operate on 120 Volt, single-phase circuits.

Motors sized 1/2 HP and above must be fed from dedicated branch/feeder circuit breakers. Multi-motor branch circuits, limited to a maximum of (2) motors, may be used for fractional horsepower motors.

For individual three phase motors not furnished as part of package with motor starter, provide individually mounted magnetic, 3-phase, across-the-line combination type motor controller with fusible switch protector and phase loss/phase reversal protection, individual 120 Volt control power transformer, control devices HOA selector switch, push buttons, pilot light as required to suit intended motor control operation as required.

Provide manual, single-phase, 120 Volt, toggle type motor rated switches with thermal overload element for fractional horsepower equipment not requiring automatic control interfaces.

4-4.2 Pumps, Piping and Fittings

4-4.2.1 Pumps

Select and install pumps to match the head and flow requirements of the system.

In-line or close-coupled centrifugal pumps should generally be used for capacities up to 100 GPM. For larger capacities, use base-mounted pumps.

Provide mechanical shaft seals to reduce leakage and maintenance.

Provide drain lines from bed plates to open drains.

4-4.2.2 Piping

Provide adequate supports, vibration isolators, and allowance for expansion and contraction for piping systems.

The piping must be properly sloped and equipped with all necessary vents and drains.

Provide adequate shutoffs and drains for all piping exposed to freezing conditions.

Conceal piping in lobbies, offices, and similar areas.

All piping systems in the building must be identified and color coded in accordance with American National Standards Institute Standard, “Scheme for the Identification of Piping Systems,“ ANSI A13.1, latest edition.

Provide proper cleanout quantities and types.

Piping in workrooms must be adequately protected to avoid damage.

Do not install any water piping of any description above electrical equipment, including above the code required clear space around the equipment.

4-4.2.3 Fittings

Provide isolating valves at each piece of equipment and locate them in such a manner to not interfere with the removal or maintenance of equipment.

Apply drain valves of sufficient size to drain the branch quickly at low points near each shut-off.

When open sight drains are not available, provide threaded hose connections at the valve.

Install pressure gauges at the following locations:

- Suction and discharge of all pumps.
- Entrance and exit of all heat exchangers.
- Entrance and exit of all chiller evaporator, and condenser sections.
- Where determined necessary of other equipment.

Install test ports at the following locations:

- Suction and discharge of all pumps.
- Entrance and exit of all heat exchangers.

- Entrance and exit of all chiller evaporator, and condenser sections.
- Entrance, exit and bypass of all water coils.
- Where determined necessary of other equipment.

Install thermometers at the following locations:

- Entrance and exit of all heat exchangers.
- Entrance and exit of all chiller evaporator and condenser sections.
- Exit of all domestic water heaters.
- Entrance and exit of all AHU water coils.
- Where determined necessary for other equipment.

Provide sufficient sectionalizing valves to permit servicing major branches of runouts without draining the entire hot or chilled water system.

For multistory buildings, shut-off valves must be provided for each floor as close to the heaters as practicable.

Flow-measuring devices must be tabulated on the contract drawings with heat exchangers, zones, pumps, and coils data. Specify flow control stations suitable for use with a portable flow meter.

4-4.3 Insulation

Provide thermal insulation on pipes, tanks, breechings, ducts, chillers, boilers, pumps, etc. (if applicable), for safety, energy conservation, and condensation prevention. Ductwork in Workrooms can be uninsulated when there is a very low possibility of condensation. When required, place the insulation on the exterior surface of the duct.

Minimum insulation thickness must be in accordance with the current version of ASHRAE 90.1. Additional thickness may be required to ensure surface temperatures that are below 100 ^{o} F and to prevent condensation on cold surfaces.

Provide perimeter insulation when required by climatic conditions and as outlined in the ASHRAE Handbook of Fundamentals.

Design hangers, anchors, and other details so as not to damage vapor barriers or insulation and so they do not themselves permit condensation.

4-4.4 Sound and Vibration Control

Care must be exercised in the design, approval, and installation of mechanical equipment and components to obtain acceptable noise levels in all occupied spaces (see Exhibit 4-4.4a). The noise level produced by mechanical equipment must comply with the latest OSHA standards and ASHRAE handbooks requirements. Refer to Module 1 Chapter 2 Architectural, Section 2-7.1.2 Sound Transmission, for additional criteria.

Exhibit 4-4.4a
Acceptable Noise Levels

SPACE	NC LEVEL
Private Offices and Conference Rooms	30
Open Office Areas, Corridors, and Lobbies	35
Workrooms, Computer Rooms	45

4-5 Fire Protection

4-5.1 Sprinkler Systems

Provide sprinkler systems where required by local code and as directed by USPS. Design sprinkler systems in accordance with NFPA 13, Installation of Sprinkler Systems, using the hydraulic method for pipe sizing. Fire Protection design engineer shall obtain chemical analysis of water supply from utility or other source prior to designing the fire sprinkler water system so that any necessary water treatment for control of microbiologically influenced contamination (MIC) is properly provided in the design. Install backflow prevention as required by local codes.

Use dry systems for any area where freezing temperatures could occur.

Equip all flow switches with a retard device to prevent false alarms due to pressure surges.

Sprinkler piping is deemed foreign to electric service equipment by NFPA code. As such, sprinkler piping must not be routed directly above electrical switchgear or transformers.

Refer to Chapter 2, Architectural, Section 2-8, Fire Protection, for additional criteria.

4-5.2 Standpipe and Hose Systems

In facilities where standpipes are required by code, Class III systems for use by either fire departments and those trained in handling heavy hose streams (2-½ inch hose) or by the building occupants (1-½ inch hose) must be provided as required. Adapters for fire department use must be provided on site.

Design standpipe systems to meet local code requirements and NFPA 14 (Standards for the Installation of Standpipe and Hose Systems).

The number of hose stations for Class III services in each building and in each section of a building divided by fire walls must be such that all portions of each story of the building are within 30 feet of a nozzle attached to not more than 100 feet of hose.

4-5.3 Duct Mounted Smoke Detectors

Install smoke detectors in air handling systems in accordance with NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems, and local codes, to automatically shut down the fan for that system and to indicate an alarm at the facility fire alarm panel upon the detection of smoke.

For air handling systems not specifically included under NFPA 90A, provide smoke detectors as required by the local code.

Designers must ensure the new duct detector installations are compatible with existing fire alarm systems. The general contractor is responsible for verifying that the installation is connected and working properly at the completion of the project, and prior to acceptance.

4-6 Construction Closeout

Replace all air filters with new and clean air filters. Balance, test, adjust, and commission (if applicable) all air conditioning systems prior to occupancy of the building. Provide test reports indicating compliance with the design documents to the USPS Contracting Officer's Representative (COR) prior to the final acceptance inspection. This is to include the final commissioning report and ECC-S.

Prior to commencing air and water balancing (if applicable), the testing organization must have been approved by the COR and must be a certified member of the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or must have submitted adequate documentation to satisfy the Contracting Officer of its competence.

Mechanical Design Checklists

Facility Name:

City, State, Zip:

Project Phase:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

NOTES:

1. This checklist shall be utilized for the design and construction of new Mail Processing Facilities or Repair & Alteration projects within existing MPF's.
2. Design/Build entity shall submit completed checklist with each design submission. Solicitation A/E to review list submitted and return as part of the design review with comments or corrections. The design A/E for "Design-Bid-Build" projects shall submit completed checklist with each design submission.
3. Items not applicable to a specific MPF or Repair & Alterations project shall be marked as "N/A".
4. Items identified with an "asterisk (*)" are high priority in the early preliminary design review stages.

Mechanical Design Checklist – 10%

Section No.	Facility Type	✓	Priority	Item	Comment
				MECHANICAL	
General	MPF			Mechanization/automation cooling loads verified with OSL and manufacturer's data.	
General	MPF		*	Has cooling load of VFS (Ventilation Filtration System) been accounted for?	
General				Verify sprinkler systems and supply pipes are protected from freezing.	
4-1				**INTRODUCTION**	
4-1.2			*	All materials, equipment, and systems are designed and installed to comply with the EPAct 2005 and current version of ASHRAE 90.1.	
4-1.3			*	Facilities Program Management, Energy/Standards Team Leader has been consulted about the level of commissioning required and USPS independent Commissioning services firm has been coordinated with.	
4-2				**HVAC**	
4-2.4				Verify inside design conditions for unoccupied spaces are per criteria.	
4-2.5.2	MPF			Verify personnel occupancy of Consolidated Computer Room and design HVAC per Criteria.	
4-2.7				Verify thermal transmittance (U-factor) requirements are met.	
4-2.15.1				IAQ standards are met per criteria.	
4-2.15.3				Mechanical equipment takes into consideration accessibility for safe and efficient operation and maintenance.	
4-3				**PLUMBING**	
4-3.1.1				Confirm hydraulically that adequate municipal water service pressure is available. Avoid use of booster systems except where absolutely needed.	
4-3.1.1				Obtain water quality information from local utility or other source to determine water treatment requirements.	
4-3.1.2				Verify potable water piping, fittings, fixtures, and solder are lead free.	
4-3.1.2				Verify potable water system has been tested for lead content and result submitted to CO.	
4-5				**FIRE PROTECTION**	

Section No.	Facility Type	✓	Priority	Item	Comment
4-5.1				Verify dry sprinkler system is used where freezing temperature could occur.	

Mechanical Design Checklist – 30%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL	
				Have all items from 10% submittal check list been incorporated?	
				MECHANICAL	
General				Verify horsepower ratings and motor speeds for major pieces of equipment match on mechanical, electrical drawings and specifications.	
General				Provide vibration isolation as required for equipment. Provide ASHRAE recommended isolation based upon motor size and location.	
General				Verify exit passageways, stairs, ramps and other exits are not used as a part of the supply, return, or exhaust system servicing other areas of the building.	
General	MPF CSF			Provide water and gas meters as required.	
General				Coordinate floor drain locations with architectural plans.	
4-1				**INTRODUCTION**	
4-1.4				Any M&V requirements have been coordinated with the Contracting Officer.	
4-2				**HVAC**	
4-2.1				Energy conservation measures have been addressed and followed.	
4-2.5.3				Battery Charging Area exhaust system has been coordinated with battery technology to be used at facility.	
4-2.9				Verify zoning avoids simultaneous heating and cooling plant operation.	
4-2.9				Verify zoning arrangement takes into consideration the hours of operation, lighting heat gain, mechanization, etc.	
4-2.15.1				Check room cfm against calculations. Locate supply and return to avoid short-cycling of air.	
4-2.15.4				Verify building pressurization requirements are met.	
4-2.15.5				Check the location of intake ducts and confirm that other hazards will not be introduced into building, e.g. exhaust from trucks at loading dock.	

Section No.	Facility Type	✓	Priority	Item	Comment
4-3				**PLUMBING**	
4-3.1.3				Verify water outlets are provided per criteria.	
4-3.1.4				Verify long hot water runs and hot water re-circulation systems are avoided.	
4-3.1.4				Verify point-of-use electric hot water heaters are used for lavatories and hand sinks located away from domestic water mains.	
4-3.1.5				Verify maximum water use at lavatories is 0.5 gal/min and, kitchen faucets and shower heads is 1.5 gal/min per criteria.	
4-3.1.5				Verify maximum water use in gal./flush for water closets is per criteria.	
4-3.1.6				In Battery Charging Area emergency portable eyewash and/or eyewash/shower are provided, depending on battery type. If located in cold climate area, ensure that tempered water is provided to meet OSHA requirements.	
4-3.6				Verify air requirements of mechanization/automation equipment to ensure proper sizing of compressed air plant.	
4-5				**FIRE PROTECTION**	
4-5.1				Verify sprinkler systems are properly classified and designed in accordance with the latest NFPA requirements. Indicate building classification on the documents.	

Mechanical Design Checklist – 70%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL	
				Have all items from 10% and 30% submittal check lists been incorporated?	
				MECHANICAL	
General				Ensure all drains from expansion tanks, air separators, strainers and other equipment are extended to floor drains.	
General				For locations with heavy snow loads and freezing conditions, rooftop equipment condensate has been routed in building for disposal in storm drain piping. Condensate drains are insulated to prevent condensation.	
General				Coordinate diffuser type with ceiling/non-ceiling areas.	
General				Proper backflow prevention with drain is provided.	
General				Sprinkler heads in high temperature areas (e.g. directly below skylights) should be rated for such conditions.	
4-2				**HVAC**	
4-2				Demonstrate project complies with estimated energy consumption 30% below current version of ASHRAE 90.1.	
4-2.5.2	MPF			Consolidated Computer Room air-conditioning units are set up for computer room layout to prevent recirculation of hot air or loss of cold air, as much as practical.	
4-2.12.3				Verify ceiling diffusers are coordinated with light fixtures.	
4-2.15.3				Mechanical equipment takes into consideration accessibility for safe and efficient operation and maintenance.	
4-2.15.6				Motorized outside air dampers are provided. Demand Control Ventilation (DCV) and enthalpy based Economizers have been included where safe and cost effective.	
4-3				**PLUMBING**	
4-3.2.1				Verify sanitary sewer piping is not combined with storm water piping, unless permitted by code.	

Section No.	Facility Type	✓	Priority	Item	Comment
4-3.2.3				Verify floor drains are provided per criteria.	
4-4				**MISCELLANEOUS HVAC/ PLUMBING COMPONENTS**	
4-4.3				Verify insulation and jacketing is provided per criteria.	
4-5				**FIRE PROTECTION**	
4-5.2				Verify standpipe and hose system requirements comply with criteria.	

Mechanical Design Checklist – 100%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL	
				Have all items from 10%, 30%, and 70% submittal check lists been incorporated?	
				MECHANICAL	
General				Cover sharp edges of all equipment or supports below 8 feet with insulating material for protection.	
General				Ensure all air filters are replaced and all strainers are cleaned prior to final systems acceptance. Provide at least one spare set of filters and strainers screens at each system.	
General				Verify air and water balancing and testing organization qualifications per criteria.	
4-1				**INTRODUCTION**	
4-1.2				All materials, equipment, and systems are designed and installed to comply with the EPA Safe Drinking Water Act	
4-2				**HVAC**	
4-2.12.3				Verify ductwork in workrooms is installed as high as practical.	
4-3				**PLUMBING**	
4-3.4				Verify design of storm drainage prevents icy patches in freezing weather in parking lots, drives, etc.	
4-4				**MISCELLANEOUS HVAC/ PLUMBING COMPONENTS**	
4-4.4				Verify sound and vibration control requirements are met per criteria.	
4-5				**FIRE PROTECTION**	
4-5.3				Check location of HVAC controls/alarms and ensure fire and smoke dampers are controlled by an automatic alarm device.	

Module 1 - General Criteria

Chapter 5 - Electrical

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Electrical Design Checklists

Chapter 5 - Electrical

5-1 Introduction

5.1.1 Scope

The design criteria within this document specify the general electrical requirements for design and construction of USPS Facilities.

The electrical design must be complete and cover all phases of the project. Information related to the adequacy, dependability, number, characteristics and regulation of the supply lines, recommended interrupting capacity of main fuses or circuit breakers total connected load and estimated demand must be furnished with the design. Whenever specific problems or conditions are encountered, the A/E must follow general industry practices as reflected in the current version of the National Electrical Code and present to USPS for final approval.

The A/E must provide a complete electrical design for the facility in accordance with the issuance of site specific program requirements. The A/E is responsible for the complete performance and installation of all electrical systems; the provided systems must be fully coordinated between disciplines, trades and existing conditions, functional and consistent with the architectural design developed for the building along with site specific facility functional requirements.

5-1.2 Codes and Standards *(Also refer to Module 3)*

Module 3

Design all facilities in accordance with the 2017 National Electrical Code (NFPA 70) and the requirements set forth by the applicable national, state and/or local codes and standards enforced at the time of design, including the current versions of the ASHRAE 90.1 – Energy Standard for Buildings and the International Building Code. In addition, follow the design criteria contained in this document. Where two or more codes, standards, or USPS criteria are in conflict, the more stringent must apply.

- Refer to Standard Design Criteria, Introduction Section, 0-2.1 Compliance with Building Codes and Standards for more information.

5-1.2.2 Energy Conservation *(Also refer to Modules 2A and 3)*

Module 2A, Module 3

Refer to Standard Design Criteria, Introduction, Section 0-2.2, Compliance with Energy Requirements, for detailed energy mandate statement.

5-1.3 Electrical Commissioning *(Also refer to Modules 2A, 2B and 3)*

Module 2A, Module 2B, Module 3

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services.

The basic purpose behind commissioning electrical systems for the USPS is to confirm that the functionality of the new equipment meets the original design intent, operates efficiently, and demonstrates that all the required features of the new system are functioning as specified in the design documents.

The development of the project-specific Commissioning Plan and the Commissioning Requirements for electrical systems are discussed in Paragraph 5-1.3 of Modules 2A, 2B, and 3.

If a project is to include electrical commissioning, then USPS specifications sections “019113 - General Commissioning Requirements” and “260800 - Commissioning of Electrical Systems” must be included in the project manual.

5-1.3.1 Observation and Testing Requirements

The below sampling rates are to be used for all building and project types.

Equipment or Systems	Sampling Rate
Electrical Systems	
Medium Voltage Switchgear and Unit Substations	50%
Normal Power Electrical Systems	25%
Emergency Power Systems	100%
Fire Alarm System	100%
Lighting Systems and Control	100%
Sub-metering	100%

5-1.4 Electrical Measurement and Verification (M&V)

Module 2A, Module 2B, Module 3

(Also refer to Modules 2A, 2B and 3)

All significant energy-saving projects being performed with the primary objective of reducing energy consumption must be measured and verified to determine actual energy savings performance at construction completion. Measurement and Verification must use an International Performance Measurement and Verification Protocol (IPMVP) option that focuses on short term, post-installation measurements, where applicable, that validate the performance estimates projected by the modeling simulation. In some cases, verification utilizing Option A can be accomplished by point source measurement of individual pieces of equipment with the stipulation that secondary impacts determined by the building energy model are realistic and achievable.

The FEMP (Federal Energy Management Program) Guidelines are an application of the International Performance Measurement and Verification Protocol (IPMVP). Refer to the FEMP document for determining the level of M&V needed and the methodologies required for the general categories, or options, outlined in Table 4-1 “Overview of M&V Options A, B, C, and D”. Confer with the USPS Facilities Program Management, Energy/Standards Team Leader for application of the specific M&V Options. A copy of the guideline can be found in BDS Folder G2, and is available online at: http://energy.gov/eere/femp/downloads/mvguidelines-measurement-and-verification-federal-energy-projects-version-30.

For specific project requirements for Electrical M&V, see Paragraph 5-1.4 in Modules 2A, 2B, and 3.

5-1.5 Electrical Computations

5-1.5.1 Fault Current (Short Circuit) Computations *(Also refer to Module 2A)*

Module 2A

Verify the available fault current amperage of the electrical utility company. Indicate bracing rating (AIC, ampere interrupting capacity) for the incoming electrical system and distribution equipment accordingly. A Registered Engineer must produce a fault current calculation that shows the fault current

let-through at all equipment. Indicate fault current values on drawings, and all circuit protective devices must be short circuit rated for the fault current available. A UL series rated system is not acceptable. The power line filters and surge suppressers, when installed, must be adequately grounded to safely dissipate the transient impulse voltages and surge energy to ground. The solicitation A/E must confer with the local utility company and determine if power line filter regulators are justified.

In addition to a fault current study, a Registered Engineer must perform a circuit breaker and fuse coordination study for all distribution systems exceeding 2000 Amps at 277/480Y or 120/208Y Volts.

5-1.5.2 Lighting

Perform lighting calculations in accordance with methods established by the Illuminating Engineering Society for all rooms over 225 sq. ft. Provide lighting level, lamp, and luminaire type in accordance with Section 5-3 Lighting. For exterior lighting at parking lots, perform a point-by-point lighting calculation on a 5-foot grid at the task to verify the illumination levels and uniformity ratios.

5-1.5.3 Voltage Drop

Perform voltage drop calculations for service, feeder, and branch circuit conductors. Size secondary service and feeder conductors for a maximum voltage drop of 2 percent. Size branch circuit conductors for a maximum voltage drop of 3 percent.

Voltage drop calculations must use the maximum allowable loading of the switchboard, panelboard, circuit breaker, or disconnect to permit the addition of future loads without compromising voltage drop.

The listed voltage drop requirements apply to all distribution system circuit conductors, including those dedicated to emergency systems.

5-1.5.4 Load Computations *(Also refer to Module 2A)*

Module 2A

Apply appropriate electrical load factors to support functional requirements, with additional 20 percent spare capacity. The 20-percent spare capacity is applicable for load calculations for incoming electrical service and interior building distribution feeders. Perform load computations to determine capacities of the electrical distribution system. The load study must indicate continuous and non-continuous connected loads, demand/diversity load factors, and spare capacities. Include the following load groups; lighting, receptacles, motor and equipment loads, and miscellaneous loads. Use the minimum connected lighting and receptacle loads indicated, combined with other building loads multiplied by appropriate demand factors and with spare capacity added for obtaining the overall electrical load of the building.

For lighting Loads, see Exhibit 5-3.1.6a for a summary of lighting power density load assumptions.

For receptacle Loads, see Exhibit 5-1.5.4a for a summary of receptacle load assumptions.

Loads associated with motors and other specialized equipment must use equipment manufacturer’s nameplate data of specified equipment.

Miscellaneous loads include: Security, communications and alarm systems, central computer servers and telecommunication equipment. Include these loads as required to satisfy manufacturer’s nameplate data of specified equipment.

Exhibit 5-1.5.4a

Receptacle Loads for Equipment Sizing *(Refer to Module 2A)*

AREA/Activity	LOCATION/DESCRIPTION	Minimum Design Load: Service Equipment (VA/SF)	Minimum Design Load: Distribution Equipment (VA/SF)
Workroom [1]	Workroom general convenience / maintenance	0.25	0.5
Support Areas	Conference and Training Room	1.3	2.5
	Corridor	0.25	0.5
	Custodial Storage	0.25	0.5
	Equipment Room, Electrical & Mech. Rooms [2]	0.25	0.5
	Custodial Closet	0.25	0.5
	Lunchroom	.5	1
	Office/Enclosed	1.3	2.5
	Office/Open	1.3	3.25
	Maintenance Areas/Shop	1.3	2.5
	Storage Room	0.25	0.5
	Telecommunications Equipment Room (ER) [3]	0.25	0.5
	Telecommunications Room (TR) [3]	0.25	0.5
	Toilet Rooms	0.25	0.5
	Investigative Office [4]	1.3	2.5
Other	All Other Rooms (Non-Workstation Areas)	.5	1.0

Keyed Notes:

1 Load value indicated is for general purpose power devices. Specialized equipment loads need to be added per site specific program requirements.

2 Load value indicated is for general purpose maintenance/convenience receptacles.

3 Load value indicated is for general purpose receptacles. Communication equipment load requirements must be added per site specific program requirements, see Section 5-4.

4 Load value indicated is for general purpose receptacles. CIS equipment load requirements must be added per site specific program requirements, see Section 5-7.

5-1.5.5 ARC Fault Hazard Analysis *(Also refer to Module 3)*

Module 3

Perform an ARC Fault Hazard Analysis to include the entire electrical distribution system (high and low voltage) for all new construction in accordance with IEEE Standard 1584 – 2002 method and NFPA 70E – 2012. The analysis must include a fault current study, a circuit breaker and fuse coordination study if applicable, ARC flash energy calculations, and the installation of ARC flash incident energy (AFIE) labels. The Registered Design Engineer must perform the ARC fault analysis.

The USPS has instituted workplace safety regulations to heighten the awareness of hazards associated with electrical ARCS. The hazard level must be quantified and workers properly protected before entering proximity

to exposed energized conductors. The design documents must therefore require the contractor to comply with the current version of NFPA 70E – Standard for Electrical Safety Requirements for Employee Workplaces. Quantify the hazard level and properly protect the construction workers.

Enclosed, energized equipment, rated 600 Volts and below, that has been properly installed and maintained is not likely to pose an ARC flash hazard. The "normal" switching of low voltage circuit breakers or switches with the dead front covers secured in place therefore requires no special "PPE" protective clothing.

5-2 Power Distribution

Design for distribution systems must be adequate to support the USPS mission. The Design Engineer must account for characteristics such as long life span, changing occupancy needs, and life cycle cost that distinguish USPS construction from other commercial buildings.

5-2.1 Incoming Electrical Service *(Also refer to Modules 2A and 2B)*

Module 2A, Module 2B

Incoming electrical service must consist of the incoming secondary service, meter and fused main disconnect switch(es), or main circuit breaker(s). Select incoming service to ensure and maintain the lowest and most economical rate possible.

Determine the voltage level and availability of electric service. Design electrical systems to take advantage of utility Company rebate programs.

5-2.1.1 Underground Service

Coordinate incoming service with the utility company for underground service. Conduits must be PVC-40 direct buried minimum 24 in. below finished grade and extend to the utility connection. Use zinc-coated rigid steel conduit for conduit elbows and conduits turning up into the building.

5-2.1.2 System Capacity

Determine and verify total connected, demand and diversity loads to determine basis for sizing all main service equipment in accordance with Load Computations, Section 5-1.4.4.

Do not include capacity for future building expansion in the design.

Size primary and secondary circuitry for stepdown transformers and switchboard equipment to accommodate full capacity of the transformers.

5-2.1.3 Emergency Power

Provide individual storage battery emergency power for life safety equipment such as fire alarm, exit signs and emergency lights and investigative system.

5-2.1.4 Utility Company Metering

Install incoming utility company metering of total building requirements in a manner to assure that the lowest possible rates for electric current are obtained. The method of metering must be governed by the class of service available.

5-2.1.5 Advanced Metering *(Refer to Modules 2A, 2B and Module 3)*

Module 2A, Module 2B, Module 3

5-2.2 Distribution Voltage Levels *(Also refer to Module 2A)*

Module 2A

Power distribution for facilities less than 20,000 SF must be 120/208Y Volt, 3 phase, 4 wire where available from utility. Power distribution for facilities larger than 20,000 SF must be 277/480Y, 3 phase, 4 wire. Unless otherwise designated, all voltage references hereinafter must be at a frequency of 60 Hz. Avoid a distribution arrangement requiring high interrupting capacities and long feeders.

5-2.2.1 Miscellaneous Loads

Vending machines, display/accent lighting, convenience outlets and certain special USPS-furnished equipment (e.g., time clocks, task lighting, and scales) must be served from 208/120Y Volt panelboards.

5-2.2.2 Automation Loads *(Refer to Module 2A)*

Module 2A

5-2.2.3 Segregation of Loads *(Also refer to Module 2A)*

Module 2A

Segregate the power feeders serving the following load categories to allow the installation of submetering, per ASHRAE 90.1, 8.4.3:

- Interior Lighting
- Exterior Lighting
- HVAC System Equipment
- Receptacle Circuits.

5-2.2.4 Lockout/Tagout *(Refer to Module 3)*

Module 3

5-2.3 Main Service Equipment *(Also refer to Module 2A and Module 3)*

Module 2A, Module 3

Main service equipment such as switchboards, distribution panelboards, main circuit breakers, or fusible disconnects must be capable of carrying the entire electrical design loads and must be indoor type wherever possible.

5-2.3.1 Design *(Also refer to Module 2A)*

Module 2A

Locate main service equipment in rooms or spaces dedicated exclusively to such equipment. The space around all equipment must in no case be less than that required by code and for adequate safety, maintenance and removal clearances. Make provisions for removal of the equipment without structural, piping or lighting changes in the building. Ducts, piping and appurtenances of all systems foreign to the electrical systems must not be installed in, or pass through, electrical rooms or vaults. Mount all freestanding main service equipment on a 3-inch thick concrete pad.

5-2.3.2 Medium Voltage Switchgear Line-up *(Refer to Module 2A)* — Module 2A

5-2.3.3 Distribution Transformers *(Refer to Module 2A)* — Module 2A

5-2.3.4 Unit Substations *(Refer to Module 2A)* — Module 2A

5-2.3.5 Automatic Equipment Feeders *(Refer to Module 2A)* — Module 2A

5-2.3.6 Infrared Viewing Panes (IR Windows) *(Refer to Module 2A)* — Module 2A

5-2.4 Switchboards and Panelboards

5-2.4.1 Switchboards *(Refer to Modules 2A and 2B)* — Module 2A, Module 2B

5-2.4.2 Panelboards *(Also refer to Module 2A)* — Module 2A

All circuit overcurrent and protective devices must have interrupting ratings no less than those required for the duty to be performed.

Circuit breakers must be the molded case bolt-on type. Provide a main circuit breaker or disconnect on all panelboards when two or more panelboards are supplied from the same feeder. Main lug only, doublewide panelboards with feed-thru lugs are not acceptable. Provide all panelboards with insulated neutral terminals and equipment grounding terminals. Provide a typed label and directory to clearly designate the load on each breaker for each panelboard and distribution switchboard. The directory label must indicate the location (designated by room name, or column location in Workroom) it services.

Provide a main circuit breaker or disconnect on all panelboards located remote from their source. Use copper bus in panels.

Provide lockout/tagout devices at all panelboards.

a. Location and Protection

Provide and maintain a clear floor space dimension in front of electrical panelboards and equipment as required by Article 110 of the National Electric Code. Locate panelboards in the Workroom on walls or columns at the center of the load or area served, and protect them with guardrails, bollards, or other type of protection.

Do not locate panelboards within public spaces.

b. Sizing and Spare Capacity

Size panelboards such that all demand and diversity factors allowed by code and local authority must be applied to load determination calculations, and must include 20 percent spare capacity. Provide space provisions for 20 percent additional branch circuit breakers.

Design panelboard branch circuits to a maximum of 80 percent of the circuit capacity.

Circuits in 277/480 Volt panelboards serving dry-type, stepdown transformers must be considered loaded to the full capacity of the transformers rather than to the actual loading of panelboards fed by the transformer.

c. Phase Balancing and Panel Directories

Measure steady state load currents at each panelboard feeder and rearrange circuits in the panelboard to balance the phase load to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

Provide typed circuit directory for each panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

5-2.5 Secondary Dry-Type Transformers

(Also refer to Module 2A)

Module 2A

Provide 208Y/120 Volt, 3-phase dry-type transformers to service miscellaneous low voltage loads served by 208Y/120 Volt panelboards. Transformers must have a maximum 80 degree Centigrade temperature rise over a 40 degree Centigrade ambient temperature. Transformer windings must be copper conductor material. Do not subfeed these transformers from adjacent 480Y/277 Volt lighting panelboards. Transformers must have six 2-1/2 percent full capacity taps, two above and four below 480 Volts. Transformer neutral terminals must be properly grounded.

Transformer efficiencies must comply with the D.O.E. Guidelines established for manufacture January 1, 2016 (10 CFR 431.192, April 2013).

K-factor or shielded transformers are not normally required and must be provided only as directed by the Project Manager.

5-2.6 Motors and Controllers *(Also refer to Module 2A)*

Module 2A

Control and protect building equipment motors by combination fused switch or circuit breaker type motor starters. Control voltages must not exceed 120 Volt to ground. Provide three-phase running overcurrent protection, phase loss/phase reversal protection and supply each starter with a hands-off-automatic (HOA) switch. Motors must be high efficiency type, and motors 5 HP and larger must be power-factor corrected.

Motors 1 hp or greater in continuous service must be premium efficiency type as listed in NEMA MG-1 Standards.

Generally, design larger motors above 1/2 HP for 208 Volt or 480 Volt, single phase or 3-phase power, unless otherwise noted for specific postal equipment. Motors 1/2 HP and smaller must operate on 120 Volt, single-phase circuits.

Motors sized 1/2 HP and above must be fed from dedicated branch/feeder circuit breakers. Multi-motor branch circuits, limited to a maximum of (2) motors, may be used for fractional horsepower motors.

5-2.6.1 Motor Controllers

For individual three phase motors not furnished as part of package with motor starter, provide individually mounted magnetic, 3-phase, across-the-line combination type motor controller with fusible switch protector and phase loss/phase reversal protection, individual 120 Volt control power transformer, control devices HOA selector switch, push buttons, pilot light as required to suit intended motor control operation as required.

Provide manual, single-phase, 120 Volt, toggle type motor rated switches with thermal overload element for fractional horsepower equipment not requiring automatic control interfaces.

5-2.7 Wiring Methods and Materials

All interior power, lighting and line voltage control conductors must be run per the NEC. Rigid galvanized steel conduit and fittings must be installed for conduits turning up through the slab and all exposed conduits in the workroom up to 10 feet AFF.

Use conduit risers to protect all low voltage, open cable systems. Exposed conduit risers within workroom must be heavy wall, rigid galvanized steel type up to 10 feet AFF, unless otherwise noted.

5-2.7.1 Conduit *(Also refer to Module 2A)*

Module 2A

Electrical metallic tubing (EMT) conduit must only be installed in dry interior spaces. Do not installed electrical metallic tubing below grade in areas subject to severe corrosive conditions or embedded in concrete. Rigid galvanized steel conduit must be installed for conduit elbows, conduits turning up through the building slab and all exposed conduits less than 8 ft. above finished floor. Conduits encased in concrete must be PVC schedule 40. All direct buried conduits must be PVC or rigid galvanized steel and must be designed to withstand appropriate vehicular traffic areas. Mark underground conduit routings with magnetic “marker tape”.

In the Workroom, clear height to underside of horizontal conduit runs, cable trays and all other utilities must be 11 ft. – 0 in. AFF minimum, unless noted otherwise.

Do not install conduit across ventilation or access openings.

Where automatic truck restraints are used, provide power to each restraint through conduit mounted in the platform wall/foundation.

Each conduit run must contain no more than six (6) current carrying conductors and an equipment grounding conductor.

Route conduits 6 inches below any isolated concrete pad or ground floor slab. Conduit must not be encased in concrete pad or ground floor slab. Conduits encased in above grade floor slabs must have 1.5 inch minimum concrete cover.

Type “MC” cable will be permitted for use in exposed and accessible ceiling spaces only. Do not use type “MC” cable above inaccessible hard ceilings or in damp locations. Cable must be supported and secured where such support does not exceed 3 ft. intervals and must be properly color coded to identify phase, neutral, ground and switch legs.

5-2.7-2 Exterior Wiring

Install all underground wiring in PVC or rigid galvanized steel conduit. All exterior underground conduit must be a minimum of one inch, buried at a depth of not less than 2 ft. below grade. Seal conduits terminating below grade to prevent entry of dirt or moisture.

Provide red detectable warning tape 12 inches above all underground conduit routings. Tape must be suitable for direct burial, 6 in. x 4 mils. and detectable by metal detector when buried up to 2 ft. – 6 in. below final grade.

Splices shall be terminated above grade. In-ground pullboxes, when required, shall be used for cable pulling purposes only. Below grade splices are not permitted.

5-2.7.3 Multiwire Branch Circuits

The sharing of neutral conductors for multiwire branch circuits is prohibited. All branch circuits must contain individual neutral conductors.

5-2.7.4 Conductors

The minimum size conductor for power and lighting must be #12 AWG. Conductors must be copper, except conductors #1/0 and larger, may be compact, stranded, aluminum if equipped with compression lugs and installed per manufacturer's recommendations. Base the design on the ampacity of copper conductors. Provide color coding as indicated in Exhibit 5-2.7.4a:

Exhibit 5-2.7.4a
Conductor Color Coding

PHASE	208/120Y VOLTS	240/120 VOLTS	480/277Y VOLTS
A	Black	Black	Brown
B	Red	Orange (Highleg)	Orange
C	Blue	Blue	Yellow
Neutral	White	White	Gray
Ground	Green	Green	Green/White

Module 2A

5-2.7.5 Grounding *(Also refer to Module 2A)*

Ground every device and metal part of the electrical system.

Maintain continuity of system and equipment grounds throughout the electrical installation. Provide ground bushing and jumpers where normal metallic ground paths are interrupted.

Do not use the electrical system neutral wire to ground miscellaneous conduit.

The resistance of the grounding system shall not exceed 5 ohms. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening ground rods or installing ground enhancement materials; then retest to demonstrate compliance. Install rods at least 8 feet apart. Furnish written report of all tests.

5-2.7.6 Identification

Connect permanent tags to all feeders at intermediate pullboxes to provide identification for future use. Identify panel and circuit number of all electrical devices, i.e., switches, receptacles, disconnect switches and motor starters, using a minimum 1/8 inch high self-stick labels with block lettering, protected with clear tape.

Module 2A

5-2.7.7 Equipment Grounding *(Also refer to Module 2A)*

All power and lighting conduits must contain a properly sized equipment grounding conductor.

Provide exterior site lighting poles with individual grounding electrodes bonded to the metal pole base using a #2/AWG copper (minimum) grounding electrode conductor.

Ground cable shielding, metallic conduits, wireways, metal enclosures of busways, cable boxes, electrical equipment housings and all noncurrent carrying metallic parts.

All conduit stub-ups must be grounded and where multiple stub-ups are made within an equipment enclosure, such as a switchboard, they must be equipped with grounding bushings and bonded together and to the enclosure and to the enclosure ground bus.

Motors must be grounded by means of an equipment grounding conductor in the same raceway with motor feeder connected to a grounding bushing at the motor terminal box and the incoming conduit grounding bushing of an individual mounted motor starter.

Where flexible conduit is used for all or part of the conduit run provide an equipment grounding conductor in the conduit and connect to grounding bushings at each end of the run.

5-2.7.8 Junction and Pull Boxes

Provide fabricated sheet metal junction and pull boxes of galvanized, code gauge, sheet steel. Include angle iron framing where required for rigidity. Use brass screws only to attach junction and pull box covers to interior floor boxes or to boxes located where moisture may be present.

Use brass or stainless steel screws to attach junction and pull box covers to interior floor boxes or to boxes located where moisture may be present.

Do not use single covers for junction and pull boxes having cover length or width dimension exceeding 3 feet. Sectionalize covers that exceed 3 feet in either dimension into two or more sections.

5-2.7.9 Busways *(Refer to Module 2A)*

Module 2A

5-2.8 Convenience Outlets

5-2.8.1 Type and Location *(Also refer to Module 2A)*

Module 2A

Provide NEMA5-20R specification grade, 2-pole, 3-wire, 20-A, 125 Volt, duplex grounding type outlets with nonconductive faceplates 24 in. AFF to bottom of outlet, unless otherwise noted, in accordance with Exhibit 5-2.8.1a. Maximum of six (6) convenience outlets wired for 20 Amp, 120V circuit, unless otherwise noted.

Exhibit 5-2.8.1a
Outlet Requirements

LOCATION	OUTLET REQUIREMENTS
Workroom:	
Workroom[2]	Two outlets per column @ 78 in. AFF, as directed by USPS (located in web of column, not on flange and not on the same circuit) and one per 25 linear feet of perimeter wall, recessed @ 78in. AFF. Maximum of four (4) outlets per circuit. See Section 5-2.8.3 for drop cord twist lock receptacles.
HEBR	A/E to show locations of Hyper Electronic Badge Readers. Coordinate with specific facility requirements. Provide a dedicated circuit.
Registry Cage	One duplex outlet connected to a dedicated 20 Amp circuit.
Investigative Office	A sub panel is required for this area. At least two quadruplex convenience outlets must be provided at the CCTV headend location. Provide one duplex outlet on each wall in the CIO office. Provide twist-lock, NEMA L5-30R receptacle behind each CCTV headend rack. Provide one information outlet on every wall.
Delivery Confirmation	One duplex outlet. Two required if over 32 carriers.
Platforms:	
Mailing/Carrier Platform[2,4] (Customer Service)	Recessed on platform wall, 25 ft. on center, 46in. AFF (top of outlet). On platform exterior, place one on parking side of every fourth column. Provide weatherproof type outlets with ground fault interrupter circuit breakers if platform is open. Provided switches in employee areas to control these receptacles.
Loading dock[4]	One quadruplex receptacle for every three dock doors @ 78 in. AFF. Locate the convenience outlet adjacent to T/O at interior dock wall. Maximum of (4) quadruplex receptacles wired per circuit.
Support Areas:	
Lunchroom and Break[2] areas	Max. 42 in. on center at vending machine locations @ 46 in. AFF (top of receptacle). At countertops, provide duplex receptacles every 30 in. on center for coffee machines

LOCATION	OUTLET REQUIREMENTS
	and microwave ovens. Maximum of (2) receptacles wired per circuit.
Water coolers/refrigerator/ freezer/etc.	One at each piece of equipment, on dedicated circuit.
Corridors[2]	One per 30 linear feet of corridor.
Open Offices[1,2]	One duplex outlet per 12 linear feet of perimeter wall plus one quadruplex outlet per employee (see PS 929).
Private Offices[1]	One quadruplex outlet at expected desk location and one additional convenience outlet at opposite wall
Telecommunications Equipment Room (ER), Telecommunications Room (TR)	See Section 5-4 Communications.
Toilets	Away from lavatories, provide ground fault interrupter type receptacles.
Vaults (interior)	Provide one duplex outlet.
Conference Rooms	One per 12 linear feet of wall
Training Rooms[1]	One per 12 linear feet of wall
Lobby (Retail and BMEU)[2,3]	One duplex outlet per 30 ft. of lobby length, no less than two receptacles per lobby. Provide digital countdown, timer switch(es) in employee area to control lobby receptacles.
Retail:	
Full Service Counters	2-duplex outlets for each counter (1 dedicated receptacle/1 convenience receptacle). Provide a multi-outlet surface raceway.
Self Service	One duplex receptacle for electronic scale or SSK unit. For SSK and Parcel Drop design details, see Program Folder, Retail, SSK.
Other:	
Trash compactor	Provide NEMA rated power outlet in weather-proof enclosure as required to suit equipment point of connection. The A/E must coordinate exact location of outlet to suit location of trash compactor.
Truck and Postal Delivery Vehicle Parking Areas[4]	Provide post mounted, duplex weather-proof GFCI outlets to power the truck engine block heaters (1250 Watts at 120 Volts) in Zones 6 & 7 and the northern parts of Zone 5 only (refer to the ASHRAE Climate Zone Map – Module 1, Appendix M1-C). The size and height of the block heater receptacle post is dependent on vehicle weight and shall not be provided where private delivery vehicles park. Refer to standard details G5-2-8c, 8c1, 8c2 and 8c3.
Roof	Ensure that a weather-proof GFI outlet is provided on the exterior of each roof-top mechanical unit. This outlet may be integral to the unit or provided separately.

LOCATION	OUTLET REQUIREMENTS
Exterior mechanical equipment[4]	Weatherproof convenience outlets with ground fault interrupter for servicing.
Dish Antenna	Provide one outlet.
Stairwells	One at each floor.
Full Service Controls (BMEU)	(2) Duplex receptacles for each IRT (1 dedicated/1 convenience receptacle). Provide multi-outlet surface raceway.
Mechanical, transformer, and electrical equipment rooms	One per 20 linear feet of wall (not less than 2 per room).
All other rooms	One per 12 linear feet of wall with a minimum of one outlet per wall.

Keyed Notes:

1 Provide automatic receptacle control for 50 percent of the receptacles within all offices, open offices, conference rooms, break rooms and classrooms, per ASHRAE 90.1, 8.4.2. Control the receptacles designated for "automatic control" by a programmable time switch, the lighting relay control panel, the "BAS" or other time-based control method. The automatic controlled receptacles must be explicitly labeled or color coded and must not be occupancy sensor controlled. Receptacles specifically dedicated for equipment requiring 24-hour operation or those where automatic shutoff would endanger safety or security of the room or occupants must not be automatically controlled.

2 Duplex receptacles mounted within 8 feet of a fire extinguisher shall be equipped with stainless steel, locking coverplates. Quadraplex receptacles mounted within 8 feet of a fire extinguisher shall be equipped with die-cast metal, lockable coverplates.

3 The receptacles within the public lobbies of retail and the BMEU must be controlled by digital countdown timers programmed for 0 to 60 minute preset time.

4 The exterior receptacles mounted within unsecure, public, outdoor areas must be equipped with locking coverplates.

5-2.8.2 Hyper Electronic Badge Readers (HEBRs)

The hyper electronic badge readers are electronic time clocks used to clock plant personnel in and out of the facility. The HEBR's are provided by the USPS. They are not part of ePACS. Coordinate location of HEBR outlets with USPS to insure a fully compatible and operational system. Each HEBR requires a duplex electrical outlet and a single jack telecommunication outlet in a split double-gang box recess mounted at 50 1/2 inches AFF, directly behind unit.

5-2.8.3 Twist Lock Receptacles *(Also refer to Module 2A)*

Module 2A

A twist lock grounding type receptacle, NEMA L5-20R with drop cord located in grid pattern (maximum of one per 625 SF located symmetrically within building bays and mounted from building steel a minimum of 11 ft. above finished floor) may be required in workroom for carrier case lighting. Twist lock receptacles must be fed from dedicated circuits and must be secured to the building structure. The drop cords must have a twist lock plug at one end and a straight blade receptacle at the other. The drop cord lengths must be field verified so that twist lock receptacles are located 6 ft. 6 in. above finished floor. Provide Kellum wire reinforcements at cord and receptacle.

5-2.8.4 Clocks *(Also refer to Module 2A)*

Module 2A

Clocks in all areas, except the workroom, must be 12 inch diameter, atomic, battery operated type and provided by the contractor.

At a minimum, clock locations are as follows: offices, shops, stockroom, locker rooms, lunchrooms, computer rooms, conference rooms, training rooms, first aid rooms and workrooms. Clocks on workroom perimeter walls must be 15-inch diameter (minimum), shatterproof and must be located 100 feet on center. Where the distance between opposite perimeter walls exceed 100 feet, provide additional clocks on intermediate columns.

Install clock 7 ft. 6 in. above the floor (except in the workroom where they must be 10 ft. above the floor. When possible locate clocks over room entrance door. Coordinate the exact location of clocks to avoid interference with equipment layouts and provide maximum visibility.

5-2.8.5 Scales

Provide one-inch conduit with pullwire from the platform scale location to the BMEU counter for data transmission. Provide convenience outlets for scale operation as required

5-2.9 Not Used

5-2.10 Power Factor Correction *(Refer to Module 3)*

Module 3

5-2.11 Safety Switches (Enclosed Switches)

Provide heavy duty type safety switches (disconnect switches) capable of being lockable in off position. The electrical ratings must be suitable for the intended use in accordance with the National Electrical Code. (Furnish safety switches with integral auxiliary contact as required.)

5-3 Lighting

The USPS is implementing the use of solid-state, LED interior and exterior luminaires to minimize the operating cost for each facility. Lighting currently represents a large percentage of the utility costs. The approach that must be taken by the A/E is one that meets the foot candle requirements using the luminaires specified for the lowest life-cycle cost, from a practical viewpoint, the Workroom lighting grid must be as large as possible while still complying with the uniformity factor described herein.

Three (3) different lighting specification sections are contained within the USPS guideline specifications. Utilize sections 265100csf or 265100mpf for newly constructed or totally upgraded interior “LED” lighting systems within CSF’s and MPF’s, accordingly. Specification section 265100ra shall only be utilized for minor R&A projects requiring legacy T8 fluorescent luminaires to match the existing.

Include in the lighting system design all computations for determining the lighting levels in a building. For both interior and exterior lighting solutions, this is to include the types of luminaires and lighting controls used, the light distribution/photometrics, and the mounting heights. Provide the same information for exterior areas such as driveways, parking and maneuvering areas and security lighting systems, as applicable. Calculations are to indicate both initial and maintained lighting levels in footcandles. The lighting system must be 277 Volts, when available.

In an effort to comply with ASHRAE 90.1, the USPS has undertaken the following policies:

Each space enclosed by walls or floor-to-ceiling height partitions must be equipped with at least one automatic control device to independently control the general lighting within the space. This control device must automatically de-energize the space lighting within 30 minutes of all occupants leaving the space.

The automatic control device must either be equipped or wired for “manual on” operation or controlled to automatically turn the lighting “on” to not more than 50 percent illumination. The following spaces do not require the “manual on” features:

Public Corridors and Stairwells

Primary Building Entrance Areas and Lobbies

Areas where “manual on” operation would endanger the safety or security of the room or occupant(s).

Interior lighting for all spaces must utilize automatic control devices to turn off lighting in all spaces without occupant intervention.

Luminaires located on exterior of building must be of weatherproof construction, and installed with stainless steel screws finished to match the luminaire. Design luminaires so that no direct illumination glare reaches drivers or pedestrians coming toward the facility.

Furnish all luminaires complete with suitable pendants, canopies, cover, ceiling roundels, opening flanges, hangers, plaster rings or frames if recessed, necessary rubber cords, chains, and all other accessories required for proper installation.

Submit an Energy Compliance Certification (ECC) form to the Facilities Program Management, Energy/Standards Team Leader for all new or lighting systems upgrades. Submit form at the 30 percent design phase and again at project acceptance to demonstrate that the lighting design is energy efficient and complies with Postal Standards. The Facilities Program Management, Energy/Standards Team Leader must approve the design before it can be implemented. Current ECC forms are available in Folder G.2 in the Building Design Standards.

5-3.1 Interior Lighting *(Also refer to Modules 2A, 3, 4A, 4D)*

Module 2A, Module 3, Module 4A, Module 4D

Energy efficient, solid-state LED lighting solutions are currently required for the majority of spaces.

LED arrays shall have a correlated color temperature (CCT) of 4000K, a minimum color rendering index (CRI) value of 80 and a minimum L70 lumen maintenance value of 50,000 hours. Provide the lighting within each space with “bi-level” control (0%, 50%-100%) as a minimum. Lighting control within the following areas need not be “bi-level”:

Corridors

Public Lobbies

Restrooms and Storage Rooms

Electrical/Mechanical Rooms

Retail Areas

Spaces containing only (1) luminaire (less than 100W)

Spaces with lighting power allowance less than 0.6 W/SF.

Install an occupant sensor that automatically turns lighting off within 20 minutes of all occupants leaving all rooms and spaces: A time-controlled device **cannot** be utilized.

Control of the Retail area lighting shall utilize switches, time-controlled circuits and occupancy sensors. Refer to section 5-3.10 and exhibits 5-3-1.6a and 5-3.1.7a for specific requirements.

5-3.1.1 Workroom and Enclosed Platform Lighting and Controls

Module 2A, Module 3

(Also refer to Modules 2A and 3)

Design the workroom or platform lighting systems to achieve the required light levels for the two lighting groups described below. Each lighting group listed is present in every workroom lighting design.

- Ambient Light Group (ALG)
- Egress Lighting Group (ELG)

Provide luminaire control as follows:

- Individual luminaires, groups of luminaires or every other luminaire must be controlled as zones to achieve the required illumination levels under different lighting conditions. Control solutions such as LED step-dimming systems are an acceptable control strategy.

All luminaires must be automatically controlled by ceiling or luminaire mounted occupancy sensors. The occupancy sensors selected must be appropriate for the ceiling height or luminaire mounting height. Ceiling mounted sensors shall be located to overlap their coverages and provide a seamless transition from one sensor zone to the next.

5-3.1.1.1 Ambient Light Group (ALG)

Limit lighting in the workroom or platform area to an Average Maintained level of 25 footcandles and use bi-level control. Average maintained high output illumination level is limited to 25 footcandles, low output illumination level to 12.5 footcandles.

There are two operational modes for the ALG lighting:

1. “High output illumination level” condition. This condition must provide 25 fc for normal workroom activities and must be automatically controlled using step-dimming type occupancy sensors. The high output illumination level groups must only be energized upon detection of presence by the occupancy sensor(s). This must be the primary lighting system provided for the workroom. The maximum to minimum uniformity for this illumination condition must not exceed 3:1
2. “Low output illumination level” condition. This condition must provide 12.5 fc for the workroom area when less visual activity is needed and must be automatically controlled using step-dimming type occupancy sensors. The maximum to minimum uniformity for this illumination condition shall not exceed 8:1.

The step-dimming occupancy sensors shall be dual-technology type and must automatically turn the ambient lighting groups “off” within 20 minutes of the last detected presence within the workroom or platform.

Lighting Controls. The control of luminaires in the ALG shall be achieved by the use of step-dimming type occupancy sensors to control each zone separately. The high output illumination level shall be achieved when activity is detected by the occupancy sensor. Upon (10) minutes of inactivity the

occupancy sensor shall dim the luminaires to the low output illumination level of 12.5 footcandles. Upon another (10) minutes of vacancy the step-dimmer occupancy sensor shall turn off the luminaires.

5-3.1.1.2 Egress Light Group (ELG)

Emergency Lighting condition. This is a condition in which power to the facility or the lighting circuitry is interrupted. During this condition, an average of 1 fc must be maintained along all emergency egress routes in accordance with the National Fire Protection Agency 101 Life Safety code. The emergency battery units within the workroom must provide this emergency egress lighting.

5-3.1.1.3 Lighting Requirements

The A/E must develop the following:

- Layouts of areas where task lighting is applicable such as offices, stockrooms, and spaces with manual operations.
- Lighting plan showing each lighting group, including the location of lighting control devices.

The A/E must include, as part of the 30 percent Design submission, a photometric plan for each “ALG” and “ELG” lighting group within the entire workroom or platform indicating the proposed lighting layout with point-by-point footcandle levels on a maximum 5 ft. X 5 ft. grid pattern. Also provide statistical summaries to demonstrate the following:

- Average maintained footcandles
- Minimum footcandles
- Maximum footcandles
- Uniformity factor

Criteria for acceptance of the workroom or platform lighting system shall be based on light meter readings taken in one or more representative lighting zones covering a minimum area of 2,500 square feet. The USPS Project Manager must approve the representative area(s) chosen.

Base the final acceptance on the measurement of initial footcandle levels after 100 hours of “burn in”, not maintained levels. Initial footcandle levels must average 110 percent (+/-3 percent) of those prescribed in Exhibit 5-3.1.5a. Readings may have to be taken after normal work hours to avoid the influence of extraneous ambient light.

The light meter used must have been recently calibrated with an accuracy of ±3 percent or better and must be positioned in a horizontal plane on a portable stand at 30 in. AFF.

5-3.1.2 Exterior Open Platform Lighting

The lighting within exterior, open mail platforms and carrier platforms must be provided with bi-level control (0%, 50% to 100%). The lower output illumination level of 12.5 footcandles shall be automatically controlled by photo-sensor(s) and the higher output level of 25 footcandles must be both automatically and countdown timer controlled utilizing photo-sensor(s) with countdown timers.

Module 3

5-3.1.3 Platform Task Light *(Also refer to Module 3)*

In addition to ambient lighting, provide adjustable platform task lights (dock lights) at all truck positions with platforms higher than 2 ft. – 6 in. above grade. The dock luminaire wall or column-mounted at 60 inches above finished floor to allow optimum illumination of the inside of the trailer to facilitate loading or unloading. At enclosed platforms, the luminaire shall be controlled by the dock door limit switch: door open - luminaire energized; door closed - luminaire is off. Provide digital countdown timer switches to control the adjustable dock lights on open docks.

5-3.1.4 Exit Lighting *(Also refer to Module 3)*

Module 3

Provide exit signs to mark locations of exits and exit routes as required to meet code. Signs must be energy efficient “LED” type, have maintenance-free battery back-up and meet the minimum UL requirements for brightness and distribution.

5-3.1.5 Emergency Lighting *(Also refer to Modules 2A and 3)*

Module 2A, Module 3

Provide emergency lighting to comply with code requirements. Battery operated emergency lighting must be circuited to the very same branch circuit that serves the normal lighting in the local area, but tapped ahead of the device or relay controlling the local normal lighting. Refer to NFPA 101, 7.9.2.3. Provide an average of 1 footcandle to illuminate designated routes of egress per NFPA 101. Locate a minimum of one emergency light at the main service panelboard.

Battery operated emergency lights must have manual push to test switches.

Emergency or night lighting that is illuminated during Plant “off hours” and where shutdown will not endanger the safety or security of the occupants must be shutdown during non-occupied times. Shutdown shall not be provided for emergency battery lighting that is automatically off during normal building operation.

5-3.1.6 Footcandle Levels and Power Density *(Also refer to Modules 2A, 4A and 4D)*

Modules 2A, Module 4A, Module 4D

Lighting power densities must not exceed the maximum values established by the current version of ASHRAE 90.1, Table 9.6.1 using the “space-by-space” computation method.

The luminaire schedule, contained within the lighting design documents, must note the maximum input wattages for the luminaire systems chosen and the lighting plans must identify the functional use of all spaces (office, storage, lobby, etc.).

Refer to Exhibit 5-3.1.6a for footcandle and lighting power density levels that must be met in the selection of luminaires to ensure quality of materials, ease of maintenance and good performance. Point-to-point calculations must use a Light Loss Factor (LLF) of 0.9 for interior applications and 0.85 for exterior applications.

Exhibit 5-3.1.6a

Footcandle Levels and Power Density

AREA	LOCATION/ DESCRIPTION	AVERAGE MAINTAINED FOOTCANDLES (FC) (At 2'-6" AFF unless otherwise noted)[5,6]		UNI-FORM-ITY	LAMPS[3]	MAX. POWER DENSITY (W/SF)
		Horizontal	Vertical			
Workroom	Workroom [7]	12.5/25[2]	10	8:1 / 3:1	LED	0.5[4]
	P.O. Boxes (Workroom Side)	30	3	3:1	LED	0.6
Platforms	Enclosed Mail	12.5/25[2]	10	8:1 / 3:1	LED	0.5[4]
	Vestibule	25		3:1	LED	0.5
Support Areas	Building and Grounds Room	20			LED	0.2[4]
	BMEU	50		3:1	LED	0.6
	Conference and Training Room	50		3:1	LED	0.9
	Corridor	20			LED	0.5[4]
	Stairways	20			LED	0.5
	Registry cages & LMP Registry Rooms	50		3:1	LED	0.6
	Custodial Storage (inactive)	20			LED	0.3[4]
	Equipment Room, Elec.& Mech. Rooms	20			LED	0.9
	Custodial Closet	20			LED	0.3[4]
Support Areas	Locker Rooms/Areas	30		3:1	LED	0.48
	Lunchroom	30		3:1	LED	0.6
	Offices	50		3:1	LED	0.9
	Storage Room (inactive)	20			LED	0.4
	Storage Room (active)	30			LED	0.5
	Telecommunications Equipment Room (ER)	20			LED	0.5[4]
	Telecommunications Room (TR)	20			LED	0.5[4]
	Toilet Rooms	20			LED	0.6[4]
	Vaults	50			LED	0.3
	Investigative Office	20ambient 40task	3 5	3:1	LED	0.9
	Mail Pickup Lobby (CAX)	50			LED	1.0
Retail	Main Box Lobby [1] (Customers)	30	3	3:1	LED	0.6[4]
	Box Lobby Alcoves (Customers)	30	3	3:1	LED/	0.6[4]
	Full Service Lobby[1] (Employees)	50	10	3:1	LED	1.0
	Full Service Lobby[1] (Customers)	30	3	3:1	LED	0.6[4]

AREA	LOCATION/ DESCRIPTION	AVERAGE MAINTAINED FOOTCANDLES (FC) (At 2'-6" AFF unless otherwise noted)[5,6]		UNI-FORM-ITY	LAMPS[3]	MAX. POWER DENSITY (W/SF)
		Horizontal	Vertical			
	Self-Service Lobby[1]	50	10	3:1	LED	1.0
	Passport Area/Office	50	10	3:1	LED	0.9
VMF	Vehicle Service Bays	25/12.5[2]	5	3:1	LED	0.5
	Stock Room & Work Area	25/12.5[2]	5	3:1	LED	0.6
	Equipment Storage	20	-		LED	0.3
	Lube & Oil Storage	20	-		LED	0.3
	Body Shop	30			LED	0.5
	Paint Shop	30			LED	0.5
	Pressure Cleaning & Vehicle Wash Bays	20			LED	0.3
	Tire Storage & Repair Shop	30			LED	0.5
Other	All Other Rooms	30		3:1	LED	0.6

Utilize ASHRAE 90.1, Table 9.6.1 for room lighting power densities not specifically listed in Exhibit 5-3.1.6a.

The lighting power densities listed in Exhibit 5-3.1.6a may be increased 20 percent for spaces with high calculated "room cavity ratios" (RCR's). Utilize the "RCR" thresholds listed in ASHRAE 90.1, Table 9.6.1.

Keyed Notes:

1 Per ASHRAE 90.1, an increase in the lighting power allowance is permitted for the display and accent lighting within full service and self-service retail areas.

2 Indicates bi-level switching for levels of illumination. Lower number represents low illumination level and higher number for high illumination level.

3 Lamping: LED = Solid State LED.

4 This value represents a ~25 percent reduction in the values established in ASHRAE/IESNA 90.1 using the space-by-space method.

5 As defined by the IESNA, Maintained Footcandle Level is to be interpreted as "Average Maintained Footcandle Level" for all interior rooms.

6 Final acceptance will be based on measurement of initial lighting levels, not maintained lighting levels.

7 Workroom lighting for carrier sorting areas is based on the assumption that task lighting will be provided for the carrier sorting cases that will result in a total illumination level of 50 fc's.

Modules 2A, Module 4A, Module 4D

5-3.1.7 Interior Luminaire Application *(Also refer to Modules 2A, 4A and 4D)*

Refer to Interior Luminaire Application chart, Exhibit 5-3.1.7a for cross-reference to the standard Postal luminaire types contained in the Postal specifications.

Exhibit 5-3.1.7a
Interior Luminaire Application

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	CONTROLS NOTES
Workroom	Workroom	W1/W2 A1/A2 EM3	8'/4' Cable/chain hung industrial LED strip light. Recessed, lensed LED troffer. Industrial 2-head emergency lighting unit with battery.	4,9
	P.O. Boxes (Workroom Side)	CL1/CL2/ CL3	Continuous LED strips wall bracket mounted behind P.O. boxes.	3
Platforms	Enclosed Mail	W1/W2 A1/A2 EM3	8'/4' cable/chain hung industrial LED strip light. Recessed, lensed LED troffer. Industrial 2-head emergency lighting unit with battery	4,9
	Vestibule (Carrier & Mail)	A1/A2 EM3	Recessed, lensed LED troffer. Industrial 2-head emergency lighting unit with battery.	1,9
Platform Dock	Platform Task Light	P1	LED Dock Luminaire.	10
Support Areas	Building and Grounds Room	B1/B2 CL1/CL3	4'/8' damp location LED with high-impact acrylic diffuser. Surface or chain mounted LED strip light.	6
	BMEU	UC1/UC2 A1/A2 EM1 EM2	Under counter LED at screen line. Recessed, lensed LED troffer. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	3,6,9,5
	Registry Cage & Registry Room	A5/A6 B1/B2	4 ft., LED surface luminaire. 4'/8' damp location LED with high-impact acrylic diffuser.	6
	Conference and Training Room	A1/A2 EM2	Recessed, lensed LED troffer. Architectural 2-head emergency lighting unit with battery.	2,6,9,5
Support Areas	Corridor	A1/A2 A3 A5/A6 R1 R5 EM1 EM2	Recessed, lensed LED troffer. 1' x 4' Recessed, lensed LED troffer. 4 ft., LED surface luminaire. 4" Dia. LED downlight. 6" Dia. LED downlight. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	1,9
	Stairway	B3	2' LED with high-impact lens and integral occupancy sensor.	7

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	CONTROLS NOTES
	Custodial Storage	CL1/CL3	Surface mounted LED strip light.	6
	Equipment Room, Electrical & Mech. Rooms	CL1/CL3 EM3	Surface or chain mounted LED strip light. Industrial 2-head emergency lighting unit with battery.	3
	Custodial Closet	CL1/CL3	Surface mounted LED strip light.	6
	Locker Rooms/Areas	A1/A2 A3 A5/A6 EM2	Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. 4 ft., LED surface luminaire. Architectural 2-head emergency lighting unit with battery.	1,9,5
	Toilet Rooms	A1/A2 A3 A5/A6 R5 EM2	Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. 4 ft., LED surface luminaire. 6" Dia. LED downlight. Architectural 2-head emergency lighting unit with battery.	1,9
	Lunchroom	A1/A2 EM1 EM2	Recessed, lensed LED troffer. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	6,9,5
	Offices	A1/A2	Recessed, lensed LED troffer.	6,5
	Storage Room	CL1/CL3	Surface or chain mounted LED strip light.	6
	Telecommunication Equipment Room (ER)	CL1/CL3 A1/A2 EM3	Surface or chain mounted LED strip light. Recessed, lensed LED troffer. Industrial 2-head emergency lighting unit with battery.	6,9
	Telecommunication Room (TR)	CL1/CL3 A1/A2 EM3	Surface or chain mounted LED strip light. Recessed, lensed LED troffer. Industrial 2-head emergency lighting unit with battery.	6,9
	Vaults	A1/A2 A5/A6 EM2	Recessed, lensed LED troffer. 4 ft., LED surface luminaire. Architectural 2-head emergency lighting unit with battery.	3
	Investigative Office	A1/A2 EM2	Recessed, lensed LED troffer. Architectural 2-head emergency lighting unit with battery.	3,9
	Mail Pickup Lobby (CAX)	A1/A2	Recessed, lensed LED troffer.	1,9

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	CONTROLS NOTES
Retail	Main Box Lobby (Customers)	R2 A1/A2 A3 R1 &R5 EM1 EM2	4" Dia. Recessed, LED wall washer. Recessed lensed LED troffer. 1'x4' Recessed lensed LED troffer. LED downlights. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	8,9
	Box Lobby Alcoves (Customers)	A1/A2 A3 R1 &R5 EM1 EM2	Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. LED downlights. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	8,9
	Full Service Lobby (Employees)	R2 A1/A2 A3 R1 &R5 EM1 EM2 UC1/UC2	4" Dia. Recessed, LED wall washer. Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. LED downlights. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery. LED under cabinet lighting mounted at casework.	3,9,11
	Full Service Lobby (Customers)	R2 A1/A2 A3 R1 &R5 EM1 EM2	4" Dia. Recessed, LED wall washer. Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. LED downlights. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	3,9,11
	Self-Service Lobby	R2 A1/A2 A3 R1 &R5 EM1 EM2	4" Dia. Recessed, LED wall washer. Recessed, lensed LED troffer. 1'x4' Recessed, lensed LED troffer. LED downlights. Recessed square emergency lighting unit with battery. Architectural 2-head emergency lighting unit with battery.	1,8,9
VMF	Vehicle Service Bays	W3/W4 EM3	4'/8' Cable/chain or pendant hung, enclosed and gasketed, LED low bay luminaire. Industrial 2-head emergency lighting unit with battery.	1,4
VMF	Stock Room & Work Area	A1/A2 EM2	Recessed, lensed LED troffers. Architectural 2-head emergency lighting unit with battery.	1,4,5
	Equipment Storage	CL1/CL3 W1/W2	Surface or chain mounted LED strip light. 8'/4' Cable/chain or pendant hung, industrial, LED strip light.	6

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	CONTROLS NOTES
	Lube & Oil Storage	W3/W4	4'/8' Cable/chain or pendant hung, enclosed and gasketed, LED low bay luminaire.	6
	Body Shop	W3/W4	4'/8' Cable/chain or pendant hung, enclosed and gasketed, LED low bay luminaire.	6
	Pressure Cleaning & Vehicle Wash Bays	B4/B5	4'/8' Enclosed and gasketed, wet location, LED luminaire.	3
	Tire Storage & Repair Shop	CL1/CL3 W1/W2	Surface or chain mounted LED strip light. 8'/4' Cable/chain or pendant hung, industrial, LED strip light.	6
Other	All Other Rooms	A1/A2	Recessed, lensed LED troffer.	1,6,5

Controls Notes:

1 Each space enclosed by floor-to-ceiling height partitions shall be provided with occupancy sensor control. Sensor must have zero to thirty minutes adjustable delay.

2 Provide multi-level control to allow for A/V presentations.

3 Provide on/off switches, unless otherwise noted.

4 Refer to lighting level criteria for controls.

5 Provide bi-level lighting control feature for teaching classrooms, conference/training rooms, lunch and break rooms and offices greater than 250 square feet.

6 Provide occupancy sensor control with "manual on" in teaching classrooms, conference/training rooms, lunch and break rooms, offices less than 250 s.f., registry cages, registry rooms, vaults and storage spaces less than 1000 s.f.

7 Provide (1) or more occupancy sensors within stairwell to automatically reduce lighting power to 50 percent when not in use.

8 Limited hour self-service and box lobbies shall be time controlled during closure hours. Provide bi-level lighting levels 30/15 fc, time and occupancy sensor controlled for 24-hour self-service and box lobbies. Refer to 5-3.1.10.

9 Provide integral battery units (700 lumen at 90 minutes) within luminaires, in lieu of self-contained emergency battery units where ceiling heights of 10' – 0" AFF or less are present.

10 Interlock with dock door limit switch or provide digital, countdown timer switch for on/off control.

11 Lighting shall be time controlled after full service hours.

5-3.1.8 Ride-Thru Lighting *(Refer to Module 2A)*

Module 2A

5-3.1.9 Daylighting

Provide automatic daylighting control in any space where the total “primary side lighted area” exceeds 250 s.f.

Do not use roof skylights in new construction. Skylights increase both roof maintenance costs and the potential for roof leaks. In regard to compliance with energy requirements, utilize the performance or calculated path under ASHRAE 90.1 using design strategies that avoid the use of skylights. Refer to Standard Design Criteria, Section 0-2.2 Compliance with Energy Requirements, for details.

5-3.1.10 Retail Lighting *(Refer to Module 4A)*

Module 4A

Design the lighting systems within the Retail Area to achieve the required light levels and lighting power densities shown within Exhibit 5.3.1.6a. Refer to Exhibit 5-3.7.1a for cross-reference to the standard postal luminaire types contained in the postal specifications.

Control of the Retail Area lighting shall utilize switches, time-controlled circuits and occupancy sensors. Refer to Module 4A, 6-4 for specific requirements.

5-3.1.11 Relamping/Reballasting Existing Luminaires (*Refer to Module 3*)

Module 3

5-3.1.12 Existing T12 Fluorescent Lighting Systems *(Refer to Module 3)*

Module 3

5-3.1.13 Existing T8 Fluorescent Lighting Systems *(Refer to Module 3)*

Module 3

5-3.1.14 Stairway Lighting

Lighting in stairwells must have one or more occupancy sensors to automatically reduce the lighting power by at least 50 percent within 30 minutes of all occupants leaving the stairwell.

5-3-1.15 VMF Lighting *(Refer to Module 4D)*

Module 4D

Design the lighting systems within the VMF to achieve the required light levels and lighting power densities shown within Exhibit 5.3.1.6a. Refer to Exhibit 5-3.7.1a for cross-reference to the standard postal luminaire types contained in the postal specifications. Refer to Module 4D, 2-2.6 for specific requirements.

5-3.2 Exterior Lighting *(Also refer to Module 2A)*

Module 2A

The USPS continues to monitor and evaluate new lighting technology as it develops. When it becomes more evident that new lighting alternatives demonstrate a lower lifecycle cost and better long term reliability than our standard luminaires, the USPS will add them to the portfolio of luminaire options.

Carefully consider light pole locations and heights, as well as lamp distribution characteristics, to minimize the number of exterior luminaires required. The ratio between maximum and minimum lighting intensities must not exceed 10 to 1.

Exterior lighting design must consider the street and/or adjacent property lighting, and eliminate light trespass for adjacent properties. Make use of direct illumination with full cutoff optics for pole mounted luminaires, and full cut-off optics for all wall mounted luminaires. Provide photo-sensor with astronomic time control for the exterior lighting.

The A/E must include as part of the submission, a photometric plan of the entire site including fencing. This plan must indicate proposed lighting layout with point-by-point footcandle levels on maximum 5 ft. by 5 ft. grid pattern.

The exterior lighting must be selectively controlled; all exterior lighting must be turned off when sufficient daylight is available. Façade and landscape lighting must automatically turn off from midnight or closing until 6:00 a.m. Furthermore, all exterior lighting, other than façade and landscape lighting, must be reduced in total lighting load by 30 percent, between midnight/closing until 6:00 a.m. or be occupancy sensor controlled. Exterior security lighting and lighting for exterior mail handling at 24 hour facilities are exempt from these control requirements.

Lighting for security is exterior lighting installed solely to enhance the security and safety of people and property. Other forms of exterior lighting, such as outdoor display lighting, landscape lighting, façade and building lighting, etc. can serve the same purpose, but are designed with additional criteria in mind. Exterior security lighting for USPS facilities must consider plant personnel, vehicular traffic and public customers and would include:

- Lighting for vehicle and pedestrian entrances or exits from the building or parking areas where required for safety, security or eye adaptation.
- Lighting that is integral to signage and installed in the signage.
- Customer parking lots.
- Employee parking lots (24/7 facility).
- Pedestrian sidewalks.
- Truck maneuvering areas (24/7 facility).
- Entry/Exit vehicle gates (24/7 facility).

Exterior mail handling areas include open platforms, docks, carrier canopies, etc. The exterior lighting within these areas must be provided with bi-level control (0%, 50% to 100%) using photo-sensor(s) and countdown twist timers per Module 1, 5-3.1.2.

5-3.2.1 Parking and Maneuvering Areas *(Also refer to Module 2A)*

Module 2A

The exterior site and building mounted luminaires at the truck maneuvering areas shall be strategically located to aide in the illumination of the reflective dock numbers mounted above the canopy and centered at each dock opening.

Protect all light pole foundations located within parking and maneuvering areas, or adjacent to driveways or curbs, at the base by reinforced concrete pedestals to minimize damage to poles. Fuse all luminaires with in-line fuses at the handhole in the pole base for service and protection.

Provide poles to be mounted in coastal or subtropical wet climates with stainless steel anchor bolts and hardware. The A/E must determine the need for these stainless steel accessories.

Provide individual surge protection within handhole of each pole and at the circuit breakers feeding the poles, if the facility is equipped with a building lightning protection system.

5-3.2.2 Parking Garages or Covered Parking Lots *(Refer to Module 2A)*

Module 2A

5-3.2.3 Not Used

5-3.2.4 Signage

Conceal all electrical runs and connections to signs. Signs must be photo-sensor and time controlled. Refer to electrical and mounting connection details located in the USPS Standard Detail Library. Use care and good judgment to select time frames and dates for the illumination of signs that will maximize the exposure to the USPS image while still creating environmentally and fiscally responsible use of natural resources. Highly traveled areas may benefit from having a single primary sign illuminated during extended hours while other secondary signs may be turned off. Always turn off a wall sign cabinet and stripes together as a unit. Do not have a wall sign cabinet illuminated without illuminating the associated striping.

5-3.2.5 Building Perimeter

Provide UL wet location listed emergency egress lighting at the exterior of all life safety egress doors. Connect emergency egress luminaires to the interior lighted exit sign at the egress door.

5-3.2.6 Exterior Footcandle Levels and Power Density *(Also refer to Module 2A)*

Module 2A

Use Lighting levels shown in Exhibit 5-3.2.6a unless higher light levels are required by state or local codes and/or CCTV camera requirements.

Exterior lighting power densities must not exceed the maximum values established by the current version of ASHRAE 90.1, Table 9.4.2-2.

Exhibit 5-3.2.6a
Exterior Footcandle Levels and Power Density

AREA	LOCATION/ DESCRIPTION	AVERAGE MAINTAINED HORIZONTAL FOOTCANDLE (FC) LEVEL (at Grade unless noted otherwise)	LAMP TYPE [4, 5]	POWER DENSITY [3] (W/SF = Watts per sq. foot) or (W/LF = Watts per linear Foot)		
		Horizontal		Zone 2	Zone 3	Zone 4
Exterior[1]	Perimeter Fence	0.50	LED	0.2 W/SF	0.2 W/SF	0.2 W/SF
	Vehicular Entrances	0.50	LED	14W/LF of Opening	21 W/LF of Opening	21 W/LF of Opening
	Pedestrian Entrance [2]	1.0	LED	14 W/LF of Opening	21 W/LF of Opening	21 W/LF of Opening
	Public Entrance Canopy	20.0	LED	0.25 W/SF	0.4 W/SF	0.4 W/SF
	Pedestrian Walkways	0.50	LED	0.5 W/LF	0.6 W/LF	0.7 W/LF
	Parking-Employee	0.50	LED	0.04 W/SF	0.06 W/SF	0.08 W/SF
	Parking-Maneuvering	0.50	LED	0.04 W/SF	0.06 W/SF	0.08 W/SF
	Parking-Customer [2]	1.0	LED	0.04 W/SF	0.06 W/SF	0.08 W/SF
	Snorkel Lane[2]	1.0	LED	0.2 W/SF	0.2 W/SF	0.2 W/SF
	Exterior Break Areas	0.50	LED	0.2 W/SF	0.2 W/SF	0.2 W/SF
Platforms	Open Mail	12.5/25	LED	0.35 W/SF	0.35W/SF	0.35 W/SF
	Carrier Canopy	10/20[6]	LED	0.35 W/SF	0.35W/SF	0.35 W/SF

Keyed Notes:

1 Uniformity ratio for exterior lighting must not exceed 10:1.

2 Not to drop below 0.5 foot-candles minimum at any point.

3 It is assumed that the majority of Postal sites are categorized as exterior lighting zones 2, 3 or 4. The exterior lighting power allowances for Postal sites within exterior lighting zones 0 and 1 must comply with ASHRAE 90.1, Table 9.4.2-2. Per ASHRAE 90.1, Table 9.4.2-1, the exterior lighting zones are described as follows:

Lighting Zone 0	Undeveloped areas within national parks, state parks, forest land, rural and undeveloped areas as defined by the authority having jurisdiction.
Lighting Zone 1	Developed areas of national parks, state parks, forest land and rural areas.
Lighting Zone 2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas.
Lighting Zone 3	All other areas.
Lighting Zone 4	High activity commercial districts in major metropolitan areas as designated by the local jurisdiction.

4 Lamping: LED – Solid State LED.

5 Refer to specification section 265600 for options.

6 The activities to be performed within the carrier platforms are assumed to be mail transfer between MTE and vehicles. Provide higher illumination of 20 fc's where mail processing is performed. The high illumination level must use digital countdown timer control wired downstream of the photocell.

General Notes:

1. As defined by the IESNA, Maintained Footcandle Level is to be interpreted as "Average Maintained Footcandle Level" on a horizontal plane at ground level.
2. Final acceptance will be based on measurement of initial lighting levels, not maintained lighting levels. Initial lighting level measurements must be 15 percent higher than calculated maintained levels.
3. Exterior areas or spaces not specifically listed by exhibit 5-3.2.6 must comply with state or local codes.

5-3.2.7 Exterior Luminaire Application *(Also refer to Modules 2A)*

Module 2A

Refer to Exhibit 5-3.2.7a Exterior Luminaire Application chart for cross reference to the standard Postal luminaire types contained in the CSF specification Section 265600.

Exhibit 5-3.2.7a
Exterior Luminaire Application

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	NOTES
Exterior	Parking Perimeter Fence	SP1 SP2	Full cut-off luminaire with solid state LED lamp mounted on pole (multiple luminaires per pole where required).	1, 2
	Vehicular Entrance	SP1 SP2	Full cut-off luminaire with solid state LED lamp mounted on pole (multiple luminaires per pole where required).	1, 2
	Snorkel Lane	SP1 SP2	Full cut-off luminaire with solid state LED lamp mounted on pole (multiple luminaires per pole where required).	1, 2

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	NOTES
Exterior	Pedestrian Entrance & Walkways	PL2 PL3 PL4 PL5 SP5 SB1 SF1 EM4	Full cut-off LED wall sconces. 6" Recessed, open, damp location LED downlight. 13" dia., full cut-off, LED wall sconce. Pendant mounted LED cylinder. Full cut-off luminaire with solid state LED lamp mounted on pole. 6" dia. Aluminum domed top round, LED bollard. Direct burial spotlight, metal halide lamp (flagpole). Wet location emergency lighting unit, xenon lamps.	1, 2, 3
	Public Entrance Canopy	PL2 PL3 PL4 PL5 EM4	Full cut-off LED wall sconces. 6" Recessed, open, damp location LED downlight. 13" dia., full cut-off, LED wall sconce. Pendant-mounted LED cylinder. Wet location emergency lighting unit, xenon lamps.	2
	Building Perimeter	MH3 PL2	Wall mounted full cut-off luminaire with wide throw distribution. Solid state LED must be designed so that no direct illumination glare reaches drivers or pedestrians coming toward the facility. Full cut-off LED wall sconces.	2
	Emergency Egress Doors	EM4	Wet location emergency lighting unit, xenon lamps.	4
Platforms	Dock (Safety)	-	Dock Traffic Signal	5
	Dock Lighting	PL1	Full cut-off luminaire with LED array.	6
	Open Mail	PL1 EM4	Full cut-off luminaire with LED array. Wet location emergency lighting unit with battery.	6
	Carrier Canopy	PL-1 EM4	Full cut-off luminaire with LED array. Wet location emergency lighting unit with battery.	6

Luminaire Application Notes

1. Pole height restrictions are dependent upon local jurisdiction.
2. Provide photocell and astronomical time clock control of site lighting.
3. Lower wattage source in comparison to area/roadway luminaires, on a shorter pole.
4. Connected to the interior exit light at the egress door.
5. Interlock with dock door.
6. Exterior platform and carrier canopy lighting must use photocell with digital, countdown timer control for high level illumination.

5-3.2.8 Dock Traffic Signals

At each enclosed dock position (47 inches high or higher), provide an exterior red and green signal light system visible through the left rearview mirror of the vehicle. At enclosed docks, provide a limit switch activated by the overhead door to indicate when the door is closed. Mount luminaires to provide protection from truck damage.

5-3.2.9 Relamping/Reballasting Existing Exterior Luminaires *(Refer to Module 3)*

Module 3

5-4 Communications

5-4.1 Scope *(Also refer to Module 3)*

Module 3

A building's communications system consists of voice and data telecommunications, paging and intercommunications, and call bell systems. Some facilities may not include all systems, however, all Postal facilities will use a Structured Cabling System (SCS) for the majority of the telecommunication cabling. This cabling system is designed to be as "applications independent" as possible. It provides maximum flexibility to support current and future system requirements.

The following is a brief description of the communications systems, services, and hardware that use the SCS and may be implemented within a Postal facility:

- Voice grade services, such as basic telephony, facsimile, Internet access and dial-up data circuits via modem.
- Digital data services such as T-1's, Fractional T-3's, MPLS, EVPN, etc.
- Local Area Network (LAN) services such as on-line information processing, batch information transfer, file storage and sharing, electronic-mail, shared printing and point-of-service applications. LAN hardware supported by this cabling infrastructure includes: Personal computers, printers, HEBR time clocks and POS terminals.

The design documents also reference other low voltage "communications" cable systems. The following systems are currently **not** part of the SCS and may be implemented within a Postal facility:

- The IP integrated, zone paging system, which is telephone activated and therefore connects to the telephone system, but its components and cabling are independent.
- Call Bell systems, which include doorbells and the assistance buzzer in Retail and BMEU facilities. Future developments of the structured cabling system may allow these systems to share common cable platform and its benefits.

It is mandatory that telecommunications drawings and specifications be developed or reviewed by a BICSI Registered Communication Distribution Designer (RCDD). The USPS Project Manager is required to contact the respective District Information Technology (IT) Office's Telecommunication Specialist of new projects in their District at the 10%, 30%, 70% and 100% design phases.

5-4.1.1 Terminology *(Also refer to Module 2A)*

Module 2A

The telecommunications industry has revised the terminology used to describe various commonly used components. This document is based on these new terms, as defined in the Electronic Industry Association and Telecommunications Industries Association (TIA/EIA) documents 568-*X* and 569-*X*. Exhibit 5-4.1.1a summarizes the changes in the terms:

Exhibit 5-4.1.1a
Terminology Matrix

Old USPS Terminology	New USPS Terminology
Structured Wiring System (SWS)	Structured Cabling System (SCS)
Main Distribution Frame (MDF)	Main Cross Connect (MC)
Intermediate Distribution Frame (IDF)	Horizontal Cross Connect (HC)
MDF/Telephone Room	Telecommunications Equipment Room (ER)
IDF Room	Telecommunications Room (TR)
Information Outlet (I/O)	Telecommunications Outlet (T/O)

5-4.2 Telecommunication Entrance Facility (TEF) *(Also refer to Module 2A)*

Module 2A

The A/E or Design Engineer must coordinate with the local telephone service provider to establish the point of incoming service. Communications service providers, including the telephone company(s) and cable TV company(s), must service the facility by extending their network cable running along the adjacent roadways into the building. These services must be brought to the facility site via underground direct buried conduits (minimum 36 inch BFG) or as required based on availability.

To connect to these networks, the Postal facility's primary communications service entrance must consist of, at a minimum, two 4 inch conduit runs from the Telecommunications Entrance Facility to the service provider's point of connection within an unpaved area. Provide (3) cell, mesh innerducts with individual pull wires for each conduit. Conduit(s) may be run below slab and stubbed up into the building with rigid metal conduit. The service providers must make the final connection of the conduit. A metallic locating strand must also be present in all conduits. Seal each end of all conduits to prevent intrusion of gas and or liquids entering the building through them. The sealant must be of a type which can be easily removed and replaced. Expandable foam sealant is not acceptable.

Communications service must not share service entrance with electrical service provider. Coordinate all aspects of this pathway requirement with the service providers at the onset of the project to ensure that conduit run distances and conduit bend constraints imposed by the service providers are properly met. Do not run communications conduits parallel to power conduits unless minimum distance separation or other shielding requirements are met per Building Industry Consulting Service International's (BICSI) current Telecommunications Distribution Methods Manual (TDMM) and TIA-569-*X* Telecommunications Pathways and Space Standard. Provide proper termination, grounding, and electrical protection of all building entrance cables per National Electrical Safety Code (ANSI 2) NFPA 70 – National Electric Code (NEC), TIA-607-*X* and all local codes governing electrical and fire safety.

The TEF shall be provided with a Primary Bonding Busbar (PBB) for bonding of all protectors and the outside plant cabling. This PBB shall be bonded to the building grounding electrode system using minimum #2/AWG/CU bond

conductor and shall be located as close as practical to the electrode system location to keep the Telecom Bonding Conductor (TBC) as short and straight as possible. Refer to CSF specification section 271100.

- Refer to "USPS Requirements for Entrance Facilities and DEMARC – October 1, 2020" included in the Building Design Standards, Folder F.5, Structured Cabling Installation.

Module 2A

5-4.3 Telecommunications - Structured Cabling System

(Also refer to Module 2A)

The Structured Cabling System (SCS) is an infrastructure wiring system that carries both voice and data. At a minimum, depending on facility size and type, the SCS must be comprised of telecommunication outlets (T/O), horizontal cabling, and a main cross connect (MC) within the telecommunications equipment room (ER). For larger or more complicated facilities, additional components are required in: Telecommunications room(s) (TRs), horizontal cross connects (HCs), cable backbone systems, and campus cable systems.

The SCS must use patch panel fields for terminating all cabling (voice and data) at MCs or HCs. A completely patchable system for voice and data must provide maximum flexibility to support current and future system requirements. The USPS CSF Specification Section 270500 and related sections reflect the structured cabling requirements outlined in this section of the Standard Design Criteria.

- The space, power, and HVAC requirements for the ER and TRs vary depending on their complexity. The main cross connect is in the ER. The horizontal cross connect, if required, is in the TR. The Solicitation A/E must publish site specific applicable requirements for the main cross connect and horizontal cross connect in the Solicitation.
- Refer to "USPS Structured Cabling System – Best Practices", 01 October 2020 included in the Building Design Standards, Folder F.5, Structured Cabling Installation. This file provides acceptable installation examples.

Module 2A, Module 3

5-4.3.1 Backbone and Horizontal Cable Design *(Also refer to Modules 2A and 3)*

Backbone cabling shall connect the MC in the Telecommunication Equipment Room (ER) with each HC in the Telecommunications Rooms.

Telecommunication Room (TR) locations must receive a minimum of (24) strand, armored, tight buffered, single mode, Fiber Optic Cabling for data.

Provide (25) pair category 3/5e UTP backbone cabling terminated on appropriate copper patch panel between the ER and each TR for the purpose of analog voice needs (i.e.: modems, faxes, etc.).

Provide category 6 UTP horizontal cabling terminated on category 6 copper patch panels for data connections.

Provide category 6A UTP horizontal cabling terminated on category 6A copper patch panels for wireless data connections.

Use category 6 UTP Horizontal cabling to connect the MC or HC to each Telecommunications Outlet (T/O) for data connections. Use two (2) category 6A horizontal cabling runs to connect the HC to each duplex T/O utilized for wireless access points.

5-4.3.2 Telecommunication Outlets (T/Os) *(Also refer to Modules 2A and 3)*

Module 2A, Module 3

Provide each telecommunication outlet (T/O) with appropriate number of category 6 UTP telecommunication horizontal cables as specified above. T/O's can be six-plex, quad-plex, triplex or duplex depending on the application. Terminate each cable with an 8-pin modular connector with TIA-"T568A" pinning at the workstation, and with 8-pin modular patch panels with TIA-"T568A" pinning, at the MC, or HC. Install a minimum 20 foot service loop, coiled so as not to exceed the minimum bend ratio of the cable, in the ceiling at the at the end of the conduit/EMT riser except where the entire cable run is encased in conduit or EMT. The terminations must match the requirements listed for telecommunication horizontal cabling above.

The solicitation A/E shall coordinate the type and location of each T/O with the Raleigh IT SME and incorporate into the solicitation documents.

Outlet boxes for T/Os must be double-gang 2.5 in. deep with single gang trim ring and coverplate. T/Os must be wall mounted at 24 in. AFF to bottom of outlet, unless otherwise noted, at the locations shown in Exhibit 5-4.3.2a:

Exhibit 5-4.3.2a
Telecommunication Outlet Requirements

All T/O's shall be quad-plex, unless otherwise noted.

LOCATION	TELECOMMUNICATION OUTLET (T/O) REQUIREMENTS
Workroom Floor (WRF)	One T/O for every 5,000SF of the Workroom floor. Column-mounted T/Os @ 78 in. AFF, (located in web of column, not on flange) on opposite side of column as the location of the power convenience outlet. Refer to the OSL for determining the location of T/Os.
Wireless Access Point[2]	Two category 6A cable runs per WAP, as specified by Raleigh Wireless Predictive WAP Placement. Duplex T/O shall be mounted at 12 ft. AFF onto fire resistant wood base mount. T/O shall be mounted above the acoustic ceiling grid in areas so equipped.
HEBR (Time clock)	Provide one duplex T/O at each time clock except where multiple clocks are immediately adjacent to each other in which case one triplex T/O is required for every three clocks. Install the T/O behind the HEBR next to a power outlet. (Where multiple clocks are installed, coordinate the space with time card space requirements.)
Registry Cage	One T/O per Cage/Vault wall.
Investigative Office	One T/O on each sidewall below writing surface
Delivery Confirmation	One T/O per every 16 carriers.
IDS Control Panel	Provide one, single T/O for each IDS Control Panel (refer to Spec Section 281600).
Fire Alarm Control Panel	Provide one, duplex T/O for the main fire alarm control panel (refer to Spec Section 283100).
Support Areas:	
Private Offices	Two tri-plex T/O's per office on different walls, one alongside desk, one on exposed wall.
Stand-alone Printers and Copiers	Provide one duplex T/O at each piece of equipment.

LOCATION	TELECOMMUNICATION OUTLET (T/O) REQUIREMENTS
Telecommunications Equipment Room (ER)	Locate T/O's on exposed overhead ladder trays at 7 ft.–6 in. above finished floor. Install one T/O every 4 linear feet on backside of ladder tray so that cable drops fall down to back of MPE cabinets.
Lunchroom	One T/O for every three Job Bidding Kiosks, if wireless access point is not provided.
Conference and Training Rooms	Provide one six-plex T/O per wall and one quad T/O for each training console. In addition, provide one T/O for WAP in each conference and training room, mounted above the ceiling at the approximate center of each room.
BMEU	Provide one T/O per BMEU counter, one T/O over each MERLIN machine and one T/O for every three dock doors. T/Os are not required for the customer side of the Retail Lobby.
General Shops	400 SF or less: Provide a minimum of two T/Os per room. Over 400 SF: Provide one T/O every 24 feet of wall with a minimum one T/O per wall.
Supply Rooms	200 SF or less: Provide a minimum of one T/O per room. Over 200 SF: Provide two T/Os on opposite walls.
Stock Room/Parts Room/Cage Counters	Provide minimum of one T/O at each counter. Provide one T/O at each desk location; minimum of (4) T/O's
Vaults	T/O not required.
Retail:	
Full Service Counters	One T/O for each counter.
Self Service	One duplex T/O is required for APC unit, even if APC is not provided at this time. For APC and Parcel Drop design details, see Program Folder, Retail, APC.
Automated Postal Center	Coordinate with USPS Retail/Marketing.
Lobby	No T/Os in Lobby.
Other:	
All other rooms	Submit Deviation Request for approval.

Keyed Notes:
1 Operational Systems Layout (OSL) provided by USPS.
2 Note that WAPs do not require 120 Volt power provisions.

5-4.3.3 Consolidation Point (CP-1) *(Refer to Module 2A)*

Module 2A

5-4.3.4 Fiber Optic Consolidation Point (FP-1) *(Refer to Module 2A)*

Module 2A

5-4.3.5 Outlets for Wall-Mounted Telephones

Outlets for wall-mounted telephones must meet the same standards as T/Os except that only one telecommunication horizontal cable and termination must be provided. Install a minimum 10 foot service loop, coiled so as not to exceed the minimum bend ratio of the cable, in the ceiling at the end of the conduit/EMT stub except where the entire cable run is encased in conduit or EMT. Arrange the cables from these single-cable T/Os on the lowest patch panel away from the standard T/Os. Provide the outlets with a box and face plate capable of supporting a wall-mount telephone.

Wall telephone outlets must be wall mounted at 42 in. AFF to top of outlet, unless otherwise noted, at the locations shown in Exhibit 5-4.3.5a:

Exhibit 5-4.3.5a
Wall Telephone Outlet Requirements

LOCATION	WALL TELEPHONE OUTLET REQUIREMENTS
Support Areas:	
Lunchroom, Break Area	One wall telephone outlet per room or when required for a specific facility.
Courtesy and Entrance	As directed by USPS.

5-4.3.6 Cable Pathways *(Also refer to Module 2A)*

Module 2A

Design cable distribution pathways to provide the capacity and capability to properly install telecommunications cables during construction as well as in the future. These cables must include horizontal, backbone, and campus cables.

Underground or below-slab conduits must only be permitted for incoming service entrance. All other cable pathway routes must be overhead.

Coordinate all cable pathway routes with other building services (electrical, mechanical, plumbing, etc.) to assure proper clearances and accessibility. Coordinate the cable pathway routes with the electrical distribution system. Where electrical and telecommunications cabling cross, it must be at right angles only. Avoid long runs of telecommunications cable in close proximity to parallel runs of electrical power cable. Maintain a minimum one foot separation between power and communications cables when running in parallel to power cables unless both power and communications cables are in conduit. Distribution of telecommunications cabling must conform to TIA-568-*X* and TIA-569-*X*. Install all telecommunications conduit with sweeping 90 degree bends; no LBs must be accepted unless approved by USPS design engineer.

Install the majority of the structured cabling system above ceilings without conduit. All communications cabling used throughout this project must comply with the requirements as outlined in the National Electric Code (NEC) article 725. All cabling must bare CMP and/or appropriate markings for the environment in which they are installed. All interior cables shall be CMP plenum rated.

Cabling routed underground, or exterior of the building, or through inaccessible ceilings must be contained in conduit. Cabling within exposed workroom areas, not routed within cable trays, must be contained within conduit raceways. Provide flush boxes within finished areas and factory boxes in unfinished areas. Provide 1 inch conduit risers with 90 degree bend and bushing for all wall mounted devices.

Where local codes mandate cables be placed in conduit or enclosed in a metal wireway, route telecommunications cables in conduit to common enclosed wireways to the ER or TR.

Where wall mounted TOs are not possible or practical due to use of modular furniture (at the Full Service Counter) or use of millwork, provide conduits to route cables to the base of the furniture, where the conduit will transition into a surface-mounted box attached to the base of the furniture.

All conduit installations must have appropriate sleeves and bushings installed to eliminate potential for damage to telecommunications cabling.

Distribute telecommunications horizontal cabling in conduits, cable trays, or cable loop supports designed for the sole purpose of supporting the cabling installation. Cables must be aggregated into common runs allowing a controlled and manageable cable installation. Use hook and loop type cable ties to bundle cabling. Nylon cable ties are not permitted. Individual cable runs must collect at right angles to the main cable bundle whenever possible, and must avoid running diagonally across the ceiling at all times. All cabling must follow building lines and maintain acceptable bend radius per manufacturer and industry standards. Support cable trays at the highest possible point along their route, in order to keep them away from other electrical and mechanical components. Telecommunications cabling shall be routed within dedicated ladder rack/cable tray assemblies. The CCTV, ePACS, IDS and fire alarm wiring shall not be routed within these cable trays. Support cable trays by elements of the building structure. Cable support loops or other devices designated suitable for the support of Category 6 cable may be used. Backbone and armored fiber-optic cabling from each HC to the MC must be run in conduit, cable trays or approved cable support solution. Refer to CSF Specification Section 270500 and related sections for more details.

Where cables pass through partitions and walls, provide properly bushed conduit sleeves in the wall to allow the cables to pass. Conduit sleeves in fire rated partitions and walls must be properly firestopped using complete UL listed firestopping systems (do not use silicone foam).

Route telecommunications horizontal cabling from T/Os in conduit riser inside partitions and stubbed out above the ceiling using 90 degree bend and bushing. Do not “loop” conduit between outlets. The minimum size of the interior conduit must be 1 in. diameter.

Where T/Os are provided in the workroom area and are to be column mounted, provide a conduit (minimum 1 inch diameter) to a cable tray to protect the cable from damage due to activities in the workroom. Coordinate the mounting height of telecommunication outlets with power outlets.

Interbuilding conduits shall be a minimum of two 4-inch diameter, buried minimum of 36 inch BFG, equipped with heavy wall rigid galvanized steel conduit elbows and risers and marked with red magnetic warning tape. Conduits shall adhere to the 40% fill ratio and each conduit shall be provided with (3) cell, mesh innerduct with individual pull strings.

5-4.3.7 Telecommunication Equipment Room (ER)

The Telecommunication Equipment Room (ER) serves as the point of demarcation for incoming communications services and the interface point between the TEF and the Structured Cabling System within CSF's. The ER for CSF's less than 10,000 sq. ft. is a room shared with other functions. CSF's in excess of 10,000 sq. ft. must have dedicated Telecommunication Equipment Rooms.

Within the ER, provide space for incoming service equipment, and Local Area Network equipment. Equipment installed in this room will be in open, floor mounted, two post aluminum racks that include horizontal and vertical wire management. Vertical wire managers will be placed between each two post rack and on ends of each row of racks. All horizontal cabling within the specified distance limitations established by TIA-568-*X* standards will terminate on patch panels in this room. All data backbone cables will terminate in this room. If the facility has TRs, mount the fiber interconnect center required to support data (fiber) cable requirements at the top of the equipment rack, below the top horizontal wire manager. The room design must follow the TIA-569-*X*. The USPS Standard Details Library (Details M5-4-3b, M5-4-3b1, G5-4-0b, G5-4-0c and G5-4-0c1) shows the standard ER layouts. Information on equipment and sizing of equipment (such as patch panels) is included in the USPS CSF Specifications 270500 Series.

The ER room must adhere to the following specification list:

- Provide three (2) 4 ft. x 8 ft. sheets of void-free, smooth plywood backboards, coated with white or light grey fire-retardant paint along wall perpendicular to ER rack(s).
- Where required, allocate a 3 ft. W x 4 ft. H space on plywood backboard for LEC termination fields, splice cases, specialized circuit components, etc.
- Floor-mounted equipment rack spacing formula: One rack mount unit (RU) equals 1.75 in. All high-density 48 port patch panels require 2 RU's. All horizontal wire managers equal 2 RU's. One horizontal wire manager is required between each patch panel. Place one horizontal wire manager at top of each equipment rack if more than (1) rack is required.
- One 7 ft. H x 19 in. W x 3 in. D floor mounted equipment rack will support up to 40 RU's. If more than 40 RU's are required, add additional 7ft. H x 19 in. W x 3 in. D floor mounted equipment racks. The ER shall be sized to accommodate a minimum of (2) floor mounted equipment racks.
- Equip each rack with a "Trip-Lite" RS-1215RA rack mounted power strip equipped with 12 power outlets and plastic cover over the power button to prevent accidental outages. Mount each rack mounted power strip in the middle of each equipment rack.
- All floor mounted equipment racks must have 36 inches of free and clear space from the front of any installed equipment racks as well as 36 inches free and clear from the furthest rearward mounted piece of equipment installed in any rack.
- Allocate a minimum of 24 RU's within the floor-mounted equipment rack for LAN and WAN electronic components to be supplied and installed by the USPS. Provide an overhead cable or basket tray system, suspended from exposed structure above. Installation guidelines are covered in USPS CSF 260533, 270500 documents and related sections.
- Maximum total cabling distances must not exceed 295 ft. for a standard telecommunications outlet. This distance is to include all horizontal and vertical distances plus required service loops

- Fiber optic cables supporting HCs (backbone) must all terminate in a rack-mounted fiber optic distribution center (FDC).
- Complete grounding and bonding of all provided hardware and cabling must be completed in accordance with the TIA-607-*X* specifications as well the NFPA-70 NEC and any applicable local codes. Provide Secondary Bonding Busbar (SBB) within the ER, if the ER and the Telephone Entrance Facility (TEF) are located remote from each other. The SBB shall be bonded to the PBB using a minimum #1/0/AWG/CU bond conductor. The SBB shall be utilized for all bonding needs within the ER. Refer to CSF Specification Section 271100.
    - Typically, the TEF is located adjacent to the MC rack(s) within the ER of a "CSF". Therefore, the Primary Bonding Busbar (PBB) located at the TEF can be utilized for bonding of the ER in this application.
- Continuous temperature and humidity controls may be required to maintain telecommunications equipment within manufacturer's recommendations.
- Provide (1) 30 Amp, 120 Volt single receptacle wall mounted directly behind the UPS and (2) dedicated 120V nominal, non-switched, AC, duplex, 20Amp outlets in each ER.
- Provide a minimum 3 KVA at 120 Volt input/output of uninterruptible power with 30 minute battery reserve rack mounted in the bottom of the right hand side MC equipment rack.
- Each rack shall be provided with an installation kit and isolation pads for security and isolating the rack to and from the floor.
- The floor surface to the ER shall be covered with static control resilient flooring if the "ER" is determined to be a critical and essential "operation". Note that installation of static control resilient flooring requires an approved Deviation. Resilient Quartz flooring is typically provided within the ER. Refer to specification section 096536 for specific grounding provisions.

5-4.3.8 Telecommunications Room (TR) *(Also refer to Modules 2A and 2B)*

Module 2A, Module 2B

CSF's (due to their small square footage) do not usually require a TR. A TR is required, in addition to the ER, only when the total cable distribution distances exceed 295 feet. Refer to Module 2B section 5-4.3.8 for applicable requirements.

MPF's (due to their large square footage) will require TR's (in addition to the CCR) to maintain the total cable distribution distances within 295 feet. Refer to Module 2A section 5-4.3.8 for applicable requirements.

5-4.3.9 Consolidated Computer Room (CCR) *(Refer to Module 2A)*

Module 2A

5-4.3.10 Telecommunications Enclosure (TE) *(Refer to Module 2A)*

Module 2A

5-4.3.11 Wireless Access Points

Wireless access point design will be provided by Raleigh Telecom Services Wireless Team by onsite Site Survey and/or by using software that provides Predictive WAP placement. A/E shall place WAP's on OSL per Raleigh Telecom Services Wireless Team provided AP Detail spreadsheet no later than the 30% Design stage.

- Refer to standard detail G5-4-3b for applicable grid mounting details.

5-4.3.12 Wireless Access Points (Alternative to Fiber Optic Cabling)

Module 2A, Module 3

(Refer to Modules 2A and 3)

5-4.4 Not Used

5-4.5 Pay Telephones

Pay Telephones are not to be installed in USPS facilities.

5-4.6 Not Used

5-4.7 Not Used

5-4.8 Sound System

5-4.8.1 IP Integrated, Public Address, Zone Paging System

Equip facilities larger than 10,000 square feet with an IP integrated, multicast, zone paging communications system incorporating safety notifications and general communications. The IP paging system must seamlessly integrate with the “BroadWorks” Cloud PBX and Unified Communications IT Management Platform utilized by all USPS facilities. The paging system shall consist of software and IP addressable hardware utilizing the facility LAN & WAN infrastructure to distribute paging announcements. Paging hardware equipment shall reside in the MC or HC equipment racks contained within the ER/CCR or TR’s.

The platform shall provide communications employing state-of-the-art IP technology including the following minimum functions.

1. IP paging.
2. Emergency announcement that shall override any pre-programmed zones assuring that Emergency/Lockdown etc. are heard at every speaker location utilizing pre-recorded audio - tones, music and voice or live voice paging.
3. Capability of pre-recording emergency announcements.
4. Utilization of computers and telephones throughout the facility for zone paging function.
5. System software to synchronize time with network timeserver or web-based time server.
6. Capability for paging configurability ranging from facility-wide to individual end-point.
7. The solution must be capable of sending synchronized pages to all BroadWorks Phone types used in the facility. BroadWorks phones may be the only speaker device for paging certain administrative offices.
8. The Contractor's solution must be recommended by and supported as an integrated partner with the “BroadWorks” Cloud PBX and Unified Communications IT Management Platform utilized by the USPS.
9. System software shall interface with the facility’s Motorola Mobile Radio System using analog DTMF connection and dialer.

IP paging speakers shall be provided within the workroom, interior and exterior platforms, support and maintenance areas, the lunchroom and breakrooms and the administrative suite. Individual speakers shall be

provided within offices, restrooms, locker rooms, and corridors. Speakers shall not be located within storage areas.

Provide adequate speaker coverage to deliver clear, concise, intelligible paging announcements above the normal room ambient noise level. Individual IP speakers do not provide the speaker coverage or voice intelligibility required within large, open areas with high ambient noise levels. Medium power speaker arrays shall be provided within large workrooms or platforms with ceiling heights exceeding 25' AFF.

Ambient noise level in the Workroom during normal operations is approximately 76-78 dB.

Each IP speaker shall have a CAT-6 cable homerun and patched to their respective PoE switch located within the "MC" and/or "HC" equipment racks. Total length of CAT-6 cable cannot exceed 295 ft.

IP speakers located within common or large areas such as workroom, platforms, lunchroom, corridors, etc. shall be zoned as a common IP address to provide group announcements.

The CAT-6 cabling material, installation and testing parameters must be provided in accordance with section 5-4.3 Telecommunications – Structured Cabling System Criteria listed herein.

5-4.8.2 Call Bell Systems *(Also refer to Module 2A)*

Module 2A

a. Doorbell

Provide a doorbell push-button at the personnel door for employee use and at the wicket door for customer use in retail facilities. Set the bell for the wicket door to double chime and the bell at the personnel door to single chime.

Provide call bell at business mail entry unit (BMEU). Provide door-bell pushbutton on the building wall adjacent to the customer entry into the BMEU. The pushbutton must operate bells located in the BMEU platform area and scale room.

b. Assistance Buzzer

In retail service areas, provide one assistance buzzer push-button at the Full Service Counter and locate the buzzer near the lunchroom.

In BMEUs, provide an assistance buzzer push-button at the workstation. The button must be located so that it is easily accessible by the clerk but hidden from customer view. The buzzer is provided as a means for a clerk to signal the need for additional staff, and is not intended for use as a duress switch. The buzzer must produce a sound that is audibly different from the doorbells and be located in the Workroom.

5-4.9 Satellite Communications

5-4.9.1 Not Used

5-4.9.2 Very Small Aperture Terminal (VSAT)

Very Small Aperture Terminal (VSAT) communication utilizes satellite technology to transmit and receive data between individual post offices and the nationwide USPS telecommunications network. The network will support a wide range of applications including the Point-Of-Service One (POS One) program.

VSAT units are currently provided and installed by others under a separate contract with USPS. The preferred installation method is by through-wall mount. Pole-mounted elsewhere on the site is an option. The units can also be roof mounted using a non-penetrating roof mount, if no other alternative is available. The unit is approximately 3.5 feet in diameter and weighs approximately 90 pounds. With the rooftop ballast, it has a distributed load of 20 pounds per square foot.

The project design must accommodate infrastructure to support the VSAT equipment installed by others. During the project planning phase District Information Technology must coordinate and fund installation and connection of the VSAT equipment.

During the design phase, give consideration to the best location for the VSAT unit, so as to shield it from public view. If the unit is to be roof mounted, the parapet wall must be high enough to provide adequate screening. If the unit is to be wall mounted, locate the mounting bracket on an inconspicuous wall of the mailing platform, where it will not be susceptible to damage by trucks. In either case, conduit with pull string should be provided to facilitate future installation of the VSAT cabling.

5-5 Fire Protection System

5-5.1 Fire Alarm System *(Also refer to Modules 2A and 3)*

Module 2A, Module 3

Provide an addressable, in-building Fire Alarm System consisting of horns and strobes in all postal facilities with more than (10) employees in accordance with NFPA 101, 4.5.4 and OSHA 1910.165(b)(5) or as required by the “AHJ”. The system must utilize addressable, intelligent, initiating, monitoring, and control devices throughout the system.

The fire alarm control panel (FACP) must allow for loading or editing operating sequences as required. The system must be capable of on-site programming to accommodate changes. Store all software operations in a non-volatile programmable memory within the fire alarm control panel. Loss of primary or backup power must not erase the instructions stored in memory.

The system must communicate with all initiating and control devices individually.

All of these devices must be uniquely annunciated at the control panel.

Annunciation must include the following conditions for each device:

- Alarm
- Trouble
- Open
- Short Ground
- Device fail/incorrect device

Each addressable device must be uniquely identified by an address code entered on each device at the time of installation.

Provide maintenance free, long life standby batteries to operate the system during power outages. Size batteries to operate the system in the standby

mode for a minimum of 60 hours and in the alarm mode for a minimum of 5 minutes at the end of the 60 hour period.

Provide sprinkler flow alarms, gas supplies, smoke detectors, and other detection devices in accordance with NFPA and the AHJ.

Audible alarms must not be less than 90 dBA and not exceed 115 dBA (measured at a 10 ft.-0 in. distance) and must be distinctly audible in all areas of the facility. Strobe type visual alarms must be visible in all occupiable areas of the facility, including but not limited to locker rooms, lounge areas, toilet rooms, lunchrooms and vending machine areas. Install special tactile alarm devices as required by code. *(Refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Install strobe light and horn occupant notification devices in all facilities. The "contact ID-point" address signals must be automatically activated by the fire alarm control panel.

Fire alarm pull station boxes must be double action, red and may be either the break-rod type or open door, pull-lever type. Provide suitable protection and markings where required. Locate alarm boxes so that the travel distance to the nearest fire alarm box will not exceed 200 ft. measured horizontally on the same floor along the routes of egress (where applicable). Route fire alarm wiring as required by NFPA and the AHJ.

5-5.1.1 Remote Annunciation

Where required by local authority having jurisdiction, provide additional remote LED type annunciator panels. Locate adjacent to main entry door or at other locations satisfactory to authority having jurisdiction. Panels must duplicate annunciation features provided at main fire control panel.

5-5.1.2 Remote Monitoring *(Also refer to Modules 2A and 2B)*

Module 2A, Module 2B

Central station remote monitoring may be required for leased facilities if the lease terms with the landlord so indicate. Coordinate requirements with the USPS Project Manager.

Central station remote monitoring is required for certain CSF's and most MPF's. Refer to Modules 2A and 2B.

5-5.2 Smoke Detectors

Provide smoke detectors in electronic computer or data processing equipment rooms, as required by NFPA 75. Arrange the detectors to activate an alarm in the room and at the facility fire alarm panel.

Arrange duct type smoke detectors to stop ventilating fan motor controllers on actuation and provide a supervisory alarm at the control panel, in accordance with NFPA 72 requirements.

Refer to Standard Design Criteria Module 1, Chapter 4 – Mechanical, Section 4-5 Fire Protection, for duct-mounted smoke detector criteria.

Provide smoke detectors above the control panel(s), expander panels and remote annunciators if required by the local AHJ.

5-5.3 Heat Detectors

Heat detectors are a valuable alarm initiating device in areas where flash fires occur with little or no smoke. Provide heat detectors in all mechanical

and electrical rooms and all non-occupied spaces not equipped with fire sprinkler protection.

5-5.3.1 Combination Heat and Carbon Monoxide (CO) Sensors

Combination heat and carbon monoxide sensors must be provided in all spaces containing permanently installed fuel burning appliances and equipment. These system sensors shall be equipped with 24 VDC sounder bases, powered from the FACP, for early detection of CO. Carbon monoxide sensors must be located, installed and maintained per NFPA 720-2015.

Early detection of CO shall be supervised at the FACP and must not cause a general fire alarm, but must be separately annunciated by a “trouble” signal at the FACP.

5-5.4 Fire Alarm Interface *(Also refer to Module 2A)*

Module 2A

The fire alarm system must be interfaced with the following ancillary systems:

- Fire Protection Sprinkler System.
- Gas Solenoid(s).
- Air Handling and Ventilation Systems.

5-5.4.1 Shutdown of MPE *(Refer to Module 2A)*

Module 2A

5-5.4.2 Shutdown of AGV’s (*Refer to Module 2A*)

Module 2A

5-5.5 Fire Alarm Wiring

If permitted by NFPA and the local AHJ, route the interior fire alarm wiring open, without conduit encasement, per NFPA 70, NEC Article 760. Cabling must be suited for the environment and installed where not subject to damage or improper handling.

5-6 Lightning Protection *(Also refer to Modules 2A, 2B and 3)*

Module 2A, Module 2B, Module 3

Follow NFPA 780 Standard for the Installation of Lightning Protection Systems, 2011 edition.

5-6.1 Building Lightning Protection System *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-6.1.1 Underground Counterpoise *(Refer to Module 2A)*

Module 2A

5-6.2 Ground and Surge Protection *(Also refer to Module 2A)*

Module 2A

Provide the following additional grounding and surge protection measures if the facility is equipped or will be provided with a building lightning protection system:

- Equip all downstream feeders and panelboards with properly sized surge protection units. Equip the secondary loads of all stepdown transformers with surge protection units.
- Install individual surge protectors (power and low voltage) at both ends of all exterior copper wiring and all wiring exiting the building. Surge

suppression shall be provided for the power and control wiring associated with the barrier arm and sliding gates. Typical for ePACS, fire alarm, CCTV, IDS, intercom, paging, voice and other related systems.

- Equip each site lighting pole with individual surge protectors and protect the branch circuit breakers feeding these poles.
- Grounding electrodes must be driven and bonded to each remote, exterior card reader, gate controller and irrigation controller.
- Equip the fiber to copper video interface units, pole mounted at all exterior cameras, with 120 Volt and low voltage surge protection.
- Facilities in Alaska and harsh, cold climates often times utilize aluminum diamond plate flooring. This plate flooring must be properly bonded to the service entrance, grounding electrode system. Each aluminum floor plate shall be bonded together using #1/0/CU/THWN insulated cable fastened to each floor plate with CU/AL bonding plates or lugs. Provide single run of #1/0/CU ground cable in 1 inch PVC from a bonded floor plate to the main grounding electrode system. Caution shall be undertaken to avoid copper materials in contact with aluminum surfaces.

5-7 Integrated Security and Investigative Platform (ISIP)

(Also refer Modules 2A, 2B and 3)

Module 2A, Module 2B, Module 3

The ISIP is the centralized video platform for all CCTV systems located within USPS facilities. Cameras from the three traditional CCTV areas; Robbery Countermeasure, Security/Access Control, and Investigative, must be integrated within the single platform. Some USPS facilities may include all three types of CCTV cameras, or components of the three may be used in combination depending on the operational use of the building.

Refer to Appendix M1-F: Building and Site Security Requirements by Type of Facility and Square Footage to determine the key criteria for the design of the CCTV, IDS and PACS systems.

Refer to the CCTV and enterprise physical access control standard operating procedures for Project Managers, "Access Control (ePACS) SOP" included in the Building Design Standards, Folder F.7. This document provides guidance in attaining CCTV and access control "IP" addresses and security clearances.

The A/E must determine the location of the cameras, headend equipment and CCTV components for all or any of the three CCTV areas. Refer to BDS folder F – Other Requirements and Info for "USPS CCTV Security Design Requirements". The A/E shall produce to the direct vendor, AutoCAD electronic copies of the camera placement drawings and camera schedules for preparation of the preliminary and final cost estimates.

Interior cameras, exterior building mounted cameras and exterior cameras covered by an overhang canopy, etc. are considered "non blue sky" type and shall be wired accordingly.

Exterior cameras mounted remote from the building exterior wall are considered "blue sky" type and shall be wired accordingly.

5-7.1 Robbery Countermeasure/Retail CCTV Cameras

Module 2B, Module 3

(Refer to Modules 2B and 3)

5-7.2 Security and Enterprise Physical Access Control CCTV Cameras *(Refer to Modules 2A and 3)*

Module 2A, Module 3

5-7.2.1 Camera Mounting Provisions *(Refer to Module 2A)*

Module 2A

5-7.2.2 CCTV Terminal Cabinets *(Refer to Module 2A)*

Module 2A

5-7.3 Intrusion Detection System (IDS) *(Also refer to Modules 2A and Module 3)*

Module 2A, Module 3

An intrusion detection system is required within any facility over 6,500 square feet, handling or processing registered mail, storing stamp stock that maintains an accountability greater than $250,000 and is located in a high crime area, as indicated by a recently completed risk analysis:

a. If the VRAT (Vulnerability and Risk Assessment Tool) CAP score is greater than 500 in the overall, crimes against persons or crimes against property categories, an IDS is required.

b. If the CAP score is greater than 400 in the overall, crimes against persons or crimes against property categories AND any TWO of the following statements apply, an IDS is required:

- A security incident has occurred within the past 12 months (vandalism, robbery, or burglary).
- The walk-in cash revenue is greater than $1 million year.
- The retail facility is easily accessed from a major highway.
- The retail facility is near a bar, liquor store, or adult oriented store.

A risk assessment must be conducted before an intrusion detection system can be installed.

For facilities that are occupied by USPS personnel 24 hours per day, 7 days per week, do not provide IDS sensors monitoring perimeter doors and windows. Within these facilities, provide IDS coverage of the SDO, the CIO, and the breakout doors of the CIO, if present. LOG breakout doors located on the Workroom floor shall not be equipped with IDS door contacts.

The IDS system must be as prescribed in Exhibit 5-7.3a. The A/E must coordinate with local inspector and in exceptional circumstances where the IDS is in excess of Exhibit 5-7.3a, submit a deviation.

Exhibit 5-7.3a
IDS Requirements

SPACE	IDS COMPONENTS
Vault	Vault type vibration sensor.
Stamped Envelope Room	Door contacts with motion sensor in the room.
Full Service Counter Area	Motion sensor on employee side.
Open Merchandise area	Motion sensor(s), ceiling or wall mounted.
Wicket Door	Motion sensor on Workroom side of door with keypad with 10-20 second delay on the workroom side (if this is a designated employee entrance).
Registry Cage	Door contacts and motion sensor on wall or column inside cage (required only at non 24 hour facilities).
Carrier and Mail Vestibules	Motion sensor on Workroom floor side of inner set of double impact doors. Provide keypad with 10-20 second delay inside employee entrance in vestibule. Optional location of keypad is on Workroom side of inner set of impact doors.
24 Hour Lobby	At door leading from public lobby into the Workroom or other Postal-only spaces (folding grilles excluded), provide motion sensor on Workroom/Postal side of door.
Non-24 Hour Lobby	Motion sensors in Box Lobby to ensure coverage of all doors and windows.
Open Platform	Motion sensor on Workroom side of door at inner personnel doors; keypad in Mail Vestibule adjacent to personnel door.
Enclosed Platform	Motion sensor on Workroom side of door on personnel door between Platform and Workroom; keypad on platform side of personnel door.
Emergency Exits from Box Lobby	Door contacts.
Emergency Exits from Workroom	Door contacts.
COD or Parcel Cages	Motion sensor on wall or column inside cage.
Stamp Distribution Office (SDO)	Motion sensor and door contacts.
Investigative Office and	Door contacts and keypad with 10-20 second

SPACE	IDS COMPONENTS
CIO Breakout Doors	delay located adjacent to Inspector's entry.
Secondary Covert Entry Vestibule	Door contacts and keypad with 10-20 second delay.
Lookout Gallery Breakout Doors to the Workroom Floor	Door contacts not required.

All new facilities that are required to have an Intrusion Detection System (IDS) must comply with the zone coverage as outlined in Exhibit 5-7.3b.

Exhibit 5-7.3b
IDS Zone Requirements

Area of Coverage[1,2]	Zone Assignment
Workroom	Zone 1
Safes/Vault[3]	Zone 2
Retail Counter	Zone 3
Merchandising Areas	Zone 4
Admin offices and corridor	Zone 5
Registry cage	Zone 6
Investigative Office (programmed area 2)	Zone 7
Business Mail Entry Unit (BMEU)	Zone 8
Electrical room	Zone 9

Keyed Notes:

1 All areas do not exist in all facilities. If an area does not exist in the specific facility, then skip its zone number.

2 Workrooms and other areas may require more than 1 sensor for adequate coverage.

3 A motion sensor is required outside the vault and vibration sensors are required on the walls inside the vault.

An IDS consists of a combination of security panel, keypad(s), door contacts and motion sensors. All motion sensors must be dual technology (passive infrared and ultrasonic) sensors. Provide a dedicated telephone line for the IDS system for the remote monitoring station and locate it in a lockable room such as a telephone/data room, accountable paper room or electrical room, coordinate final location with USPIS. Provide a keypad at the designated employee entrance door to energize and de-energize the IDS. If the keypad is within a sensor zone, program a delay for that zone.

Wire Criminal Investigative Office (CIO) IDS components as separate zones. Design the system so that the alarm panel records, but does not display, the status of the IDS components associated with the CIO.

An IDS control panel provided to supervise only the criminal investigative components of the CIO shall be located within the CIO.

The contractor must purchase and install the system. Coordinate the final design layout of the system with the local Inspection Service. No deviations from the manufacturers and products listed in the USPS Specifications are allowed.

5-7.4 Enterprise Physical Access Control System (ePACS) *(Refer to Modules 2A, 2B and 3)*

Module 2A, Module 2B, Module 3

5-7.4.1 Video Intercom and Exterior Gate Control System *(Refer to Modules 2A and 3)*

Module 2A, Module 3

5-7.4.2 Photo ID System *(Refer to Module 2A)*

Module 2A

5-7.4.3 ePACS Surge Protection *(Refer to Module 2A)*

Module 2A

5-7.4.4 ePACS Terminal Cabinets *(Refer to Module 2A)*

Module 2A

5-7.4.5 ePACS Controllers *(Refer to Module 2A)*

Module 2A

5-7.5 Investigative Systems *(Also refer to Modules 2A, 2B and 3)*

Module2A, Module 2B, Module 3

Customer Service Facilities under 1350 square feet do not require a Criminal Investigative Office (CIO) or Criminal Investigative (CIS) CCTV System. During the planning phase, the OIG SAC or Inspector in Charge (or designee) must determine if a request for deviation to install a CIO and a CIS CCTV system is warranted.

5-7.5.1 Investigative Office *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-7.5.2 Investigative CCTV System *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-7.5.3 Cameras and Junction Boxes *(Refer to Modules 2A, 2B and 3)*

Module 2A, Module 2B, Module 3

5-7.5.4 Camera Mounting Provisions *(Refer to Module 2A)*

Module 2A

5-7.5.5 Video and Control Wiring *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-7.5.6 Camera Systems *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-7.5.7 CCTV Remote Node Cabinets *(Refer to Modules 2A and 2B)*

Module 2A, Module 2B

5-7.5.8 Lookout Galleries (*Refer to Module 3*)

Module 3

5-7.5.9 Registry Cage/Registry Room Surveillance *(Refer to Module 2A)*

Module 2A

5-7.5.10 Remotely Located Cameras *(Refer to Module 2A)*

Module 2A

5-7.6 Exit Door Alarm *(Also refer to Modules 2A and 2B)*

Module 2A, Module 2B

See Standard Design Criteria Module 1, Chapter 2 Section 2-7.2.2.a for hardware requirements.

Module 1

Equip the following doors with Exit Alarm:

- Exterior doors from Workroom used for emergency egress only.
- Doors or gates leading to the exterior from exterior covered non-smoking or smoking break areas near the lunchroom.
- Any other site specific doors as directed by plant manager and local inspector.

Install the following equipment at doors described above:

- A 110 dBA horn and 75 cd strobe light unit installed directly over or adjacent to the door must sound every time the door is opened. The exit door alarm is powered by a 120 Volt source and equipped with battery reserve. Refer to Module 1, 2-7.2.2.
- Equip the door with a visual device such as a strobe to notify hearing impaired employees.
- Exit alarm shall be equipped with a keyed reset station mounted top at 60 inches AFF. Alarm and visual indications shall be field adjusted to operate continuously for (30) seconds, if not reset.
- In facilities equipped with an Enterprise Physical Access Control System (ePACS), the exit door alarm is to be rated at 12 VDC and provided by the ePACS integrator. Refer to Module 2A, 5-7.6 for further details.
- Label these doors 'EMERGENCY EXIT ONLY - RE-ENTRY PROHIBITED.

Delaying exiting devices are prohibited.

5-7.7 Vault Alarms

Equip walk-in vaults with manually-actuated emergency electric alarms. Locate a pushbutton alarm switch and pilot light within the vault at a readily visible and accessible point and clearly identified by a printed sign indicating its function. Locate a loud horn immediately outside the vault door and clearly mark the horn. Provide vaults with a motion detector which is connected to the IDS.

5-8 Not Used

5-9 Special Occupancies *(Refer to Module 2A)*

Module 2A

5-9.1 Battery Charging Areas *(Refer to Module 2A)*

Module 2A

5-9.2 Evidence Rooms *(Refer to Module 2A)*

Module 2A

5-9.3 Not Used

5-9.4 Not Used

5-9.5 General Shop *(Refer to Module 2A)*

Module 2A

5-10 Construction Closeout *(Also refer to Module 2A and 3)*

Module 2A, Module 3

5-10.1 As-Built Riser Diagrams

The A/E shall ensure that the contractor has posted an as-built copy of the power distribution riser diagram in the main electrical room, framed and mounted under glass.

5-10.2 Operation and Maintenance Manuals

The A/E shall ensure that the contractor has provided complete operating and maintenance manuals (assembled and bound) covering all electrical equipment and systems for use by operating personnel.

5-10.3 Operation and Maintenance Training

The A/E shall ensure that the USPS employees have been properly trained in the operation and maintenance of each category of major electrical equipment. Training must be performed by qualified instructors and is the responsibility of the contractor.

5-10.4 Testing *(Also refer to Module 2A)*

Module 2A

The A/E shall ensure that the contractor has performed voltage, insulation and resistance tests on switchgear, grounding systems and all 600 Volt cables larger than #3/AWG to ensure that the integrity of the material has been maintained during installation.

The operation of all equipment furnished by the contractor must be demonstrated in the presence of the A/E or a USPS representative to confirm compliance with contract documents.

5-10.4.1 Major R&A Projects *(Refer to Module 3)*

Module 3

5-10.4.2 Testing of Existing Coaxial, CAT-5/5e and Fiber Optic Camera Cabling (*Refer to Module 3*)

Module 3

5-10.4.3 Structured Cabling Test Results

The A/E shall ensure that the copper and fiber structured cabling system test results are included within the closeout documents prepared by the Contractor.

5-10.5 Calculations

The A/E shall ensure that the following calculations have been formalized, individually separated and included within the closeout documents by the contractor:

- Circuit Breaker and Fuse Coordination Study (if applicable)
- ARC Fault Hazard Analysis

The following design calculations must be formalized, assembled and bound by the A/E and turned over to the USPS.

- Fault Current Calculations
- Lighting Calculations

5-11 Not Used

Electrical Design Checklists

Facility Name:

City, State, Zip:

Project Phase:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

NOTES:

1. This checklist shall be utilized for the design and construction of new Facilities or Repair & Alteration projects within existing Facilities.
2. Design/Build entity shall submit completed checklist with each design submission. Solicitation A/E to review list submitted and return as part of the design review with comments or corrections. The Design A/E for “Design-Bid-Build” projects shall submit completed checklist with each design submission.
3. Items not applicable to a specific Facility or Repair & Alteration project shall be marked as “N/A”.
4. Items identified with an “asterisk (*)” are high priority in the early preliminary design review stages.

Electrical Design Checklist – 10%

Section No.	Facility Type	✓	Priority	Item	Comment
5-1				**INTRODUCTION**	
5-1.2			*	All pertinent codes and standards have been established.	
5-1.4.1	MPF R&A		*	The need for power line filters has been established.	
5-2				**POWER DISTRIBUTION**	
5-2.1	MPF CSF		*	Need for emergency generator has been evaluated.	
5-2.1 5-2.3.1			*	Voltage level and availability of electrical service has been determined.	
5-2.1 5-2.3.1 5-2.3.2 5-2.3.3 5-2.3.4	MPF		*	The use of Power Company or USPS Owned transformers has been determined.	
5-2.1 5-4.2				Existing condition information has been verified and site utilities have been located.	
5-2.1.4			*	Utility metering meets criteria.	
5-3				**LIGHTING**	
5-3.1.7	MPF		*	Ride-thru lighting for the Workroom has been considered.	
5-3.1.8			*	Feasibility of utilizing day lighting for the workroom has been considered.	
5-4				**COMMUNICATIONS**	
5-4.1	MPF		*	Contact Raleigh IT SME to initiate layout of TE/TR's (in AutoCAD) based on known CCR location.	
5-4.1			*	Contact Raleigh IT SME to notify new site is being built and initiate Predictive Wireless Access Point Design.	
5-4.3.9	MPF			The location of the CCR has been established.	
5-4.8.1			*	The requirements for a public address, IP zone paging system have been established.	
5-5				**FIRE PROTECTION**	
5-5			*	Extent of fire alarm system has been established.	
5-6				**LIGHTNING PROTECTION**	

Section No.	Facility Type	✓	Priority	Item	Comment
5-6.1			*	Lightning risk assessment calculation has been prepared.	
5-6.1	MPF		*	The requirement for an underground counterpoise has been established.	
5-6.2			*	The extent and type of surge suppression has been established.	
5-6.2	MPF		*	The extent and type of exterior fence grounding has been established.	
5-7				**INTEGRATED SECURITY AND INVESTIGATIVE PLATFORM (ISIP)**	
5-7.1			*	The requirements for robbery/countermeasure/retail CCTV cameras have been established. Risk assessment has been prepared by Inspection Services.	
5-7.2	MPF		*	The requirements for security and ePACS CCTV cameras have been established.	
5-7.3			*	The requirements for an IDS have been established. Risk assessment has been prepared by Inspection Services. Is facility a 24/7 operation?	
5-7.4	MPF		*	The requirements for an ePACS have been established. The extent of surge protection has been determined.	
5-7.4.1	MPF		*	The requirements for a video intercom and gate release system have been established. The extent of surge protection has been determined.	
5-7.5			*	The requirements for investigative CCTV cameras have been established. The need of an investigative office has been determined.	

Electrical Design Checklist – 30%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL Have all items from 10% submittal check lists been incorporated?	
5-1				**INTRODUCTION**	
5.1.1 5-2.2.2	MPF		*	MPE locations and loads have been determined.	
5-1.3 5-3			*	Preliminary ECC forms have been completed and submitted.	
5-1.4.1.1			*	Lighting calculations have been performed.	
5-1.5	MPF CSF R&A		*	The degree of electrical commissioning has been established.	
5-1.6	MPF R&A		*	The M&V of the lighting systems complies with criteria and early paperwork has been prepared.	
5-2				**POWER DISTRIBUTION**	
5-2.1.1				Conduit requirements for underground service entrance feeders comply with criteria.	
5-2.1.1			*	Incoming service is coordinated with the utility company for underground service.	
5-2.1.2 5-4.2			*	Check incoming power and telephone service locations with civil site/utility plans.	
5-2.1.5 5-2.4.1	MPF CSF R&A		*	The type and requirements for advanced metering have been determined.	
5-2.2.3			*	Power feeders have been segregated per criteria.	
5-2.8.3			*	Drop cord locations are identified.	
5-2.8.4			*	Verify location of battery clocks.	
5-2.8.5				Verify convenience outlet and spare conduit for scale.	
5-3				**LIGHTING**	
5-3			*	Interior/Exterior lighting photometric plans have been prepared.	
5-3.1.3			*	Exit lights clearly indicate normal paths of egress and are unobstructed.	
5.3.1.4			*	Emergency lighting and circuitry meets criteria and minimum UL requirements for brightness and distribution.	

Section No.	Facility Type	✓	Priority	Item	Comment
5.3.1.5			*	Interior lighting design meets current version of ASHRAE 90.1 power densities.	
5-3.1.5			*	Design meets footcandle level for interior lighting.	
5-3.1.6				Interior luminaire types/lamps meet criteria.	
5-3.1.9			*	Retail and box lobby lighting complies with criteria.	
5-3.2				Lighting intensity ratio in parking and maneuvering areas does not exceed 10:1.	
5-3.2.5			*	Exterior emergency lighting has been provided at all egress doors.	
5-3.2.6			*	Design meets footcandle level for exterior lighting.	
5-3.2.6			*	Exterior lighting design meets current version of ASHRAE 90.1 power densities.	
5-3.2.7				Exterior luminaire types/lamps meet criteria.	
5-3.2.8			*	Dock traffic lights have been provided and controlled per criteria.	
5-4				**COMMUNICATIONS**	
5-4.1	MPF		*	Required SCS drawings and specifications developed or reviewed by Owners Agent BICSI Registered Communication Distribution Designer (RCDD) and Raleigh IT SME BICSI RCDD via onsite meeting.	
5-4.2			*	Location and sizing of incoming circuits have been determined and coordinated with Raleigh IT SME.	
5-4.2	MPF		*****	The TEF, CCR, TR's and TE's have been located and the bonding provisions for PBB and SBB's have been established.	
5-4.2			*****	The TEF, ER and TR (if applicable) have been located and the bonding provisions for PBB and SBB's have been established.	
5-4.3			*****	WAP locations have been identified by Raleigh Wireless Predictive WAP Placement and are shown on the drawings.	
5-4.3			*****	The port-to-port assignments for every patch panel have been established by the A/E.	

Section No.	Facility Type	✓	Priority	Item	Comment
5-4.3.3	MPF		*	Copper and fiber consolidation points of the structured cabling system are per the OSL.	
5-4.3.9	MPF		*	The equipment and rack layouts for the CCR have been finalized and approved by Raleigh IT SME, District IS Manager and local Maintenance Manager.	
5-4.8.1			*	Verify speaker coverage within Workroom is adequate.	
5-4.8.1				The paging system speakers are located per the criteria.	
5-5				**FIRE PROTECTION**	
5-5.1			*	Visual and audible alarms are provided per criteria.	
5-5.1			*	The location of all panels and expander panels has been determined.	
5-5.1			*	FACP is located in constantly attended location if 24/7 facility.	
5-5.1.1			*	The location of remote annunciators has been determined.	
5-5.1.2			*	Need for central station monitoring has been determined.	
5-5.2				Smoke detectors comply with criteria.	
5-5.3				Heat detectors are provided per criteria.	
5-5.3.1				Location of “CO” detectors comply with criteria.	
5-5.4				Interface with fire sprinkler system and other ancillary systems has been determined.	
5-6				**LIGHTNING PROTECTION**	
5-6.1				The building lightning protection design has been established.	
5-6.1	MPF		*	The design of the underground counterpoise has been finalized.	
5-7				**INTEGRATED SECURITY AND INVESTIGATIVE PLATFORM (ISIP)**	
5-7.1			*	Robbery countermeasure/retail cameras are located per Module 2B and approved by Inspection Services. The location of retail CCTV monitor has been coordinated with Postmaster.	

Section No.	Facility Type	✓	Priority	Item	Comment
5-7.2	MPF		*	Exterior and interior security and ePACS cameras are located per Module 2A, exhibit 5-7.2a and approved by Inspection Services. Primary and secondary monitoring stations have been determined.	
5-7.3			*	IDS devices and control panel have been located per Module 1, exhibit 5-7.3a.	
5-7.4	MPF		*	Interior and exterior ePACS devices have been located per Module 2A, exhibit 5-7.4a and approved by Inspection Services. ePACS CPU and reader controller locations have been established.	
5-7.4	R&A		*	The reuse of existing card readers has been established.	
5-7.4.1	MPF		*	Interior and exterior video intercom call stations, the CEU and master stations have been located. Gate and door releases have been established.	
5-7.4.2	MPF			The location of the photo ID badge making station has been coordinated with the facility.	
5-7.5			*	Interior and exterior investigative cameras have been located and scheduled per Module 2A, exhibit 5-7.4a and approved by OIG/Inspection Services. The headend is located in the IO and node cabinet locations have been established.	
5-7.5	MPF		*	The mounting heights and pendant stem lengths for the workroom and/or platform cameras has been established.	
5-7.5			*	Entire CCTV design transmitted (AutoCAD) to direct vendor for preliminary pricing per BDS Folder F – USPS CCTV Security Design Requirements	
5-7.5	R&A		*	The reuse of existing CAT 5/5e and fiber camera cabling has been determined.	

Section No.	Facility Type	✓	Priority	Item	Comment
5-7.5	R&A		*	The decision to provide a hybrid digital non-ISIP CCTV system in lieu of an integrated digital “ISIP” CCTV system has been determined by the USPS.	
5-7.5.7			*	Camera(s) have been provided within the registry cage per criteria.	
5-7.6			*	Verify the requirement for exit only door alarms.	
5-9				**SPECIAL OCCUPANCIES**	
5-9.1	MPF		*	Verify type of battery charging systems to be utilized.	

Electrical Design Checklist – 70%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL Have all items from 10% and 30% submittal check lists been incorporated?	
5-2				**POWER DISTRIBUTION**	
5-2.1.2				Connected and demand load calculations for sizing the panelboards and transformers have been performed.	
5-2.3.1			*	Check for proper access and clearance of electrical equipment. Verify means of egress.	
5-2.5				Transformer sizing requirements and spare capacities meet criteria.	
5-2.8.1				Convenience outlets are located per criteria.	
5-2-8.2			*	Locations and requirements for HEBR's meet criteria.	
5-3				**LIGHTING**	
5-3				All interior spaces are provided with automatic controls.	
5-3				Luminaire mounting, type and height are coordinated with ceiling finishes.	
5-3.1.1			*	Workroom lighting and controls per criteria.	
5-3.1.2				Verify Platform lighting control meets criteria.	
5-3.2.4				Exterior illuminated signs have been located.	
5-3.2.6				Exterior lighting is controlled by photo-cell on; time switch off.	
5-4				**COMMUNICATIONS**	
5-4.1				Required SCS drawings and specifications have been reviewed and approved by Raleigh IT SME, District IS Manager and local Maintenance Manager.	
5-4.3	MPF			The TR/TEs have been located and sized.	
5-4.3	CSF			The SCS racks within the ER and TR have been located and sized.	
5-4.3				The layout of the ER has been finalized.	

Section No.	Facility Type	✓	Priority	Item	Comment
5-4.3			*	The port-to-port one-liner assignments for all T/O's, etc. and the equipment rack elevations are finalized by A/E and approved by Raleigh IT SME.	
5-4.3.5				Conduit riser and cable trays are sized and located per criteria.	
5-4.3.8	MPF			The "CCR" has been designed in conformance with NFPA 75 and criteria,	
5-4.8.1				Riser diagram or point-to-point plan has been prepared showing all cabling required for the IP zone paging system.	
5-4.8.2				Required call bell and buzzer systems have been provided.	
5-5				**FIRE PROTECTION**	
5-5.1	MPF		*	"Post Alarm Sequence" operation has been approved by the AHJ.	
5-5.4.1	MPF		*	The shutdown of the "MPE" has been determined.	
5-5.5				The use of open fire alarm wiring has been approved by the AHJ.	
5-5.5.1	R&A			The locations of the FACP, expander panels and devices have been field verified with existing conditions.	
5-6				**LIGHTNING PROTECTION**	
5-6.1				The design of the building lightning protection system and counterpoise have been finalized. Preconstruction soil testing has been specified.	
5-7				**INTEGRATED SECURITY AND INVESTIGATIVE PLATFORM (ISIP)**	
5-7.1				Riser diagram or point-to-point plan has been prepared showing all cabling required for the robbery countermeasure CCTV cameras.	
5-7.1	R&A			The locations of the robbery countermeasure CCTV cameras, monitor and DVR have been field verified with existing conditions.	
5-7.2	MPF			Riser diagram or point-to-point plan has been prepared showing all cabling and surge protection required for security and ePACS CCTV cameras.	

Section No.	Facility Type	✓	Priority	Item	Comment
5-7.2	R&A			The locations of security and ePACS CCTV cameras and monitoring stations have been field verified with existing conditions.	
5-7.3				Riser diagram or point-to-point plan has been prepared showing all cabling required for IDS.	
5-7.3	R&A			The locations of the IDS control panel and devices have been field verified with existing conditions.	
5-7.4	MPF			Riser diagram or point-to-point plan has been prepared showing all cabling and surge protection required for ePACS.	
5-7.4.1	MPF			Riser diagram or point-to-point plan has been prepared showing all cabling and surge protection required for video intercom and door release functions.	
5-7.4	R&A			The locations of the ePACS CPU, interface modules, card readers and devices have been field verified with existing conditions.	
5-7.4.1	R&A			The locations of call stations, master stations, CEU and gate/door release components have been field verified with existing conditions.	
5-7.5	MPF			Riser diagram or point-to-point plan and camera schedule showing all ISIP CCTV system cabling and interfaces have been prepared.	
5-7.5	R&A			The locations of investigative cameras, node cabinets and headend equipment have been field verified with existing conditions and approved by local inspector.	
5-7.5.1 5-7.5.5				Ensure adequate dedicated electrical service for CIO and cameras.	
5-9				**SPECIAL OCCUPANCIES**	
5-9.5	MPF			Dedicated power for shop areas meets criteria.	

Electrical Design Checklist – 100%

Section No.	Facility Type	✓	Priority	Item	Comment
				GENERAL Have all items from 10%, 30% and 70% submittal check lists been incorporated?	
5-1				**INTRODUCTION**	
5-1.4.1 5-10.5				Short circuit calcs. have been prepared. Bracing rating (AIC rating) for incoming service and distribution equipment has been verified.	
5-1.4.1 5-10.5	MPF			Protective device coordination study has been completed.	
5-1.4.2				Voltage drop calculation for feeder and branch circuit wiring has been performed.	
5-1.4.4 5-10.5				ARC Flash Hazard Analysis has been performed and labeling has been specified.	
5-2				**POWER DISTRIBUTION**	
5-2.2.1				Branch circuits serving miscellaneous loads are coordinated with equipment schedules.	
5-2.4.2				AIC rating of panelboards is noted, and panels are equipped with “door within door” feature.	
5-2.4.2				20 percent spare capacity and spares/spaces in each panelboard have been provided.	
5-2.6	MPF			Motor control center is sized for 20 percent spare capacity.	
5-2.6				Motors sized ½ HP and larger are fed from dedicated breakers.	
5-2.6.1				All 3 phase-motors are controlled by combination type starters equipped with phase loss protection.	
5-2.7.1				Conduits meet criteria for different locations.	
5-2.7.2				Exterior underground conduit is continuously marked and buried top at 24 inches BFG. Minimum size 1 inch.	
5-2.7.3				Verify all branch circuits are equipped with individual neutrals	

Section No.	Facility Type	✓	Priority	Item	Comment
5-2.7.5			*	Check quantity and location of ground rods and sizes of grounding loop conductors. Verify electric service grounding connections and transformer secondary grounding connections.	
5-2.7.6 5-10.4				Ensure contract documents specify that feeders are to be tagged for construction closeout.	
5-2.7.7				Equipment grounding conductors have been provided in all lighting and power conduits.	
5-2.11				Verify safety switches are heavy duty type.	
5-3				**LIGHTING**	
5-3.2.1				Pole bases are protected per criteria.	
5-3.2.1				The use of stainless steel anchor bolts and hardware has been determined.	
5-3.2.1				Exterior lighting poles are grounded per criteria. Surge protection provided as required.	
5-4				**COMMUNICATIONS**	
5-4.3.1				Voice and network data backbone cables have been sized per criteria.	
5-4.3.5 5-10.4				Ensure that contract documents specify that SCS cable test results must be performed for construction closeout.	
5-4.3.7	CSF		*	Verify the requirements for TRs.	
5-4.8.1				Verify that paging and telephone systems are compatible and meet criteria.	
5-4.8.1				The IP zone paging system design is fully coordinated, complete and approved by RITSC. Spec section 275116 has been prepared.	
5-5				**FIRE PROTECTION**	
5-5.1			*	Central station monitoring of the fire alarm system has been established.	
5-5.4				All fire alarm interfaces have been detailed.	
5-7				**INTEGRATED SECURITY AND INVESTIGATIVE PLATFORM (ISIP)**	

Section No.	Facility Type	✓	Priority	Item	Comment
5-7.1				Robbery countermeasure/retail CCTV system design is fully coordinated and complete.	
5-7.1				Spec section 282304 has been prepared (if the robbery countermeasure/retail CCTV system requires no more than (16) cameras) and is to be independent from an ISIP CCTV system.	
5-7.2	MPF			Security and ePACS CCTV system designs fully coordinated and complete. All 120 Volt power necessary is shown on the drawings.	
5-7.3				IDS design is fully coordinated and complete. 120 Volt power for the control panel is shown on the drawings. Spec section 281600 has been prepared.	
5-7.4	MPF			ePACS design is fully coordinated and complete. All 120 Volt power necessary is shown on the drawings. Spec section 281304 has been prepared.	
5-7.4.1	MPF			The video intercom and door release system is fully coordinated and complete. All 120 Volt and gate power are shown on the drawings. Spec section 275117 has been prepared.	
5-7.4.2	MPF			Procurement of the photo ID badge making printer, cards, camera and ACE software have been coordinated with PACS-SUPPORT@usps.gov.	
5-7.5	MPF			The ISIP CCTV system is fully coordinated and complete. All 120 Volt power is shown on the drawings. Spec section 282305 has been prepared.	
5-7.5			*	Final CCTV design transmitted (AutoCAD to direct vendor for final pricing per BDS Folder F – USPS CCTV Security Design Requirements	
5-10				**CONSTRUCTION CLOSEOUT**	

Section No.	Facility Type	✓	Priority	Item	Comment
5-10.1	MPF			Ensure contract documents specify that an as-built distribution diagram must be posted in the main electrical room for construction closeout.	
5-10.2 5-10.3				Ensure that contract documents include contractor closeout procedures and training spec section 017704.	
5-10.4				Ensure contract documents specify that power cable test results must be performed for construction closeout.	
5-10.4	MPF			A “Lessons Learned” SCS onsite meeting with Raleigh IT SME present has been conducted.	
5-10.4	MPF			Results of the two-point ground/continuity test (per TIA-607-C9.1) have been submitted.	
5-10.4	MPF			Results of the grounding electrode resistivity test (per TIA-607-C9.2.1) have been submitted.	
5-10.4	MPF			Results of the soil resistivity tests (5 locations per TIA-607-C9.3.2) have been submitted.	
5-10.4	MPF			The commissioning report for the functional and operational testing of the UPS (within the CCR) has been submitted.	
5-10.4				Ensure the emergency lighting system has been field tested and in accordance with Life Safety requirements.	
5-10.5	MPF			Ensure the contract documents specify ARC fault hazard analysis and breaker/fuser coordination study to be prepared by contractor for construction closeout.	
5-10.5				Lighting photometrics and fault current calculations have been turned over to USPS.	

Appendix M1-A

Boundary and Topographic Site Survey Specifications

Intent The purpose of these specifications is to designate and describe the minimum requirements for a boundary and topographic site survey for use in the acquisition of real property and the design and construction of new or modified postal buildings and other site improvements.

General The Surveyor shall perform all field work necessary to accurately determine the property lines and existing physical conditions of the site, mark corner in accordance with appropriate State Board of Land Surveyor requirements, establish bench mark, and ascertain and record on a topographic and boundary survey drawing the information and data as required and hereinafter specified. The Surveyor shall obtain from public records such information and data as may be required to complete the work. All data and information required by these specifications shall be shown on the survey drawing or designated as nonexistent.

Survey Drawing (Map) The survey drawing shall be prepared using AutoCAD, latest version. When plotted, the size of the site survey drawing shall be: 30" x 42" with 1-1/2" margin on the left edge for binding and a 1/2" margin on the remaining sides. The drawing shall be prepared, so when half-sized, it is legible. Where the size of the site is such that the specified size is deemed impractical, the Surveyor may, with the approval of the Contracting Officer, modify the above-specified dimension.

The survey drawing shall be prepared at a scale of one inch equals 20 feet, except when authorized otherwise by the Contracting Officer.

The drawing shall be of such material (mylar, velum, or other material in customary use) and shall be plotted in pen as will assure quality reproduction of easily readable prints.

North Arrow The compass direction shall be shown by an accurately positioned North Arrow designated as (a) magnetic north, or (b) true north.

Land Description The survey drawing shall contain a legal description of the property of each ownership within the boundary lines of the site.

Bench Mark A bench mark referenced to an established datum shall be marked on a permanent object adjacent to the site and clearly located and described on the survey drawing.

Boundary Lines Boundary lines of the site shall be shown in bearings and distances.

Corners All corners of the site and boundary line intersections not previously marked shall be so marked in accordance with appropriate State Board of Land Surveyor requirements.

Area The total area within the boundary lines shall be designated on the drawing in square feet and acres. If more than one parcel makes up the subject property, the area of the property of each ownership within the boundary lines must be identified.

Closure Report Provide a copy of the closure report confirming that the metes and bounds are accurate.

Easements Indicate location, description and dimensions of easements of record. If there are no easements, that fact shall be noted on the drawing.

Encroachments Any and all encroachments on the property being surveyed shall be accurately and clearly indicated.

Improvements Indicate the position, size, and material of any and all improvements on the property including buildings, retaining walls, architectural walls, areaways, driveways, paving, etc. Indicate the existence and location of off-site structures within 20 feet of the property lines.

Trees and Vegetation Indicate the location and size of trees over 4 inches in trunk diameter and wooded or vegetated areas where trees of smaller diameter or vegetation are in profusion. Thickly wooded or vegetated areas may be designated with number or size of trees or type of vegetation.

Building Line Note whether or not an "official building line" has been established and, if so, its location with respect to streets and property lines. Indicate location, if any, of adjacent building lines.

Adjoining Property Owners Note names of owners of adjoining properties.

Streets and Alleys The following data shall be indicated on the survey drawing for all streets, alleys, roads, highways and rights of way adjacent to the site:

(a) Name and/or route number.
(b) Direction of traffic.
(c) Distance from property lines and between curbs.
(d) Type, dimension and condition of paving. Where no paving exists, so note.
(e) Elevations along center lines at 25 feet intervals and intersections.
(f) Description of all proposed streets, alleys, roads, highways and rights of way including contemplated dates of installation and proposed locations and elevations.

Sidewalks, Curbs and Gutters The following data shall be indicated for all sidewalks, curbs, and gutters on or adjacent to the site (where no sidewalks, curbs or gutters exist, that fact shall be noted):

(a) Distance from property lines and dimensions.
(b) Type and condition of material.
(c) Cross-sections of each type of curb and gutter.
(d) Elevations of sidewalk along edge nearest site at 25 feet intervals, at corners, and points of slope change.
(e) Elevations of top of curbs and flow line of gutters at 25 feet intervals, at corners and points of slope change.
(f) Description of all proposed sidewalks, curbs and gutter improvement including contemplated dates of installation and proposed locations and elevations.

Utilities & Telephone The following information pertaining to utilities adjacent to the site shall be shown and noted on the survey drawing:

(a) Electric & Telephone. Location, type and capacity of available electric & telephone service. Location of electric & telephone lines, poles and manholes.
(b) Water. Location of water mains, hydrants and manholes. Indicate size of water mains.
(c) Gas. Location and size of gas mains including type, pressure, and source of gas supply.
(d) Sewers. Location, size, direction of flow, rate of fall, and type of material of sanitary, storm, or combined sewer mains. Indicate whether public or private and whether the use is exclusively for sanitary wastes, or storm water drainage. Indicate elevations of flowline, location of manholes and elevation of "in" and "out" inverts.

If a utility is not available at the site, determine the nearest location where the service is available in the community.

Elevations and Contour Lines Elevations of the site shall be taken on a grid suitable to the topography and size of the site, and shall include elevations 25 feet outside of the property boundary.

Contour lines shall be drawn at intervals, which will accurately reflect the existing topography of the site but in no case at more than 2 feet intervals. Elevations shall be marked on contour lines at regular intervals.

Floodplain The surveyor shall state whether all or any part of the site lies within a known floodplain or floodway fringe (ESRI/FEMA). If none of the site lies within a floodplain or floodway fringe, note it as such.

Other Information Note other information pertaining to site conditions, such as abandoned underground structures, ditches, culverts, wells, excavations, erosion problems, known seismic fault zones, slide areas, existing stream courses, etc.

Public Records The surveyor, in addition to other contractual services, shall obtain and/or verify requisite information and data from public records, including names, locations, dimensions and elevations of streets, curbs, gutters, sidewalks, established building lines, easements, utilities, proposed improvements, condemnations etc., necessary for, and incidental to, a complete site survey, preparation of the drawing thereof, and the certification by the Surveyor that the data represented thereon is true and correct.

Copies of Survey Drawing Upon completion of the boundary and topographic site survey, the Surveyor shall submit one (1) CD ROM containing boundary and topographic site survey and one (1) mylar or velum reproducible drawing to the Postal Service for reproduction by others, along with three (3) non-reproducible copies for immediate use.

Surveyor's Certification The survey drawing shall contain a signed certification by the Surveyor that the survey of the described property was made under his supervision and that the data shown thereon is true and correct. The drawing and the Record of Survey when required shall also have the imprint of the surveyor's registration seal, or in lieu thereof a certification as to his State registration or license. The following certification is required: (check one)

- ☐ New Construction Leased Site – The Surveyor shall provide an industry standard certification on the survey drawing.
- ☐ New Construction Owned Site – In order to comply with the recommendations of Postal Service Legal Counsel, the survey shall be certified to the United States Postal Service AND the title insurance company designated by the Postal Service. The following paragraph shall appear directly on the survey drawing:

To (name of client and name of title insurance company, if known):

This is to certify that this map or plat and the survey on which it is based were made in accordance with the current Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys and the Accuracy Standards for ALTA-NSPS Land Title Surveys (available at www.alta.org or www.nsps.us.com).

(SURVEYOR"S SEAL)

_____ _____

License Number Signature of Surveyor

Cooperation with Title Company For property that will be owned by the US Postal Service, the Surveyor shall cooperate with the title company, abstractor, or attorneys selected by the Postal Service to furnish title information in connection with the site, in order that the numbering of certificates or opinions of title will correspond with the maps furnished by the Surveyor. In addition, a narrative metes and bounds description consistent with the description that will appear on an owner's title policy, shall be prepared on a separate sheet(s). The Surveyor shall complete the boundary and topographic survey in accordance with ALTA specifications sufficient for the title company to issue 1991 US Policy to the US Postal Service. For property that will be leased by the US Postal Service, the Surveyor shall provide a narrative metes and bounds description on the survey or attached on a separate sheet.

Appendix M1-B

Specifications for Subsurface Explorations

A. SOILS AND FOUNDATIONS REPORT

A report containing an evaluation of site conditions and definitive recommendations for building foundation and pavement design shall be prepared by a registered geotechnical engineer. The geotechnical engineer must be present while borings are taken and provides expertise with on-site and laboratory analysis. The geotechnical engineer is responsible for issuing the final report that includes all data collected during the field exploration, including the following:

1. Logs of borings showing top elevations, depth, soil identifications and description in accordance with the Unified Soils Classification System.
2. Standard Penetration test blow counts.
3. Stratum thickness.
4. Elevation of the water table.
5. Laboratory analysis, consisting of:
    a. Moisture, density, composition and grain size analysis of granular soils.
    b. Moisture, density, composition, Atterberg Limit Tests and unconfined compression test on cohesive soils.
6. Charts and graphs indicating test results.
7. Recommended safe bearing values of the soils.

The report must also include an evaluation of the data collected and recommendations for site development and foundation design to aid the designer in the selection of the optimum foundation system. The report should include specific recommendations for parameters to be used in design, including the following, as applicable:

8. Allowable soil-bearing pressure and recommended depth of footings.
9. Active and passive lateral soil pressure.
10. Pile capacities, pile-driving criteria and requirements for tests, if pile foundation is recommended.
11. Estimates of settlement, and recommendation for foundation design under all loading conditions, including seismic load.
12. Requirements for fill, including data required for the preparation of construction specifications and inspection requirements for fill.
13. Suitability of the material excavated from the site for possible use as back fill on the site.
14. Values of the California Bearing Ratio (CBR) and the modulus of sub-grade reaction (K) of the compacted sub-grade under pavements and slabs on grade, and the compaction procedures required to obtain these values in the field.
15. Recommendations for pavement design.
16. Highest anticipated ground water level and probable seasonable variations.
17. Estimated quantity of subsurface water infiltration into foundation drains (per linear foot of drain).
18. Presence of deleterious substances in the soils, including those that will generate gases, their expected effect on foundations and utility lines and recommended preventive action.
19. History of foundation or leakage trouble experienced in the neighborhood.
20. Anticipated construction problems resulting from existing subsurface conditions.
21. Identification of observed, or suspected hazardous/toxic soil conditions which may pose health, safety, or design concerns for future site use (i.e., hydrocarbons, benzene, tyolene, xylene, asbestos, and/or other known, or suspected toxic/hazardous materials), on or adjacent to the site.
22. Review known or suspected past and present use(s) of buildings and improvements (i.e., gas stations, manufacturing, warehousing etc.) and related land use(s) (i.e., railroad storage yard, farming, residential etc.).

B. SUBMITTAL OF REPORT

Five (5) copies of the report shall be submitted typed on bond paper along with logs of the borings, and tabular data, signed and sealed by a geotechnical engineer registered as a professional engineer in the state where the site is located. A draft of the report must be submitted for USPS review within thirty (30) calendar days from notice of award, or as stipulated in the contract.

C. BORINGS-NUMBER LOCATION AND DEPTH

The suggested number, location and depth of borings will be indicated on the Site Utilization Plan or other site plan furnished by the Postal Service. It shall be the contractor's responsibility to determine if these parameters are adequate to prepare the report. Any change in these parameters must be approved by the Postal Service. The finalized parameters shall be indicated on a Site Utilization Plan which shall be made a part of the contract.

As a minimum, four (4) boreholes will be drilled within the building area, one at each corner of the building, to a minimum depth of 25 feet, unless bedrock is encountered before the end of the boring. A borehole will be drilled to a minimum depth of 10 feet within each parking lot and maneuvering area. Typically, a minimum of seven boreholes will be drilled to gain a good understanding of the subsurface conditions. When unsuitable soils conditions are encountered, such as fill or muskeg, the boreholes must be terminated to at least 5 feet below the bottom of the unsuitable soil.

D. SEALING OF BOREHOLES

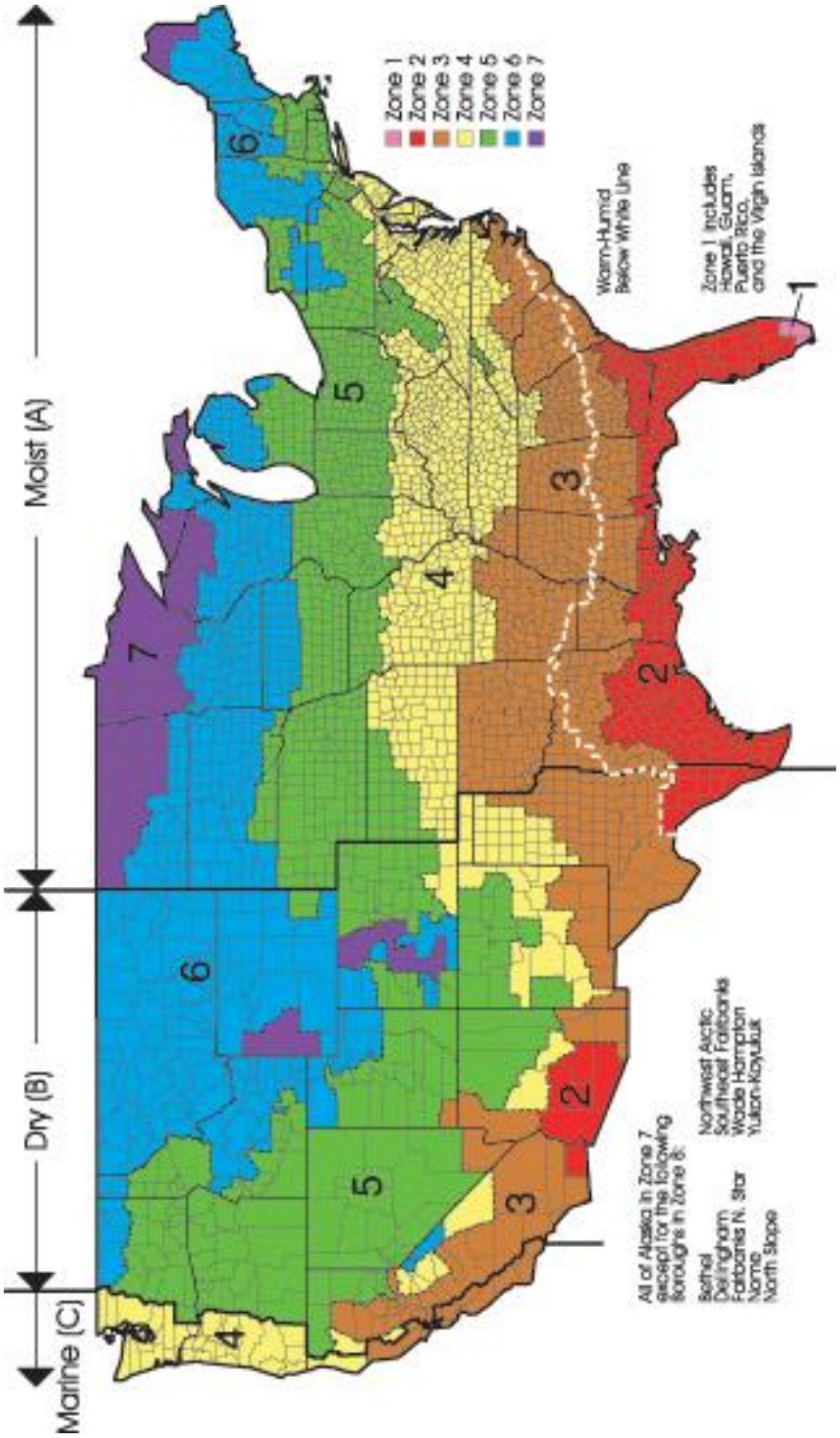
All boreholes will be backfilled and properly abandoned and the ground surface restored to the original conditions

E. DISPOSITION OF SAMPLES

All samples obtained from the borings will be suitably boxed in a manner that will prevent damage to the samples during storage. The samples will be stored by the contractor for a period of twelve (12) months from the date the borings were made, and will be disposed of by the contractor thereafter.

Appendix M1-C

ASHRAE Climate Zone Map



Appendix M1-D

USPS Interior Finishes and Colors

		FLOORS (See Note 1)				Base (See Note 2)			WALLS (UNO)								CEILING				
ROOM #	ROOM (See Note 23)	RESILIENT FLOORING	FLOOR MAT	EPOXY	SEALED CONCRETE	VB-VINYL BASE	INTEGRAL EPOXY	None	P-1 (white)	P-2 (light gray)	P-4 (Postal red)	P-5 (Postal blue)	P-6 (dark gray - doors & frames)	FRP	EPOXY	SEALED	None	Lay-In Tile	Gyp. Brd.	Plywood	Exp. Struct	See Keyed Notes for additional info
	OFFICES																					
	Plant Manager	●				●			●				●					●				
	Postmaster	●				●			●				●					●				
	Secretary/Reception Area	●				●			●				●					●				
	Manager, In-Plant Support	●				●			●				●					●				
	I.T. Manager	●				●			●				●					●				
	Comp. System Ops	●				●			●				●					●				
	Ops Support Specialist	●				●			●				●					●				
	QWL Improv. Specialist	●				●			●				●					●				
	Manager, Transportation	●				●			●				●					●				
	Supv. Transportation Oprns.	●				●			●				●					●				
	Vehicle Oprns Analyst	●				●			●				●					●				
	Network Analyst	●				●			●				●					●				
	General Clerk	●				●			●				●					●				
	District Domicile General Office	●				●			●				●					●				
	Mgr. Maintenance	●				●			●				●					●				
	Supv., Maint. Operations	●				●			●				●					●				
	Maint. Support Clerks	●			●	●			●				●					●				
	Filing space	●				●			●				●					●				
	Office Supplies	●				●				●			●					●				
	Conference Area	●				●			●				●					●				
	Reference Room	●				●			●				●					●				
	Mail/Copy Room	●				●			●				●					●				
	Break Area				●	●			●				●					●				
	Toilets			●			●		●				●		●			●				See Note 10
	PEDC:																					
	Classroom	●				●			●				●					●				
	Library/Self Study	●				●			●				●					●				
	Storage	●				●				●			●					●				
	LOBBIES/HALLWAYS																					
	Admin. Hallway	●				●			●				●					●				
	Employee Hallway				●	●			●				●					●				
	Mechanical/Maintenance Hallways				●	●			●				●	●				●				See Note 16
	MPF Security Lobby and Vestibule		●		●	●			●				●					●				See Notes 3, 12
	Retail:																					
	Full Service Lobby (employees)	●				●					●							●				Doors & Frames match wall color
	Full Service (employees CSF Small 15-20)	●				●			●										●			
	Full Service Lobby (customers)	●				●						●						●				Doors & Frames match wall color
	CSF Entry Vestibule		●		●	●			●									●				See Notes 3, 12
	Lobby (customers CSF Small 15-20)	●				●			●										●			
	Self-Service/PO Box Lobbies	●				●						●						●				Doors & Frames match wall color
	Box Lobby (CSF Small 15-20)	●				●			●										●			
	PO Box Alcove	●				●				●								●				Doors & Frames match wall color
	APC/SSK Alcove in Self-Service	●				●				●		●							●			P-2 on back wall, P-5 on side walls
	Passport Office attached to Retail Lobby	●				●						●						●				Doors & Frames match wall color
	Passport Office in standalone location	●				●			●				●					●				
	EMPLOYEE FACILITIES																					
	Employee Lunchroom	●				●			●				●					●				See Note 16, see note 18 if kitchen is provided
	Supplemental Services				●	●			●				●					●				
	Multi-Purpose Room	●				●			●				●					●				
	Vending Machine Supply Storage				●	●			●				●					●				
	Public Service Area	●				●			●				●					●				
	Toilets Female / Male			●			●			●			●		●			●				See Note 10
	Toilets (CSF Small 15-20)			●			●		●						●				●			
	Toilets (CSF Small 25-100)			●			●		●						●			●				
	Exterior Break Area				●																●	
	GENERAL SUPPORT AREA																					
	Storage:																					
	Archived Paperwork Room	●				●				●			●					●				
	General Supplies (Non-custodial)				●	●				●			●					●				
	Mail Processing Equipment Storage				●	●				●			●								●	
	Miscellaneous:																					
	Vehicle Dispatch	●				●			●				●					●				
	Platform Supervisor	●																				See Note 5
	Manager, Distribution Operations	●				●			●				●					●				
	Supervisor, Distribution Operations	●				●			●				●					●				
	Label Room				●	●			●				●					●				
	TACS Site	●			●	●			●				●					●				
	Contract Drivers				●	●			●				●					●				See Note 10
	Contract Drivers Toilets			●			●		●				●		●			●				
	Consolidated Computer Room (CCR)	●				●				●			●					●				See Note 4, 15
	Telephone Switching Equipment (in CCR)	●				●				●			●					●				See Note 15
	Telecommunications Equipment Room (ER)	●				●				●								●				See Note 15
	Telecommunications Room (TR)	●				●				●								●				See Note 15

		FLOORS (See Note 1)				BASE (See Note 2)			WALLS (UNO)								CEILING				
ROOM #	ROOM (See Note 23)	RESILIENT FLOORING	FLOOR MAT	EPOXY	SEALED CONCRETE	VB-VINYL BASE	INTEGRAL EPOXY	None	P-1 (white)	P-2 (light gray)	P-4 (Postal red)	P-5 (Postal blue)	P-6 (dark gray – doors & frames)	FRP	EPOXY	SEALED	None	Lay-In Tile	Gyp. Brd.	Plywood	Exp. Struct.	See Keyed Notes for additional info
	GENERAL SUPPORT AREA (cont.)																					
	Locker Area				●	●			●				●					●				
	MDF/LAN Room (in CCR)	●				●			●				●					●				See Notes 4, 15
	Supervisor Break Room	●				●			●				●					●				
	Business Mail Entry Unit (BMEU)	●			●				●				●					●			●	See Note 9
	MAINTENANCE SUPPORT																					
	Custodial Storage				●	●				●			●								●	See Note 17
	Storage/Jan Closet (CSF Small 25-100)				●	●				●									●			
	Custodial Closet				●	●				●			●		●			●				See Note 11
	Custodial (CSF Small 25-100)				●	●				●									●			
	Building and Ground Storage				●			●		●			●								●	See Notes 13, 17
	Building and Grounds (CSF Small 100)				●	●				●									●			
	General Shop (including welding)				●			●		●			●								●	See Note 17
	Training Room/Library	●				●			●				●					●				
	Storage (Flammable)				●			●		●											●	See Notes 13, 17
	Electronics Room				●	●				●			●					●				
	Shower Room			●	●	●	●			●			●		●			●				See Note 10
	Machine Shop (Large Facilities Only)				●			●		●			●								●	See Note 17
	WORKROOM																					
	Workroom				●			●	●				●								●	See Notes 7, 17
	Workroom (CSF Small 15-20)				●	●			●					●					●			
	Workroom (CSF Small 25-100)				●	●			●					●				●				
	Reg. Disp. Security Cage				●			●													●	
	Satellite Label / Placard Areas				●			●													●	
	BMEU Cleared Mail Staging				●			●					●								●	
	Satellite Maint Shops (Cage)				●			●													●	
	Battery Charging				●			●													●	See Note 17
	Nixie Station				●			●													●	
	Satellite Vending Areas				●			●													●	See Note 8
	Satellite Restrooms			●			●		●						●			●				See Note 10
	TACs				●			●										●				
	Empty Equipment				●			●		●											●	
	Trash and Recycling				●			●		●			●		●				●			See Notes 10, 15, 17
	Stamp Storage				●			●		●			●						●			
	Stamped Envelopes (CSF Small 100)				●	●			●									●				
	Vault				●			●		●			●						●			
	Records				●			●		●			●								●	
	OTHER																					
	Mech./Electric Room				●			●		●			●								●	
	Mechanical Room (CSF Small 15-25)				●	●				●									●			
	CIO	●				●												●				See Note 22
	LOGs/Breakouts	●				●												●				See Note 22
	Platforms				●			●		●			●									See Notes 6, 7, 17
	Mail Platform (CSF Small 25-100)				●			●		●										●		See Note 20
	Open Platform				●			●		●							●				●	
	Mail Vestibule				●	●				●			●								●	
	Mail Vestibule (CSF Small 15-20)				●	●				●				●					●			
	Mail Vestibule (CSF Small 25-100)				●	●				●				●						●		
	Carrier Vestibule				●					●			●								●	
	Carrier Vestibule (CSF Small 25-100)				●	●				●				●						●		
	VMF Service and Maintenance bays				●			●							●	●					●	See Notes 19, 21
	VMF Pressure Cleaning bays				●			●							●						●	See Note 21
	All Other				●	●			●				●					●				

GENERAL NOTES

- Signage background color should match paint color P-5. Letter and symbols color should be black.
- Dock numbers to be in a high contrast color.
- See Specifications for material finishes and colors.
- Spaces directly off workroom shall not have floor covering.
- For sealed concrete, refer to spec section 033000.

KEYED NOTES

1. All admin spaces off Workroom will receive resilient tile, and all support space off Workroom floor (including telephone closets) will be sealed concrete, unless stated otherwise.
2. Provide Vinyl Base on painted walls only.
3. Security Walls & Ceiling
4. In Critical Computer Rooms where it is determined to be essential, static control resilient flooring may be used only with an approved deviation.
5. If half wall, provide vinyl base, P-1 walls.
6. TKO doors to have factory finished paint.
7. P-1 is the field paint for the walls, P-2 is the accent paint to be applied to all the interior Workroom doors.
8. This refers to Satellite Break Area off the Workroom floor.
9. Resilient tile in Supervisors Office, Administrative hall, behind Full Service Counters and Mailer Training Room.
10. Wall epoxy up to ceiling height.
11. CMU walls are to be left exposed block *with4" integral epoxy base.* If gypsum wallboard is used paint P-1 to *8'-0" AFF with 4" vinyl base.*
12. Coordinate selection of the most appropriate floor mat option with the USPS Project Manager. Floor can be integrally colored concrete.
13. Ceiling to be fire rated as required.
14. Not Used
15. Ceiling height 10'-0" AFF.
16. Top of FRP 4'-0" AFF.
17. Interior face of exterior block/concrete building walls remains unfinished, if gypsum wallboard (exterior grade) is used paint P-1 to 8'-0" AFF with 4" vinyl base. Exposed roof structure to remain factory primed and roof deck exposed with no painting. Columns shall be cleaned and prime painted; paint red only where required to identify fire safety equipment. Paint column protectors and bollards red or yellow as required for safety.
18. Behind serving line (or serving/grill line) provide sealed concrete and a durable transition between concrete and resilient tile.
19. Epoxy paint shall be applied 8 feet AFF on all types of wall materials. All concrete block walls shall be sealed with block filler to full height.
20. Paint enclosed platform P-2.
21. Refer to MPF Section 099100 Painting for floor coating.
22. All walls and ceiling should be painted P-7 (black).
23. Rooms or spaces not associated with a particular prototype are assumed to be similar for all prototypes.

Appendix M1-E

ASHRAE 90.1 HVAC Minimum Efficiency Requirements

The HVAC Minimum Efficiency Requirements tables included in this Appendix are reprinted with approval from ASHRAE. For more information, visit www.ashrae.org

Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and *Condensing Units*—Minimum *Efficiency* Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
Air conditioners, air cooled	<65,000 Btu/h[b]	All	Split *system*, three phase	13.0 *SEER*	AHRI 210/240
			Single package, three phase	14 *SEER*	
Through the *wall*, air cooled	≤30,000 Btu/h[b]	All	Split *system*, three phase	12.0 *SEER*	AHRI 210/240
			Single package, three phase	12.0 *SEER*	
Small duct, high velocity, air cooled	<65,000 Btu/h[b]	All	Split *system*, three phase	11.0 *SEER*	AHRI 210/240
Air conditioners, air cooled	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)	Split *system* and single package	11.2 *EER* 12.9 *IEER*	AHRI 340/360
		All other		11.0 *EER* 12.7 *IEER*	
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)		11.0 *EER* 12.4 *IEER*	
		All other		10.8 *EER* 12.2 *IEER*	
	≥240,000 Btu/h and <760,000 Btu/h	*Electric resistance* (or none)		10.0 *EER* 11.6 *IEER*	
		All other		9.8 *EER* 11.4 *IEER*	
	≥760,000 Btu/h	*Electric resistance* (or none)		9.7 *EER* 11.2 *IEER*	
		All other		9.5 *EER* 11.0 *IEER*	
Air conditioners, water cooled	<65,000 Btu/h	All	Split *system* and single package	12.1 *EER* 12.3 *IEER*	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)		12.1 *EER* 13.9 *IEER*	AHRI 340/360
		All other		11.9 *EER* 13.7 *IEER*	
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)		12.5 *EER* 13.9 *IEER*	
		All other		12.3 *EER* 13.7 *IEER*	
	≥240,000 Btu/h and <760,000 Btu/h	*Electric resistance* (or none)		12.4 *EER* 13.6 *IEER*	
		All other		12.2 *EER* 13.4 *IEER*	
	≥760,000 Btu/h	*Electric resistance* (or none)		12.2 *EER* 13.5 *IEER*	
		All other		12.0 *EER* 13.3 *IEER*	

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Single-phase, air-cooled air conditioners <65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. *SEER* values for single-phase products are set by the U.S. Department of Energy.

Informative Note: See Informative Appendix F for the U.S. Department of Energy minimum *efficiency* requirements of single-phase air conditioners.

Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and *Condensing Units*—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
Air conditioners, evaporatively cooled	<65,000 Btu/h[b]	All	Split *system* and single package	12.1 *EER* 12.3 *IEER*	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)		12.1 *EER* 12.3 *IEER*	AHRI 340/360
		All other		11.9 *EER* 12.1 *IEER*	
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)		12.0 *EER* 12.2 IERR	
		All other		11.8 *EER* 12.0 *IEER*	
	≥240,000 Btu/h and <760,000 Btu/h	*Electric resistance* (or none)		11.9 *EER* 12.1 *IEER*	
		All other		11.7 *EER* 11.9 *IEER*	
	≥760,000 Btu/h	*Electric resistance* (or none)		11.7 *EER* 11.9 *IEER*	
		All other		11.5 *EER* 11.7 *IEER*	
Condensing units, air cooled	≥135,000 Btu/h			10.5 *EER* 11.8 *IEER*	AHRI 365
Condensing units, water cooled	≥135,000 Btu/h			13.5 *EER* 14.0 *IEER*	AHRI 365
Condensing units, evaporatively cooled	≥135,000 Btu/h			13.5 *EER* 14.0 *IEER*	AHRI 365

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Single-phase, air-cooled air conditioners <65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. *SEER* values for single-phase products are set by the U.S. Department of Energy.

Informative Note: See Informative Appendix F for the U.S. Department of Energy minimum *efficiency* requirements of single-phase air conditioners.

Table 6.8.1-2 Electrically Operated Unitary and Applied Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
Air cooled (cooling mode)	<65,000 Btu/h[b]	All	Split *system*, three phase	14 *SEER*	AHRI 210/240
			Single package, three phase	14 *SEER*	
Through the *wall*, air cooled (cooling mode)	≤30,000 Btu/h[b]	All	Split *system*, three phase	12.0 *SEER*	AHRI 210/240
			Single package, three phase	12.0 *SEER*	
Small duct, high velocity, air cooled	<65,000 Btu/h[b]	All	Split *System*, three phase	11.0 *SEER*	AHRI 210/240
Air cooled (cooling mode)	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)	Split *system* and single package	11.0 *EER* 12.2 *IEER*	AHRI 340/360
		All other		10.8 *EER* 12.0 *IEER*	
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)		10.6 *EER* 11.6 *IEER*	
		All other		10.4 *EER* 11.4 *IEER*	
	≥240,000 Btu/h	*Electric resistance* (or none)		9.5 *EER* 10.6 *IEER*	
		All other		9.3 *EER* 10.4 *IEER*	
Water to air, water loop (cooling mode)	<17,000 Btu/h	All	86°F entering water	12.2 *EER*	ISO 13256-1
	≥17,000 Btu/h and <65,000 Btu/h			13.0 *EER*	
	≥65,000 Btu/h and <135,000 Btu/h			13.0 *EER*	
Water to air, groundwater (cooling mode)	<135,000 Btu/h	All	59°F entering water	18.0 *EER*	ISO 13256-1
Brine to air, ground loop (cooling mode)	<135,000 Btu/h	All	77°F entering water	14.1 *EER*	ISO 13256-1
Water to water, water loop (cooling mode)	<135,000 Btu/h	All	86°F entering water	10.6 *EER*	ISO 13256-2
Water to water, groundwater (cooling mode)	<135,000 Btu/h	All	59°F entering water	16.3 *EER*	ISO 13256-2
Brine to water, ground loop (cooling mode)	<135,000 Btu/h	All	77°F entering water	12.1 *EER*	ISO 13256-2
Air cooled (heating mode)	<65,000 Btu/h[b] (cooling capacity)		Split *system*, three phase	8.2 *HSPF*	AHRI 210/240
			Single package, three phase	8.0 *HSPF*	
Through the *wall*, air cooled (heating mode)	≤30,000 Btu/h[b] (cooling capacity)		Split *system*, three phase	7.4 *HSPF*	AHRI 210/240
			Single package, three phase	7.4 *HSPF*	
Small duct high velocity, air cooled (heating mode)	<65,000 Btu/h[b]		Split *system*, three phase	6.8 *HSPF*	AHRI 210/240

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Single-phase, air-cooled heat pumps <65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. *SEER* and *HSPF* values for single-phase products are set by the U.S. Department of Energy.

Informative Note: See Informative Appendix F for the U.S. Department of Energy minimum.

Table 6.8.1-2 Electrically Operated Unitary and Applied Heat Pumps—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
Air cooled (heating mode)	≥65,000 Btu/*hc* and <135,000 Btu/h (cooling capacity)		47°F db/43°F wb *outdoor air*	3.3 COP_H	AHRI 340/360
			17°F db/15°F wb *outdoor air*	2.25 COP_H	
	≥135,000 Btu/*hc* (cooling capacity)		47°F db/43°F wb *outdoor air*	3.2 COP_H	
			17°F db/15°F wb *outdoor air*	2.05 COP_H	
Water to air, water loop (heating mode)	<135,000 Btu/h (cooling capacity)		68°F entering water	4.3 COP_H	ISO 13256-1
Water to air, groundwater (heating mode)	<135,000 Btu/h (cooling capacity)		50°F entering water	3.7 COP_H	ISO 13256-1
Brine to air, ground loop (heating mode)	<135,000 Btu/h (cooling capacity)		32°F entering fluid	3.2 COP_H	ISO 13256-1
Water to water, water loop (heating mode)	<135,000 Btu/h (cooling capacity)		68°F entering water	3.7 COP_H	ISO 13256-2
Water to water, groundwater (heating mode)	<135,000 Btu/h (cooling capacity)		50°F entering water	3.1 COP_H	ISO 13256-2
Brine to water, ground loop (heating mode)	<135,000 Btu/h (cooling capacity)		32°F entering fluid	2.5 COP_H	ISO 13256-2

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Single-phase, air-cooled heat pumps <65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. *SEER* and *HSPF* values for single-phase products are set by the U.S. Department of Energy.

Informative Note: See Informative Appendix F for the U.S. Department of Energy minimum.

Table 6.8.1-3 Water-Chilling Packages—Minimum *Efficiency* Requirements[a,b,e]

Equipment Type	Size Category	Units	Path A	Path B	Test Procedure[c]
Air-cooled chillers	<150 tons	*EER* (Btu/Wh)	≥10.100 FL	≥9.700 FL	AHRI 550/590
			≥13.700 *IPLV*.IP	≥15.800 *IPLV*.IP	
	≥150 tons		≥10.100 FL	≥9.700 FL	
			≥14.000 *IPLV*.IP	≥16.100 *IPLV*.IP	
Air-cooled without condenser, electrically operated	All capacities	*EER* (Btu/Wh)	Air-cooled chillers without condenser must be rated with matching condensers and comply with air-cooled chiller *efficiency* requirements		AHRI 550/590
Water-cooled, electrically operated positive displacement	<75 tons	*kW*/ton	≤0.750 FL	≤0.780 FL	AHRI 550/590
			≤0.600 *IPLV*.IP	≤0.500 *IPLV*.IP	
	≥75 tons and <150 tons		≤0.720 FL	≤0.750 FL	
			≤0.560 *IPLV*.IP	≤0.490 *IPLV*.IP	
	≥150 tons and <300 tons		≤0.660 FL	≤0.680 FL	
			≤0.540 *IPLV*.IP	≤0.440 *IPLV*.IP	
	≥300 tons and <600 tons		≤0.610 FL	≤0.625 FL	
			≤0.520 *IPLV*.IP	≤0.410 *IPLV*.IP	
	≥600 tons		≤0.560 FL	≤0.585 FL	
			≤0.500 *IPLV*.IP	≤0.380 *IPLV*.IP	
Water cooled, electrically operated centrifugal	<150 tons	*kW*/ton	≤0.610 FL	≤0.695 FL	AHRI 550/590
			≤0.550 *IPLV*.IP	≤0.440 *IPLV*.IP	
	≥150 tons and <300 tons		≤0.610 FL	≤0.635 FL	
			≤0.550 *IPLV*.IP	≤0.400 *IPLV*.IP	
	≥300 tons and <400 tons		≤0.560 FL	≤0.595 FL	
			≤0.520 *IPLV*.IP	≤0.390 *IPLV*.IP	
	≥400 tons and <600 tons		≤0.560 FL	≤0.585 FL	
			≤0.500 *IPLV*.IP	≤0.380 *IPLV*.IP	
	≥600 tons		≤0.560 FL	≤0.585 FL	
			≤0.500 *IPLV*.IP	≤0.380 *IPLV*.IP	
Air-cooled absorption, single effect	All capacities	*COP* (W/W)	≥0.600 FL	NA[d]	AHRI 560
Water-cooled absorption, single effect	All capacities	*COP* (W/W)	≥0.700 FL	NA[d]	AHRI 560
Absorption double effect, indirect fired	All capacities	*COP* (W/W)	≥1.000 FL	NA[d]	AHRI 560
			≥1.050 *IPLV*.IP		
Absorption double effect, direct fired	All capacities	*COP* (W/W)	≥1.000 FL	NA[d]	AHRI 560
			≥1.000 *IPLV*		

a. The requirements for centrifugal chillers shall be adjusted for nonstandard rating conditions per Section 6.4.1.2.1 and are only applicable for the range of conditions listed there. The requirements for air-cooled, water-cooled positive displacement and absorption chillers are at standard rating conditions defined in the reference test procedure.
b. Both the full-load and *IPLV*.IP requirements must be met or exceeded to comply with this standard. When there is a Path B, compliance can be with either Path A or Path B for any application.
c. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
d. NA means the requirements are not applicable for Path B, and only Path A can be used for compliance.
e. FL is the full-load performance requirements, and *IPLV*.IP is for the part-load performance requirements.

Table 6.8.1-4 Electrically Operated *Packaged Terminal Air Conditioners*, *Packaged Terminal Heat Pumps*, *Single-Package Vertical Air Conditioners*, *Single-Package Vertical Heat Pumps*, *Room Air Conditioners*, and Room Air Conditioner Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
PTAC (cooling mode) standard size	All capacities	95°F db *outdoor air*	13.8 – (0.300 × Cap/1000)[c] (before 1/1/2015) 14.0 – (0.300 × Cap/1000)[c] (as of 1/1/2015)	AHRI 310/380
PTAC (cooling mode) nonstandard size[a]	All capacities	95°F db *outdoor air*	10.9 – (0.213 × Cap/1000)[c] *EER*	AHRI 310/380
PTHP (cooling mode) standard size	All capacities	95°F db *outdoor air*	14.0 – (0.300 × Cap/1000)[c]	AHRI 310/380
PTHP (cooling mode) nonstandard size[b]	All capacities	95°F db *outdoor air*	10.8 – (0.213 × Cap/1000)[c] *EER*	AHRI 310/380
PTHP (heating mode) standard size	All capacities		3.7 – (0.052 × Cap/1000)[c] COP_H	AHRI 310/380
PTHP (heating mode) nonstandard size[b]	All capacities		2.9 – (0.026 × Cap/1000)[c] COP_H	AHRI 310/380
SPVAC (cooling mode)	<65,000 Btu/h	95°F db/75°F wb *outdoor air*	10.0 *EER*	AHRI 390
	≥65,000 Btu/h and <135,000 Btu/h		10.0 *EER*	
	≥135,000 Btu/h and <240,000 Btu/h		10.0 *EER*	
SPVHP (cooling mode)	<65,000 Btu/h	95°F db/75°F wb *outdoor air*	10.0 *EER*	AHRI 390
	≥65,000 Btu/h and <135,000 Btu/h		10.0 *EER*	
	≥135,000 Btu/h and <240,000 Btu/h		10.0 *EER*	
SPVHP (heating mode)	<65,000 Btu/h	47°F db/43°F wb *outdoor air*	3.0 COP_H	AHRI 390
	≥65,000 Btu/h and <135,000 Btu/h		3.0 COP_H	
	≥135,000 Btu/h and <240,000 Btu/h		3.0 COP_H	
Room air conditioners with louvered sides	<6000 Btu/h		9.7 *SEER*	ANSI/AHAM RAC-1
	≥6000 Btu/h and <8000 Btu/h		9.7 *SEER*	
	≥8000 Btu/h and <14,000 Btu/h		9.8 *EER*	
	≥14,000 Btu/h and <20,000 Btu/h		9.7 *SEER*	
	≥20,000 Btu/h		8.5 *EER*	
SPVAC (cooling mode), nonweatherized *space* constrained	≤30,000 Btu/h	95°F db/75°F wb *outdoor air*	9.2 *EER*	AHRI 390
	>30,000 Btu/h and≤36,000 Btu/h		9.0 *EER*	
SPVHP (cooling mode), nonweatherized *space* constrained	≤30,000 Btu/h	95°F db/75°F wb *outdoor air*	9.2 *EER*	AHRI 390
	>30,000 Btu/h and ≤36,000 Btu/h		9.0 *EER*	

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Nonstandard size units must be factory *labeled* as follows: "MANUFACTURED FOR NONSTANDARD SIZE APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW STANDARD PROJECTS." Nonstandard size efficiencies apply only to units being installed in existing sleeves having an external *wall* opening of less than 16 in. high or less than 42 in. wide and having a cross-sectional area less than 670 $in.^2$.

c. "Cap" means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h, use 7000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

Table 6.8.1-4 Electrically Operated *Packaged Terminal Air Conditioners*, *Packaged Terminal Heat Pumps*, *Single-Package Vertical Air Conditioners*, *Single-Package Vertical Heat Pumps*, *Room Air Conditioners*, and Room Air Conditioner Heat Pumps—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
SPVHP (heating mode), nonweatherized *space* constrained<	≤30,000 Btu/h	47°F db/43°F wb *outdoor air*	3.0 COP_H	AHRI 390
	>30,000 Btu/h and ≤36,000 Btu/h		3.0 COP_H	
Room air conditioners without louvered sides	<8000 Btu/h		9.0 *EER*	ANSI/AHAM RAC-1
	≥8000 Btu/h and <20,000 Btu/h		8.5 *EER*	
	≥20,000 Btu/h		8.5 *EER*	
Room air conditioner heat pumps with louvered sides	<20,000 Btu/h		9.0 *EER*	ANSI/AHAM RAC-1
	≥20,000 Btu/h		8.5 *EER*	
Room air conditioner heat pumps without louvered sides	<14,000 Btu/h		8.5 *EER*	ANSI/AHAM RAC-1
	≥14,000 Btu/h		8.0 *EER*	
Room air conditioner, casement only	All capacities		8.7 *EER*	ANSI/AHAM RAC-1
Room air conditioner, casement slider	All capacities		9.5 *EER*	ANSI/AHAM RAC-1

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Nonstandard size units must be factory *labeled* as follows: "MANUFACTURED FOR NONSTANDARD SIZE APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW STANDARD PROJECTS." Nonstandard size efficiencies apply only to units being installed in existing sleeves having an external *wall* opening of less than 16 in. high or less than 42 in. wide and having a cross-sectional area less than 670 $in.^2$.
c. "Cap" means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h, use 7000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

Table 6.8.1-5 Warm-Air Furnaces and Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces, and Unit Heaters—Minimum *Efficiency* Requirements

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure[a]
Warm-air furnace, gas fired	<225,000 Btu/h	Maximum capacity[c]	78% *AFUE* or 80% E_t[b,d]	DOE 10 CFR Part 430 or Section 2.39, Thermal *Efficiency*, ANSI Z21.47
	≥225,000 Btu/h		80% E_t[d]	Section 2.39, Thermal *Efficiency*, ANSI Z21.47
Warm-air furnace, oil fired	<225,000 Btu/h	Maximum capacity[c]	78% *AFUE* or 80% E_t[b,d]	DOE 10 CFR Part 430 or Section 42, Combustion, UL 727
	≥225,000 Btu/h		81% E_t[d]	Section 42, Combustion, UL 727
Warm-air duct furnaces, gas fired	All capacities	Maximum capacity[c]	80% E_c[e]	Section 2.10, *Efficiency*, ANSI Z83.8
Warm-air unit heaters, gas fired	All capacities	Maximum capacity[c]	80% E_c[e,f]	Section 2.10, *Efficiency*, ANSI Z83.8
Warm-air unit heaters, oil fired	All capacities	Maximum capacity[c]	80% E_c[e,f]	Section 40, Combustion, UL 731

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Combination units not covered by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430 (three-phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating.
c. Compliance of multiple firing rate units shall be at the maximum firing rate.
d. E_t = thermal *efficiency*. Units must also include an interrupted or intermittent ignition device (IID), have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a *flue damper*. A *vent damper* is an acceptable alternative to a *flue damper* for those furnaces where combustion air is drawn from the *conditioned space*.
e. E_c = combustion *efficiency* (100% less flue losses). See test procedure for detailed discussion.
f. As of August 8, 2008, according to the *Energy* Policy Act of 2005, units must also include an interrupted or intermittent ignition device (IID) and have either power venting or an *automatic flue damper*.

Table 6.8.1-6 Gas- and Oil-Fired *Boilers*—Minimum *Efficiency* Requirements

Equipment Type[a]	Subcategory or Rating Condition	Size Category (Input)	Minimum *Efficiency*	*Efficiency* as of 3/2/2020	Test Procedure
Boilers, hot water	Gas fired	<300,000 Btu/h[f,g]	82% *AFUE*	82% *AFUE*	10 CFR Part 430
		≥300,000 Btu/h and ≤2,500,000 Btu/h[d]	80% E_t	80% E_t	10 CFR Part 431
		>2,500,000 Btu/h[a]	82% E_c	82% E_c	
	Oil fired[e]	<300,000 Btu/h[g]	84% *AFUE*	84% *AFUE*	10 CFR Part 430
		≥300,000 Btu/h and ≤2,500,000 Btu/h[d]	82% E_t	82% E_t	10 CFR Part 431
		>2,500,000 Btu/h[a]	84% E_c	84% E_c	
Boilers, steam	Gas fired	<300,000 Btu/h[f]	80% *AFUE*	80% *AFUE*	10 CFR Part 430
	Gas fired—all, except natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h[d]	79% E_t	79% E_t	10 CFR Part 431
		>2,500,000 Btu/h[a]	79% E_t	79% E_t	
	Gas fired—natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h[d]	77% E_t	79% E_t	
		>2,500,000 Btu/h[a]	77% E_t	79% E_t	
	Oil fired[e]	<300,000 Btu/h	82% *AFUE*	82% *AFUE*	10 CFR Part 430
		≥300,000 Btu/h and ≤2,500,000 Btu/h[d]	81% E_t	81% E_t	10 CFR Part 431
		>2,500,000 Btu/h[a]	81% E_t	81% E_t	

a. These requirements apply to *boilers* with rated input of 8,000,000 Btu/h or less that are not packaged *boilers* and to all packaged *boilers*. Minimum *efficiency* requirements for *boilers* cover all capacities of packaged *boilers*.
b. E_c = combustion *efficiency* (100% less flue losses). See reference document for detailed information.
c. E_t = thermal *efficiency*. See reference document for detailed information.
d. Maximum capacity—minimum and maximum ratings as provided for and allowed by the unit's *controls*.
e. Includes oil-fired (residual).
f. *Boilers* shall not be equipped with a constant burning pilot light.
g. A *boiler* not equipped with a tankless domestic water-heating coil shall be equipped with an *automatic* means for adjusting the temperature of the water such that an incremental change in inferred heat load produces a corresponding incremental change in the temperature of the water supplied.

Table 6.8.1-7 Performance Requirements for Heat Rejection *Equipment*—Minimum *Efficiency* Requirements

Equipment Type	Total *System* Heat-Rejection Capacity at Rated Conditions	Subcategory or Rating Condition[h]	Performance Required[a,b,c,f,g]	Test Procedure[d,e]
Propeller or axial fan open-circuit cooling towers	All	95°F entering water 85°F leaving water 75°F entering wb	≥40.2 gpm/hp	CTI ATC-105 and CTI STD-201 RS
Centrifugal fan open-circuit cooling towers	All	95°F entering water 85°F leaving water 75°F entering wb	≥20.0 gpm/hp	CTI ATC-105 and CTI STD-201 RS
Propeller or axial fan closed-circuit cooling towers	All	102°F entering water 90°F leaving water 75°F entering wb	≥16.1 gpm/hp	CTI ATC-105S and CTI STD-201 RS
Centrifugal closed-circuit cooling towers	All	102°F entering water 90°F leaving water 75°F entering wb	≥7.0 gpm/hp	CTI ATC-105S and CTI STD-201 RS
Propeller or axial fan evaporative condensers	All	R-507A test fluid 165°F entering gas temperature 105°F condensing temperature 75°F entering wb	≥157,000 Btu/h·hp	CTI ATC-106
Propeller or axial fan evaporative condensers	All	Ammonia test fluid 140°F entering gas temperature 96.3°F condensing temperature 75°F entering wb	≥134,000 Btu/h·hp	CTI ATC-106
Centrifugal fan evaporative condensers	All	R-507A test fluid 165°F entering gas temperature 105°F condensing temperature 75°F entering wb	≥135,000 Btu/h·hp	CTI ATC-106
Centrifugal fan evaporative condensers	All	Ammonia test fluid 140°F entering gas temperature 96.3°F condensing temperature 75°F entering wb	≥110,000 Btu/h·hp	CTI ATC-106
Air cooled condensers	All	125°F condensing temperature 190°F entering gas temperature 15°F subcooling 95°F entering db	≥176,000 Btu/h·hp	AHRI 460

a. For purposes of this table, open-circuit cooling tower performance is defined as the water flow rating of the tower at the thermal rating condition listed in Table 6.8.1-7 divided by the fan motor nameplate power.
b. For purposes of this table, closed-circuit cooling tower performance is defined as the process water flow rating of the tower at the thermal rating condition listed in Table 6.8.1-7 divided by the sum of the fan motor nameplate power and the integral spray pump motor nameplate power.
c. For purposes of this table, air-cooled condenser performance is defined as the heat rejected from the refrigerant divided by the fan motor nameplate power.
d. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
e. The efficiencies and test procedures for both open- and closed-circuit cooling towers are not applicable to hybrid cooling towers that contain a combination of separate wet and dry heat exchange sections. The certification requirements do not apply to field-erected cooling towers.
f. All cooling towers shall comply with the minimum *efficiency* listed in the table for that specific type of tower with the capacity effect of any project-specific accessories and/or options included in the capacity of the cooling tower.
g. For purposes of this table, evaporative condenser performance is defined as the heat rejected at the specified rating condition in the table, divided by the sum of the fan motor nameplate power and the integral spray pump nameplate power.
h. Requirements for evaporative condensers are listed with ammonia (R-717) and R-507A as test fluids in the table. Evaporative condensers intended for use with halocarbon refrigerants other than R-507A must meet the minimum *efficiency* requirements listed above with R-507A as the test fluid.

Table 6.8.1-8 Heat Transfer *Equipment*—Minimum *Efficiency* Requirements

Equipment Type	Subcategory	Minimum Efficiency[a]	Test Procedure[b]
Liquid-to-liquid heat exchangers	Plate type	NR	AHRI 400

a. NR = no requirement
b. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow Air Conditioners—Minimum *Efficiency* Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
VRF air conditioners, air cooled	<65,000 Btu/h	All	*VRF* multisplit *system*	13.0 *SEER*	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	11.2 *EER* 13.1 *IEER* (before 1/1/2017) 15.5 *IEER* (as of 1/1/2017)	
	≥135,000 Btu/h and <240,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	11.0 *EER* 12.9 *IEER* (before 1/1/2017) 14.9 *IEER* (as of 1/1/2017)	
	≥240,000 Btu/h	*Electric resistance* (or none)	*VRF* multisplit *system*	10.0 *EER* 11.6 *IEER* (before 1/1/2017) 13.9 *IEER* (as of 1/1/2017)	

Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
VRF air cooled (cooling mode)	<65,000 Btu/h	All	*VRF* multisplit *system*	13.0 *SEER*	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	*Electric resistance* (or none)		11.0 *EER* 12.9 *IEER* (before 1/1/2017) 14.6 *IEER* (as of 1/1/2017)	
			VRF multisplit *system* with heat recovery	10.8 *EER* 12.7 *IEER* (before 1/1/2017) 14.4 *IEER* (as of 1/1/2017)	
	≥135,000 Btu/h and <240,000 Btu/h		*VRF* multisplit *system*	10.6 *EER* 12.3 *IEER* (before 1/1/2017) 13.9 *IEER* (as of 1/1/2017)	
			VRF multisplit *system* with heat recovery	10.4 *EER* 12.1 *IEER* (before 1/1/2017) 13.7 *IEER* (as of 1/1/2017)	
	≥240,000 Btu/h		*VRF* multisplit *system*	9.5 *EER* 11.0 *IEER* (before 1/1/2017) 12.7 *IEER* (as of 1/1/2017)	
			VRF multisplit *system* with heat recovery	9.3 *EER* 10.8 *IEER* (before 1/1/2017) 12.5 *IEER* (as of 1/1/2017)	

Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
VRF water source (cooling mode)	<65,000 Btu/h	All	*VRF* multisplit *systems* 86°F entering water	12.0 *EER* 16.0 *IEER* (as of 1/1/2018)	AHRI 1230
			VRF multisplit *systems* with heat recovery 86°F entering water	11.8 *EER* 15.8 *IEER* (as of 1/1/2018)	
	≥65,000 Btu/h and <135,000 Btu/h		*VRF* multisplit *system* 86°F entering water	12.0 *EER* 16.0 *IEER* (as of 1/1/2018)	
			VRF multisplit *system* with heat recovery 86°F entering water	11.8 *EER* 15.8 *IEER* (as of 1/1/2018)	
	≥135,000 Btu/h and <240,000 Btu/h		*VRF* multisplit *system* 86°F entering water	10.0 *EER* 14.0 *IEER* (as of 1/1/2018)	
			VRF multisplit *system* with heat recovery 86°F entering water	9.8 *EER* 13.8 *IEER* (as of 1/1/2018)	
	≥240,000 Btu/h		*VRF* multisplit *system* 86°F entering water	10.0 *EER* (before 1/1/2018) 12.0 *IEER* (as of 1/1/2018)	
			VRF multisplit *system* with heat recovery 86°F entering water	9.8 *EER* (before 1/1/2018) 11.8 *IEER* (as of 1/1/2018)	
VRF groundwater source (cooling mode)	<135,000 Btu/h	All	*VRF* multisplit *system* with heat recovery 59°F entering water	16.2 *EER*	AHRI 1230
			VRF multisplit *system* with heat recovery 59°F entering water	16.0 *EER*	
	≥135,000 Btu/h		*VRF* multisplit *system* with heat recovery 59°F entering water	13.8 *EER*	
			VRF multisplit *system* with heat recovery 59°F entering water	13.6 *EER*	
VRF ground source (cooling mode)	<135,000 Btu/h	All	*VRF* multisplit *system* 77°F entering water	13.4 *EER*	AHRI 1230
			VRF multisplit *system* with heat recovery 77°F entering water	13.2 *EER*	
	≥135,000 Btu/h		*VRF* multisplit *system* 77°F entering water	11.0 *EER*	
			VRF multisplit *system* with heat recovery 77°F entering water	10.8 *EER*	

Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
VRF air cooled (heating mode)	<65,000 Btu/h (cooling capacity)		*VRF* multisplit *system*	7.7 *HSPF*	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 47°F db/43°F wb *outdoor air*	3.3 COP_H	
			17°F db/15°F wb *outdoor air*	2.25 COP_H	
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 47°F db/43°F wb *outdoor air*	3.2 COP_H	
			17°F db/15°F wb *outdoor air*	2.05 COP_H	
VRF water source (heating mode)	<65,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	4.2 COP_H (before 1/1/2018) 4.3 COP_H (as of 1/1/2018)	
	≥135,000 Btu/h and <240,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	3.9 COP_H (before 1/1/2018) 4.0 COP_H (as of 1/1/2018)	
	≥240,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 68°F entering water	3.9 COP_H	
VRF groundwater source (heating mode)	<135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 50°F entering water	3.6 COP_H	AHRI 1230
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 50°F entering water	3.3 COP_H	
VRF ground source (heating mode)	<135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 32°F entering water	3.1 COP_H	AHRI 1230
	≥135,000 Btu/h (cooling capacity)		*VRF* multisplit *system* 32°F entering water	2.8 COP_H	

Table 6.8.1-11 Air Conditioners and *Condensing Units* Serving *Computer Rooms*—Minimum *Efficiency* Requirements

Equipment Type	Net Sensible Cooling Capacity	Standard Model	Minimum Net Sensible COP_C			Test Procedure
			Return Air Dry-Bulb Temperature/ Dew-Point Temperature			
			Class 1	Class 2	Class 3	
			75°F/52°F	85°F/52°F	95°F/52°F	
Air cooled	<65,000 Btu/h	Downflow unit		2.30		AHRI 1360
		Upflow unit—ducted		2.10		
		Upflow unit—nonducted	2.09			
		Horizontal-flow unit			2.45	
	≥65,000 and <240,000 Btu/h	Downflow unit		2.20		
		Upflow unit—ducted		2.05		
		Upflow unit—nonducted	1.99			
		Horizontal-flow unit			2.35	
	≥240,000 Btu/h	Downflow unit		2.00		
		Upflow unit—ducted		1.85		
		Upflow unit—nonducted	1.79			
		Horizontal-flow unit			2.15	
Water cooled	<65,000 Btu/h	Downflow unit		2.50		AHRI 1360
		Upflow unit—ducted		2.30		
		Upflow unit—nonducted	2.25			
		Horizontal-flow unit			2.70	
	≥65,000 and <240,000 Btu/h	Downflow unit		2.40		
		Upflow unit—ducted		2.20		
		Upflow unit—nonducted	2.15			
		Horizontal-flow unit			2.60	
	≥240,000 Btu/h	Downflow unit		2.25		
		Upflow unit—ducted		2.10		
		Upflow unit—nonducted	2.05			
		Horizontal-flow unit			2.45	
Water cooled with *fluid economizer*	<65,000 Btu/h	Downflow unit		2.45		AHRI 1360
		Upflow unit—ducted		2.25		
		Upflow unit—nonducted	2.20			
		Horizontal-flow unit			2.60	
	≥65,000 and <240,000 Btu/h	Downflow unit		2.35		
		Upflow unit—ducted		2.15		
		Upflow unit—nonducted	2.10			
		Horizontal-flow unit			2.55	
	≥240,000 Btu/h	Downflow unit		2.20		
		Upflow unit—ducted		2.05		
		Upflow unit—nonducted	2.00			
		Horizontal-flow unit			2.40	

Table 6.8.1-11 Air Conditioners and *Condensing Units* Serving *Computer Rooms*—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type	Net Sensible Cooling Capacity	Standard Model	Minimum Net Sensible COP_C			Test Procedure
			Return Air Dry-Bulb Temperature/ Dew-Point Temperature			
			Class 1	Class 2	Class 3	
			75°F/52°F	85°F/52°F	95°F/52°F	
Glycol cooled	<65,000 Btu/h	Downflow unit		2.30		AHRI 1360
		Upflow unit—ducted		2.10		
		Upflow unit—nonducted	2.00			
		Horizontal-flow unit			2.40	
	≥65,000 and <240,000 Btu/h	Downflow unit		2.05		
		Upflow unit—ducted		1.85		
		Upflow unit—nonducted	1.85			
		Horizontal-flow unit			2.15	
	≥240,000 Btu/h	Downflow unit		1.95		
		Upflow unit—ducted		1.80		
		Upflow unit—nonducted	1.75			
		Horizontal-flow unit			2.10	
Glycol cooled with *fluid economizer*	<65,000 Btu/h	Downflow unit		2.25		AHRI 1360
		Upflow unit—ducted		2.10		
		Upflow unit—nonducted	2.00			
		Horizontal-flow unit			2.35	
	≥65,000 and <240,000 Btu/h	Downflow unit		1.95		
		Upflow unit—ducted		1.80		
		Upflow unit—nonducted	1.75			
		Horizontal-flow unit			2.10	
	≥240,000 Btu/h	Downflow unit		1.90		
		Upflow unit—ducted		1.80		
		Upflow unit—nonducted	1.70			
		Horizontal-flow unit			2.10	

Table 6.8.1-12 Commercial Refrigerator and Freezers—Minimum *Efficiency* Requirements

Equipment Type	Application	*Energy* Use Limits, kWh/day	Test Procedure
Refrigerator with solid *doors*	Holding temperature	0.10 × *V* + 2.04	AHRI 1200
Refrigerator with transparent *doors*	Holding temperature	0.12 × *V* + 3.34	AHRI 1200
Freezers with solid *doors*	Holding temperature	0.40 × *V* + 1.38	AHRI 1200
Freezers with transparent *doors*	Holding temperature	0.75 × *V* + 4.10	AHRI 1200
Refrigerators/freezers with solid *doors*	Holding temperature	the greater of 0.12 × *V* + 3.34 or 0.70	AHRI 1200
Commercial refrigerators	Pulldown	0.126 × *V* + 3.51	AHRI 1200

V = the chiller or frozen compartment volume (ft^3) as defined in Association of Home Appliance Manufacturers Standard HRF-1.

Table 6.8.1-13 Commercial Refrigeration—Minimum *Efficiency* Requirements

Equipment Type					
Equipment Class[a]	Family Code	Operating Mode	Rating Temperature	*Energy* Use Limits[b,c], kWh/day	Test Procedure
VOP.RC.M	Vertical open	Remote condensing	Medium temperature	0.82 × TDA + 4.07	AHRI 1200
SVO.RC.M	Semivertical open	Remote condensing	Medium temperature	0.83 × TDA + 3.18	AHRI 1200
HZO.RC.M	Horizontal open	Remote condensing	Medium temperature	0.35 × TDA + 2.88	AHRI 1200
VOP.RC.L	Vertical open	Remote condensing	Low temperature	2.27 × TDA + 6.85	AHRI 1200
HZO.RC.L	Horizontal open	Remote condensing	Low temperature	0.57 × TDA + 6.88	AHRI 1200
VCT.RC.M	Vertical transparent *door*	Remote condensing	Medium temperature	0.22 × TDA + 1.95	AHRI 1200
VCT.RC.L	Vertical transparent *door*	Remote condensing	Low temperature	0.56 × TDA + 2.61	AHRI 1200
SOC.RC.M	*Service* over counter	Remote condensing	Medium temperature	0.51 × TDA + 0.11	AHRI 1200
VOP.*SC*.M	Vertical open	Self contained	Medium temperature	1.74 × TDA + 4.71	AHRI 1200
SVO.*SC*.M	Semivertical open	Self contained	Medium temperature	1.73 × TDA + 4.59	AHRI 1200
HZO.*SC*.M	Horizontal open	Self contained	Medium temperature	0.77 × TDA + 5.55	AHRI 1200
HZO.*SC*.L	Horizontal open	Self contained	Low temperature	1.92 × TDA + 7.08	AHRI 1200
VCT.*SC*.I	Vertical transparent *door*	Self contained	Ice cream	0.67 × TDA + 3.29	AHRI 1200
VCS.*SC*.I	Vertical solid *door*	Self contained	Ice cream	0.38 × *V* + 0.88	AHRI 1200
HCT.*SC*.I	Horizontal transparent *door*	Self contained	Ice cream	0.56 × TDA + 0.43	AHRI 1200
SVO.RC.L	Semivertical open	Remote condensing	Low temperature	2.27 × TDA + 6.85	AHRI 1200
VOP.RC.I	Vertical open	Remote condensing	Ice cream	2.89 × TDA + 8.7	AHRI 1200
SVO.RC.I	Semivertical open	Remote condensing	Ice cream	2.89 × TDA + 8.7	AHRI 1200
HZO.RC.I	Horizontal open	Remote condensing	Ice cream	0.72 × TDA + 8.74	AHRI 1200
VCT.RC.I	Vertical transparent *door*	Remote condensing	Ice cream	0.66 × TDA + 3.05	AHRI 1200
HCT.RC.M	Horizontal transparent *door*	Remote condensing	Medium temperature	0.16 × TDA + 0.13	AHRI 1200

a. *Equipment* class designations consist of a combination (in sequential order separated by periods (AAA).(BB).(C)) of the following: (AAA)—An *equipment* family code (VOP = vertical open, SVO = semivertical open, HZO = horizontal open, VCT = vertical transparent *doors*, VCS = vertical solid *doors*, HCT = horizontal transparent *doors*, HCS = horizontal solid *doors*, and SOC = *service* over counter); (BB)—An operating mode code (RC = remote condensing and *SC* = self contained); and (C)—A rating temperature code (M = medium temperature [38°F], L = low temperature [0°F], or I = ice cream temperature [15°F]). For example, "VOP.RC.M" refers to the "vertical open, remote condensing, medium temperature" *equipment* class.
b. *V* is the volume of the case (ft) as measured in AHRI Standard 1200, Appendix C.
c. TDA is the total display area of the case (ft) as measured in AHRI Standard 1200, Appendix D.

Table 6.8.1-13 Commercial Refrigeration—Minimum *Efficiency* Requirements *(Continued)*

Equipment Type					
***Equipment* Class**[a]	**Family Code**	**Operating Mode**	**Rating Temperature**	***Energy* Use Limits**[b,c]**, kWh/day**	**Test Procedure**
HCT.RC.L	Horizontal transparent *door*	Remote condensing	Low temperature	0.34 × TDA + 0.26	AHRI 1200
HCT.RC.I	Horizontal transparent *door*	Remote condensing	Ice cream	0.4 × TDA + 0.31	AHRI 1200
VCS.RC.M	Vertical solid *door*	Remote condensing	Medium temperature	0.11 × *V* + 0.26	AHRI 1200
VCS.RC.L	Vertical solid *door*	Remote condensing	Low temperature	0.23 × *V* + 0.54	AHRI 1200
VCS.RC.I	Vertical solid *door*	Remote condensing	Ice cream	0.27 × *V* + 0.63	AHRI 1200
HCS.RC.M	Horizontal solid *door*	Remote condensing	Medium temperature	0.11 × *V* + 0.26	AHRI 1200
HCS.RC.L	Horizontal solid *door*	Remote condensing	Low temperature	0.23 × *V* + 0.54	AHRI 1200
HCS.RC.I	Horizontal solid *door*	Remote condensing	Ice cream	0.27 × *V* + 0.63	AHRI 1200
HCS.RC.I	Horizontal solid *door*	Remote condensing	Ice cream	0.27 × *V* + 0.63	AHRI 1200
SOC.RC.L	*Service* over counter	Remote condensing	Low temperature	1.08 × TDA + 0.22	AHRI 1200
SOC.RC.I	*Service* over counter	Remote condensing	Ice cream	1.26 × TDA + 0.26	AHRI 1200
VOP.*SC*.L	Vertical open	Self contained	Low temperature	4.37 × TDA + 11.82	AHRI 1200
VOP.*SC*.I	Vertical open	Self contained	Ice cream	5.55 × TDA + 15.02	AHRI 1200
SVO.*SC*.L	Semivertical open	Self contained	Low temperature	4.34 × TDA + 11.51	AHRI 1200
SVO.*SC*.I	Semivertical open	Self contained	Ice cream	5.52 × TDA + 14.63	AHRI 1200
HZO.*SC*.I	Horizontal open	Self contained	Ice cream	2.44 × TDA + 9.0	AHRI 1200
SOC.*SC*.I	*Service* over counter	Self contained	Ice cream	1.76 × TDA + 0.36	AHRI 1200
HCS.*SC*.I	Horizontal solid *door*	Self contained	Ice cream	0.38 × *V* + 0.88	AHRI 1200

a. *Equipment* class designations consist of a combination (in sequential order separated by periods (AAA).(BB).(C)) of the following: (AAA)—An *equipment* family code (VOP = vertical open, SVO = semivertical open, HZO = horizontal open, VCT = vertical transparent *doors*, VCS = vertical solid *doors*, HCT = horizontal transparent *doors*, HCS = horizontal solid *doors*, and SOC = *service* over counter); (BB)—An operating mode code (RC = remote condensing and *SC* = self contained); and (C)—A rating temperature code (M = medium temperature [38°F], L = low temperature [0°F], or I = ice cream temperature [15°F]). For example, "VOP.RC.M" refers to the "vertical open, remote condensing, medium temperature" *equipment* class.

b. *V* is the volume of the case (ft) as measured in AHRI Standard 1200, Appendix C.

c. TDA is the total display area of the case (ft) as measured in AHRI Standard 1200, Appendix D.

Table 6.8.1-14 Vapor Compression Based *Indoor Pool Dehumidifiers*—Minimum *Efficiency* Requirements

Equipment Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
Single package indoor[a] (with or without economizer)	Rating Conditions: A, B, or C	3.5 *MRE*	AHRI 910
Single package indoor water-cooled (with or without economizer)		3.5 *MRE*	
Single package indoor air-cooled (with or without economizer)		3.5 *MRE*	
Split *system* indoor air-cooled (with or without economizer)		3.5 *MRE*	

a. Units without air-cooled condenser.

Table 6.8.1-15 Electrically Operated *DX-DOAS Units*, Single-Package and Remote Condenser, without *Energy* Recovery—Minimum *Efficiency* Requirements

Equipment Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
Air cooled (dehumidification mode)		4.0 *ISMRE*	AHRI 920
Air source heat pumps (dehumidification mode)		4.0 *ISMRE*	AHRI 920
Water cooled (dehumidification mode)	Cooling tower condenser water	4.9 *ISMRE*	AHRI 920
	Chilled Water	6.0 *ISMRE*	
Air source heat pump (heating mode)		2.7 *ISCOP*	AHRI 920
Water source heat pump (dehumidification mode)	Ground source, closed loop	4.8 *ISMRE*	AHRI 920
	Ground-water source	5.0 *ISMRE*	
	Water source	4.0 *ISMRE*	
Water source heat pump (heating mode)	Ground source, closed loop	2.0 *ISCOP*	AHRI 920
	Ground-water source	3.2 *ISCOP*	
	Water source	3.5 *ISCOP*	

Table 6.8.1-16 Electrically Operated *DX-DOAS Units*, Single Package and Remote Condenser, with *Energy* Recovery—Minimum *Efficiency* Requirements

Equipment Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
Air cooled (dehumidification mode)		5.2 *ISMRE*	AHRI 920
Air source heat pumps (dehumidification mode)		5.2 *ISMRE*	AHRI 920
Water cooled (dehumidification mode)	Cooling tower condenser water	5.3 *ISMRE*	AHRI 920
	Chilled Water	6.6 *ISMRE*	
Air source heat pump (heating mode)		3.3 *ISCOP*	AHRI 920
Water source heat pump (dehumidification mode)	Ground source, closed loop	5.2 *ISMRE*	AHRI 920
	Ground-water source	5.8 *ISMRE*	
	Water source	4.8 *ISMRE*	
Water source heat pump (heating mode)	Ground source, closed loop	3.8 *ISCOP*	AHRI 920
	Ground-water source	4.0 *ISCOP*	
	Water source	4.8 *ISCOP*	

Table 6.8.2 Minimum Duct Insulation R-Value[a]

Climate Zone	Duct Location		
	Exterior [b]	*Unconditioned Space* and Buried Ducts	*Indirectly Conditioned Space* [c,d]
Supply and Return Ducts for Heating and Cooling			
0 to 4	R-8	R-6	R-1.9
5 to 8	R-12	R-6	R-1.9
Supply and Return Ducts for Heating Only			
0 to 1	None	None	None
2 to 4	R-6	R-6	R-1.9
5 to 8	R-12	R-6	R-1.9
Supply and Return Ducts for Cooling Only			
0 to 6	R-8	R-6	R-1.9
7 to 8	R-1.9	R-1.9	R-1.9

a. Insulation *R-values*, measured in h·ft^2·°F/Btu, are for the insulation as installed and do not include film resistance. The required minimum thicknesses do not consider water vapor transmission and possible surface condensation. Where portions of the *building envelope* are used as a *plenum* enclosure, *building envelope* insulation shall be as required by the most restrictive condition of Section 6.4.4.1 or Section 5, depending on whether the *plenum* is located in the *roof*, *wall*, or *floor*. Insulation resistance measured on a horizontal plane in accordance with ASTM C518 at a *mean temperature* of 75°F at the installed thickness.
b. Includes attics above insulated ceilings, parking garages and crawl *spaces*.
c. Includes return air plenums with or without exposed *roofs* above.
d. Return ducts in this duct location do not require insulation.

Table 6.8.3-1 Minimum *Piping* Insulation Thickness Heating and Hot Water Systems[a,b,c,d,e] (Steam, Steam Condensate, Hot-Water Heating and Domestic Water *Systems*)

Fluid Operating Temperature Range (°F) and Usage	Insulation Conductivity		≥Nominal Pipe or Tube Size, in.				
	Conductivity, Btu·in/h·ft^2·°F	Mean Rating Temperature, °F	<1	1 to <1-1/2	1-1/2 to <4	4 to <8	≥8
			Insulation Thickness, in.				
>350	0.32 to 0.34	250	4.5	5.0	5.0	5.0	5.0
251 to 350	0.29 to 0.32	200	3.0	4.0	4.5	4.5	4.5
201 to 250	0.27 to 0.30	150	2.5	2.5	2.5	3.0	3.0
141 to 200	0.25 to 0.29	125	1.5	1.5	2.0	2.0	2.0
105 to 140	0.22 to 0.28	100	1.0	1.0	1.5	1.5	1.5

a. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows: $T = r\{(1 + t/r)^{K/k} - 1\}$, where T = minimum insulation thickness (in.), r = actual outside radius of pipe (in.), t = insulation thickness listed in this table for applicable fluid temperature and pipe size, K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature [Btu·in/h·ft^2·°F]; and k = the upper value of the conductivity range listed in this table for the applicable fluid temperature.
b. These thicknesses are based on *energy efficiency* considerations only. Additional insulation is sometimes required relative to safety issues/surface temperature.
c. For *piping* smaller than 1.5 in. and located in partitions within *conditioned spaces*, reduction of these thicknesses by 1 in. shall be permitted (before thickness adjustment required in footnote [a]) but not to thicknesses below 1 in.
d. For direct-buried heating and hot-water *system piping*, reduction of these thicknesses by 1.5 in. shall be permitted (before thickness adjustment required in footnote [a]) but not to thicknesses below 1 in.
e. The table is based on steel pipe. Nonmetallic pipes schedule 80 thickness or less shall use the table values. For other nonmetallic pipes having *thermal resistance* greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per metre than a steel pipe of the same size with the insulation thickness shown in the table.

Table 6.8.3-2 Minimum *Piping* Insulation Thickness Cooling *Systems* (Chilled Water, Brine, and Refrigerant)[a,b,c,d]

Fluid Operating Temperature Range (°F) and Usage	Insulation Conductivity		Nominal Pipe or Tube Size, in.				
	Conductivity, Btu·in/h·ft^2·°F	Mean Rating Temperature, °F	<1	1 to <1-1/2	1-1/2 to <4	4 to <8	≥8
			Insulation Thickness, in.				
40 to 60	0.21 to 0.27	75	0.5	0.5	1.0	1.0	1.0
<40	0.20 to 0.26	50	0.5	1.0	1.0	1.0	1.5

a. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows: $T = r\{(1 + t/r)^{K/k} - 1\}$, where T = minimum insulation thickness (in.), r = actual outside radius of pipe (in.), t = insulation thickness listed in this table for applicable fluid temperature and pipe size, K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature [Btu·in/h·ft2·°F]; and k = the upper value of the conductivity range listed in this table for the applicable fluid temperature.

b. These thicknesses are based on *energy efficiency* considerations only. Issues such as water vapor permeability or surface condensation sometimes require vapor retarders or additional insulation.

c. For direct-buried cooling *system piping*, insulation is not required.

d. The table is based on steel pipe. Nonmetallic pipes schedule 80 thickness or less shall use the table values. For other nonmetallic pipes having *thermal resistance* greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per foot than a steel pipe of the same size with the insulation thickness shown in the table.

Appendix M1-F

Building and Site Security Requirements by Type of Facility and Square Footage

Type of Facility and Net Square Footage	Security Requirements							
	Access Control System							
	Mechanical	Electromechanical	Computerized	Criminal Investigative Office at Finished Floor	Intrusion Detection System	Robbery Countermeasure CCTV System	Criminal Investigative CCTV System	Security & ePACS CCTV System
CSF under 1,350 SF	■[5]					■		
CSF 1,350 to 6,500 SF (including Carrier Annexes)	▲			●		■	●[6]	
CSF 6,501 to 60,000 SF (including Carrier Annexes 6,501 to 10,000 SF)		▲[10]		●	■	■	●[6]	
Carrier Annexes over 10,000 SF			■[4]	▲	■		▲	
CSF over 60,000 SF and > 200 employees			■[4]	▲	■	■	▲	■
VMF (independent)			■[4]		▲[8]			■[9]
VMF (co-located with an MPF)			■[4, 7]		▲[8]			■[9]
MPF (with Workrooms under 60,000 SF)			▲	●	■[1]	■	●	▲
MPF (with Workrooms 60,000 SF & larger)			▲	▲	■[1]	■	▲	▲
Stamp Services Center (SSC), Postal Service data center, or information technology center			■[4]		▲		■[3]	■[3]
Administrative[2]	■[3]	■[3]	■[3]	■[3]	■[3]			■[3]

▲ = Required

■ = Conditional, dependent on results of Risk Assessment (and/or other issue, per Keyed Note)

● = Conditional, if 10-year projected complement exceeds 28 carrier routes

Keyed Notes:

1. *At 24-hour facilities, an intrusion detection system (IDS) is only provided at Stamp Distribution Offices, Criminal Investigative Offices, and CIO breakout doors.*
2. *Administrative Facilities includes Facilities Field Offices, Inspection Service offices, Office of Inspector General (OIG) offices, National Law Enforcement Command Centers, Computer Data Centers, Area Offices, District Offices, Law Offices, etc. These facilities serve functions that are separate from MPF and CSF, even if co-located within an MPF or CSF.*
3. *Closed-circuit television (CCTV) system, level of access control, and IDS determined by decision of occupants with concurrence of the Inspection Service. CCTV system, level of access control, and IDS at OIG offices as determined by the OIG.*
4. *If a Risk Assessment does not support a computerized access control system (ePACS), provide an electromechanical cipher lock system.*
5. *If a Risk Assessment does not support mechanical access control device(s), provide standard mortise deadbolt lock.*
6. *If a CSF in this category will have a 10-year projected complement of 29 or more carrier routes, it will require an Investigative CCTV system. Project Manager is expected to work closely with the Inspection Service to optimize the CCTV camera layout to best fit the operational layout.*
7. *If VMF associated with an MPF warrants ePACS, it should interface with the same access control system as the MPF.*
8. *Provide IDS in all VMFs that do not operate 24/7.*
9. *Provide Security CCTV for VMFs only in locations indicated in SDC Module 4D, Exhibit 3-6.3a*
10. *Facility must have more than 20 employees, as per RE-5, paragraph 3-1.7.10.1.*

Module 2 – Prototype-Specific Criteria

2A – Mail Processing Facilities (MPFs)

Chapter 1 Civil

Chapter 2 Architectural

Chapter 3 Structural

Chapter 4 Mechanical

Chapter 5 Electrical

2B – Customer Service Facilities (CSFs)

Chapter 2 Architectural

Chapter 4 Mechanical

Chapter 5 Electrical

Appendices

Appendix M2-A Mail Processing Facility Door Schedule
Appendix M2-B Customer Service Facility Door Schedule

Module 2A - Mail Processing Facilities

Chapter 1 - Civil

1-2 Site Design

1-2.1 Utilities
1-2.4 Parking and Drives
1-2.5 Stairs, Ramps, Walks and Retaining Walls
1-2.6 Landscaping
1-2.7 Security Fencing
1-2.8 Not Used
1-2.9 Not Used
1-2.10 Not Used
1-2.11 Not Used
1-2.12 Guardhouses

Chapter 1 - Civil

1-2 Site Design *(Also refer to Module 1)*

Where possible in Zones 5, 6 and 7 (refer to the ASHRAE Zone Map – Appendix M1-C) the building shall be oriented so that the loading docks are not facing the direction of prevailing winds and utilize a southern exposure to the maximum extent possible to melt ice and snow.

There shall be two means of access to the site with curb cuts provided off the main road. One shall be for truck traffic and the other shall be for the employee entrance. A stop sign shall be provided to stop trucks from entering while a truck is requesting access to the truck maneuvering area.

A BMEU area should be provided off of the truck driveway entrance prior to entering the secure truck maneuvering area for public access. There shall also be a means for trucks to turn around should they be rejected access to the site. The BMEU area can be utilized as a truck turn-around area or a separate turn-around area can be provided. If the BMEU area is used as the truck turn-around area, the A/E should ensure that the BMEU operations are not affected. The employee entrance can also be utilized to access the food service area.

1-2. 1 Utilities

New utility services shall be provided to the building. Electrical power and telecommunications lines shall be supplied to the facility underground.

Mechanical or Electrical equipment set on-grade shall be screened through the use of chain link fencing with privacy slats, unless the equipment is located within the truck maneuvering area. If equipment is located within the truck maneuvering area, no screening is required. Equipment would only need to be protected from traffic through the use of bollards.

1-2.4 Parking and Drives

Driveways leading to truck entry gates may not exceed 30 feet in width.

The design of the trailer parking area must be coordinated with the location of light poles. There are two options for positioning the light poles along the back of the trailer parking area, so that they are protected from trailers:

1. Place the front surface of the concrete base of the light poles 2 feet back from the back of curb and provide a 6-foot wide striped "no parking" area centered on the light pole between adjacent trailer parking spaces. This option will require an increase in paved area.
2. Position the front surface of the concrete base of the light poles 12 feet clear behind the back of curb. This option will require coordination of the fence line along this side of the parking area, see section 1-2.7.

1-2.4.1 Paving

Rigid pavement shall be designed in accordance with American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures.

Any flexible bituminous concrete pavement within the truck maneuvering area shall be designed as heavy duty flexible pavement to support AASHTO

HS-20 loading. The flexible bituminous concrete pavement within the employee parking lot and the kitchen delivery access shall be designed to support the personal vehicular traffic anticipated in this area. All pavements shall be designed in accordance with the latest edition of the AASHTO Guide for Design of Pavement Structures and/or State Department of Transportation specifications, whichever is more stringent. All pavement types shall be State DOT standards.

Required minimum pavement width from the face of the mail platform to the back of the truck maneuvering area is 150 feet. The design of the truck maneuvering area should be based on the requirements of the trucks expected to use the facility. These trucks may be non-USPS owned vehicles, which are larger and require more space than USPS vehicles. The Solicitation A/E shall verify vehicle size requirements with USPS Project Manager as part of the Solicitation.

1-2.4.2 Curbs and Curb Cuts

All curbs shall be concrete and in accordance with State Department of Transportation standards. Curbs shall be provided along all paved vehicular traffic areas, including the backs of all parking stalls. An underground storm drainage system shall be provided to convey runoff away from paved areas. All curbs, except those described below, shall be 6” high standard straight concrete curbs. No curbed islands shall be provided.

The Solicitation A/E shall prescribe the design and location of curbs for trailer parking spaces. These shall be 12” in horizontal depth and 10” in height above finished paving. They shall extend below the pavement at least to the bottom of the paving plus aggregate that is below the paving.

On projects where snow will be pushed outside of parking and truck maneuvering areas, the Solicitation A/E shall prescribe the design and location of curbs that are surmountable by snow removal vehicles.

1-2.4.3 Site Signage and Pavement Markings

Bollards shall be provided within truck areas to protect the building and equipment within the truck maneuvering area. They shall be painted safety yellow.

See Architectural Chapter for further information on exterior signage.

1-2.5 Stairs, Ramps, Walks and Retaining Walls

Provide a concrete sidewalk handicap accessible route from the employee parking lot to the main employee entrance. Handicap ramps shall be provided at all handicap parking spaces. Site shall be designed in accordance with USPS Handbook RE-4 Standards for Facility Accessibility.

1-2.6 Landscaping

Solicitation A/E shall investigate local requirements and assist the USPS in negotiating these to a minimum.

All disturbed areas not receiving impervious materials, shall receive topsoil and seed. No other landscaping is required unless the local approving authority requires additional landscaping. Should the local approving authority require landscaping, the A/E shall provide landscaping to meet minimum requirements. Seed and other plant materials shall be drought resistant, if applicable. No irrigation systems are to be provided.

1-2.7 Security Fencing

Provide minimum 9 gauge, 6 foot high chain link fence around the employee parking lot, truck maneuvering area and around the site perimeter, unless directed otherwise by USPS prior to design.

The Project Manager shall confer with the local USPIS Inspector as to the feasibility of eliminating the employee parking lot fencing and submit a Request for Deviation if appropriate.

The fencing at the back of all trailer parking spaces shall be set a minimum of 10 feet from the back of curb. The fencing at the back of all other curbs shall be set back a minimum of 5 feet.

To prevent light poles being used to gain unauthorized access to site, place fencing a minimum of 4 feet from center line of light poles.

Solicitation A/E shall evaluate measures to reduce fencing around site perimeter by not fencing unused portions of this site. Solicitation A/E shall coordinate this fencing layout with USPS during the design process.

Provide fencing around stormwater detention/retention areas as required by local authority having jurisdiction.

Provide a motorized sliding gate with card access and loop induction to provide access to the truck maneuvering areas. At all truck gates, provide roadway with a minimum 12 feet clearance between bollards, card readers, and any other devices or obstructions.

Provide a motor operated lift gate with card access and loop induction to provide access to the employee parking area. Visitor parking spaces shall be located outside the fenced area.

Fabric for fencing shall extend to within 2” of firm grade.

Provide a 10 foot wide double swing gate to provide access from Buildings and Grounds Storage to employee parking lot. Gate shall have provisions for lock.

Coordinate fencing requirements with RE-5 for conditions requiring access control, manual vs automatic gates and requirements for gate closures at all fenced areas.

Design all gate components to operate in local weather conditions and climate zone.

Provide a “Knox Box” for Fire Department site access if requested by the local fire marshal (AHJ) at manual vehicle gates at non 24/7 facilities only.

1-2.12 Guardhouses *(Also refer to Handbook RE-5)*

1-2.12.1 Guardhouses may be provided when approved by Deviation that is supported by a recent USPIS risk assessment, normally at truck and carrier entrance gates of 24-hour operating facilities that have security force coverage.

They are to be located on the inbound side of the roadway where a single gate is used and between inbound and outbound traffic where double gates are used. Single gate installments are to be protected by six-inch diameter concrete-filed bollards at the two roadway side corners, and at all four corners at two-gate installations.

They may be site built or prefabricated but must incorporate materials that will withstand the local conditions with minimal upkeep and maintenance.

Refer to Handbook RE-5 Building and Site Security Requirements for additional criteria for location, architectural design, heating, ventilation, air conditioning, plumbing, and electrical.

Module 2A - Mail Processing Facilities

Chapter 2 - Architectural

2-1 Introduction
2-1.1 Scope

2-2 Workrooms
2-2.1 Floors
2-2.2 Wire Screen Enclosures
2-2.3 Height Requirements
2-2.4 Workroom Support Bay

2-3 Platforms
2-3.4 Trash and Recycling
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2-4 Support Areas
2-4.1 Employee Entrance
2-4.2 Toilet Facilities
2-4.3 Locker Areas
2-4.4 Lunchroom / Break Area
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2-4.6 Custodial Storage Room
2-4.10 Satellite Vending Machine Areas
2-4.12 Conference and Training Rooms
2-4.14 Battery Charging Areas
2-4.15 Hazardous Materials Area
2-4.17 Supervisor, Distribution Operations
2-4.18 Contract Drivers Room
2-4.19 Stamp Distribution Office (SDO)
2-4.21 Business Mail Entry Units (BMEU)
2-4.23 Consolidated Computer Room (CCR)
2-4.24 Time and Attendance Control System (TACS) Room

2-4.26 Building and Grounds Storage
2-4.30 Stockroom
2.4.32 Biohazard Detection System (BDS)
2.4.33 Shop

2-6 Exterior Envelope

2-6.1 Walls
2-6.2 Roof
2-6.3 Energy Conservation

2-7 Miscellaneous Building Components

2-7.1 Interior Partitions
2-7.2 Doors and Hardware
2-7.3 Vertical Circulation
2-7.4 Protective Barriers
2-7.5 Building Identification and Signage

2-9 Criminal Investigative Systems

2-9.1 Criminal Investigative Office (CIO)
2-9.2 Evidence Rooms
2-9.3 Holding Cells

Chapter 2 - Architectural

2-1 Introduction

2-1.1 Scope

The most life-cycle cost-effective building envelope and structure shall be designed and constructed including but not limited to pre-engineered metal buildings and tilt up systems. Consideration shall be given to pre-engineered buildings and metal roofing, except in Zones 5, 6 and 7 due to snow loading conditions that make pre-engineered buildings an unsuitable solution.

Interior materials and finishes shall conform to those prescribed in Appendix M1-D USPS Interior Finishes and Colors.

2-2 Workrooms

All interior partitions within the workroom shall be constructed of gypsum wallboard. Where ceilings are required, a minimum ceiling height of 8 feet-6 inches above finished floor shall be provided. Partitions at Satellite Vending Areas shall be constructed of galvanized highway type guardrails. Aisle spacing – Motorized aisles: 14 feet wide; non-motorized aisles: 8 feet wide.

Locate water coolers around perimeter of workroom/platform in conjunction with toilet rooms, Satellite Vending Areas, and lunchroom. On interior walls water coolers shall be placed in alcoves to eliminate protrusions in workroom aisles.

2-2.1 Floors

Workroom floor finish for all new construction is sealed concrete, using a clear penetrating sealer. Asphalt plank is no longer manufactured and is only repaired or replaced in existing workrooms as called for in Module 3, 2-2.1 Floors.

Module 3

2-2.2 Wire Screen Enclosures

High Volume Registry cages shall be provided with two doors, an entry/egress door and a sliding service door. The sliding service door shall be 6 feet in width, mounted on the interior of the cage, shall be gravity activated self-closing and self-locking, have a pull handle on the inside, as well as a “Not an Exit” sign attached to the inside. If cage has both sliding and swinging doors, and the sliding door is used only for MTE, then the keyed mortise cylinder shall only be installed on the inside, and be blanked off on the outside.

In addition, a 4-foot swinging entry/egress door shall be provided and shall include an automatic closer and self-lock mortise lock. All egress/entry doors shall have a badge access control system that includes a primary lock/key device this is only accessible by the Registered mail Employees.

In addition to the mechanical lock, both sliding and swinging cage doors shall also be provided with an interior mounted, fail-secure, electro-magnetic lock which is activated by badge access control card readers placed on the inside of the registry cage, tied into the registry door hardware. The card reader for each door shall be programmed to indicate the person unlocking the door. A

door release pushbutton (for override of the Egress Card Reader and tied to a local alarm) shall be provided on the interior side of the door to release the electro-magnetic lock. For doors used for personnel access only, also mount a card reader on the exterior of the cage beside to door.

Small cages may be provided with only the single 4-foot entry/egress door with the previously described hardware if this does not adversely impact the operation of the cage.

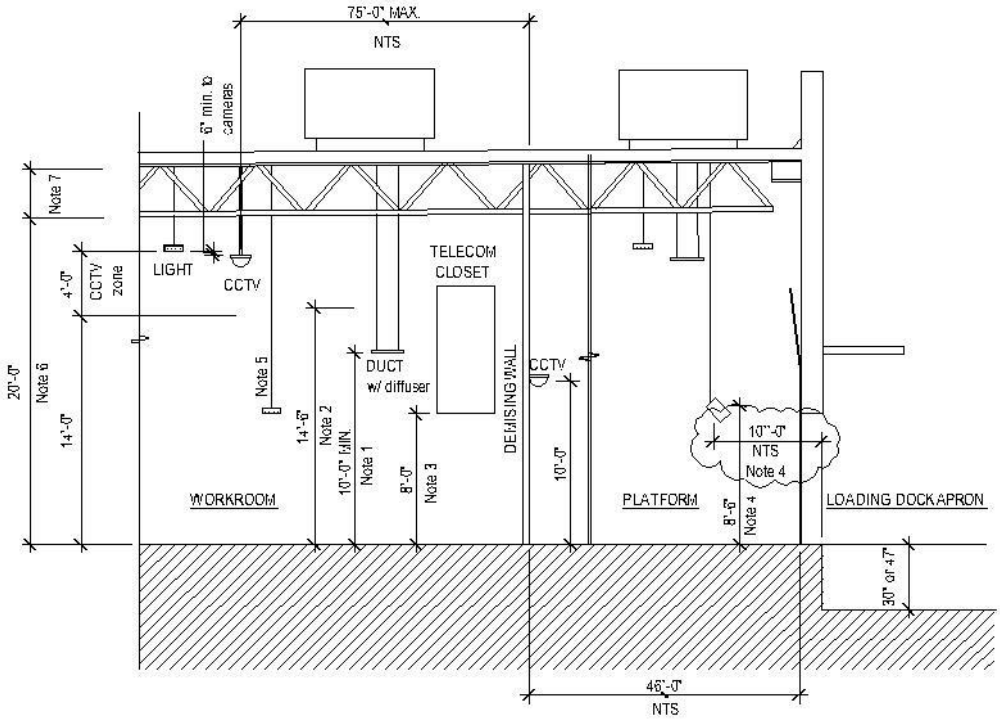
Provide no more than two doors per cage. All locks must be supplied with USPIS approved strike shrouds to prevent surreptitious entry. In facilities that do not have an existing access control system, a 1/4-inch thick clear acrylic panel shall be secured covering the entry/egress door to prevent access to the interior latch mechanism. All entry/egress doors and door hardware shall comply with requirements of RE-4 related to handicap accessibility and shall comply with applicable life-safety codes.

USPS Handbook RE-4

(Also refer to USPS Handbook RE-4)

2-2.3 Ceilings and Height Requirements

Exhibit 2-2.3a
Section Through Workroom/Platform Loading Dock



Notes:

1. To underside of vertical branch ducts serving single diffusers.
2. Mail Processing Equipment Storage, Tool and Parts Room, Custodial Storage and Stockroom clear heights.
3. Mezzanines and any office overhead systems under which powered industrial equipment passes provide a mandatory 8 feet after installation of subsystems such as sprinklers and lights.
4. To center of fixture.
5. Task lighting may be lowered in coordination with OSL.

6. To lowest side of structural member, and clear height to underside of all horizontal utilities (except the diffusers). Tool and parts room to be clear height if FFS equipment in the project. See Mechanical and Electrical Chapters for additional clearance requirements. **Note**—for MPFs larger than 200K SF, clearance in the Workroom should be a minimum of 24 feet from finished floor to bottom of roof deck. Clearance in the rest of the building can be lower.
7. All mechanical horizontal ductwork, except diffusers and horizontal piping, electrical conduit runs, cable trays and structural cabling.

2-2.4 Workroom Support Bay

Provide a Support Bay between the Workroom and Platform on the long side of the building only. The Support Bay width shall be 11 feet 3 inches clear from the outside face of the Workroom wall to the inside face of the Workroom Support Bay wall or the proper dimension for RE-4 compliant toilet rooms, whichever is greater. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

The purpose of this Support Bay is to improve adjacencies of the Workroom support areas, allow for locating rapid roll-up automatic door induction loops out of traffic aisles and provide a buffer zone between the Workroom and Platform to conserve energy.

In milder climates, A/E is encouraged to review elimination of vestibules and air locks between Workroom and Platform and apply for a Deviation Request for alternate plans that meet design intent.

Provide rapid roll-up doors at all workroom aisles at a minimum. With each rapid roll-up door provide a pedestrian door. The rapid roll-up door and pedestrian door shall be located in center of support bay.

The Support Bay is to provide space for stairs to roof and, as feasible, functions such as the following;

- Custodial Closets
- Satellite Vending
- Electric water cooler alcoves
- Electrical Rooms and/or Platforms
- Telecommunication Closets
- Compressor Room
- Employee Toilets
- Battery Charging Area
- Storage

2-3 Platforms

Standard dock height requirement shall be 47 inches.

The full length of the platform slab shall be level with the Workroom floor.

The Platform shall extend from the outside face of the wall of the Workroom Support Bay to the exterior wall. Platform structural bay shall accommodate the support space plus a platform depth of 46 feet to 50 feet depending on the most economical span. The clear height from finished floor to underside of lowest structural member shall be a minimum of 14 feet 6 inches except where a facility is scheduled to receive a Bulk Mail System. Increase the clear height of the section of the Platform at the Bulk Mail System to 20 feet. Special coordination is required both at the Platform and Workroom to accommodate the Bulk Mail System and related surge conveyors.

Wrap around docks on the Workroom may be necessary to extend the Platform to accommodate the required number of dock positions.

Dock canopies are to extend 3 feet 10 inches from the face of the exterior wall and slope toward the building and drain into a gutter, downspout and underground storm water system. Minimum clear height of canopy to be 14 feet 6 inches.

Where site fencing terminates between two loading dock doors, the doors must be spaced a minimum of 6 feet between the door jambs to allow sufficient clearance between the fencing and docking trucks.

Provide an enclosed office space for the Platform Supervisor, located along the Platform. The office space should be conditioned to levels equivalent to the other administrative spaces within the facility. The office shall have vision panels with the bottom edge located 2 feet 6 inches above the finished floor and covering no less than 60% of the wall area to include side walls. The office should be protected from platform traffic by means of bollards or galvanized highway type guardrails secured to the platform floor.

2-3.4 Trash and Recycling

Standard facility design criteria in this section is based on the premise that the facility will function as a National Recycling Operation (NRO) hub site, to prepare and consolidate recyclables. To ensure that facility design and construction is consistent with the USPS NRO standards, facility planning and design development for all new construction Trash and Recycling areas must be done in coordination with HQ's Office of Sustainability, Corporate Sustainability Initiatives Office.

The space requirements for recycling are a function of the volume of undeliverable standard mail, discarded plastic and cardboard generated from Post Offices in the service area of the processing facility, along with the waste and recycling streams generated within the plant. Basic equipment and space requirements are determined by recycling space criteria developed by the Office of Sustainability, based on standard waste generation rates for mixed paper, cardboard and plastic. For the purposes of trash and recycling requirements, a Large MPF is one that processes mail for more than 1,500 delivery routes. A Small MPF processes mail for 1,500 or fewer delivery routes. The requirements differ for each.

Slope floor to drain ¼-inch per foot.

Provide exterior bumper full width of each dock door opening.

If located adjacent to a BMEU, provide privacy slats in chain link fencing separating the trash and recycling area from the BMEU area. Extend privacy slats a minimum of 30 feet from the face of the building.

2-3.4.1 Required Equipment

Trash compactors and balers will be USPS furnished.

The solicitation A/E shall determine the size and power requirements of the compactor(s) and baler(s) and incorporate this information in the solicitation.

Utilities required at the compactor area are contractor furnished and installed.

If more than one compactor is provided, they shall be located adjacent to each other and to any trash or recyclables dumpster(s). The compactor(s) shall be located contiguous to the platform and workroom, with easy access for maneuvering and dumping the tilt carts, hampers, dumpsters, or other equipment used for internal collection of the material.

a. Large MPF:

(1) Recycle Equipment:

- Two (2) stationary compactors equipped with a universal dumper for recycling mixed paper. Enclosures (doghouses) shall be

provided to provide security and protection from the elements during recycling compactor operation. The recycling contractor is to supply the receiver boxes.

- Two (2) vertical balers; one for baling clean shrink/stretch wrap, one for baling mixed plastic.
- One (1) horizontal baler with auto tie equipped with a universal dumper or conveyer feed system.
- Two (2) box trailers for storage of completed plastic and cardboard bales.

(2) Solid Waste Equipment:

- One (1) stationary compactor for disposal of solid waste. An enclosure (doghouse) shall be provided to provide security and protection from the elements. The solid waste contractor is to supply the receiver box.

b. Small MPF:

(1) Recycle Equipment:

- One (1) stationary compactor equipped with a universal dumper for recycling mixed paper. An enclosure (doghouse) shall be provided to provide security and protection from the elements during recycling compactor operations. The recycling contractor is to supply the receiver box.
- Two (2) vertical balers; one for baling clean shrink/stretch wrap, one for baling mixed plastic.
- One (1) horizontal baler with auto tie equipped with a universal dumper or conveyer feed system.
- Two (2) box trailers for storage of completed plastic and cardboard bales.

(2) Solid Waste Equipment:

- An eight (8) cubic yard trash dumpster supplied by the solid waste contractor.

2-3.4.2 Dock and Work Space

Provide an indoor holding area for designated containers used for internal collection of trash and recyclables from each of the respective functional areas throughout the building. This area will provide staging of the containers in preparation for recycling or disposal and for active storage of the empty containers.

a. Large MPF:

- Five (5) dock positions to serve stationary recycling compactors, recycling trailers and trash compactor.
- A minimum of 10,600 square feet on the platform, adjacent to the five (5) dock doors for staging and maneuvering of recycling containers. This includes the footprint for the balers.
- An area adjacent to one 40 cubic yard open top roll-off container for larger solid waste items.
- An area for the staging of one (1) 40 cubic yard open top roll-off container for metal recycling.

b. Small MPF:

- Four (4) dock positions to serve stationary recycling compactors, recycling trailers and trash dumpster.

- A minimum of 5,200 square feet on the platform, adjacent to the four (4) dock doors for staging, and maneuvering of recycling containers. This includes the footprint for the three (3) balers.
- An area adjacent to the trash dumpster dock for storage and maneuvering of trash containers.

2-3.6 Ramps

A ramp to facilitate the movement of forklifts and equipment between the workroom/platform and the exterior of the building shall be provided. The minimum clear width of ramp shall be 8 feet with a maximum allowable slope of 1:12. Provide a 12-foot wide platform/landing at the top.

Provide rolling overhead door of 8 feet wide and an adjacent man door 3 feet wide.

Where ramps are also an accessible means of egress from the building they must be in compliance with RE-4 and all local code requirements. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

2-3.7 Stairs

From the workroom/platform provide exit stairs along platforms, at intervals limited to a distance of 300 linear feet, or as required by applicable code. Locate stairs between loading docks; when possible, recessing them into the platform. Protect the end of stair railings from dock operations by use of bollards or steel guardrails. Provide exit signs over doors at exit stairs per code.

2-3.8 Dock Equipment

The Solicitation A/E shall determine this information and incorporate into the Solicitation.

1. For new MPF facilities or major additions to existing MPF facilities: all docks serving tractor trailers must have automatic truck restraints with indicating lights installed. For existing MPF facilities, see Module 3.

2-3.8.1 Flip Ramps

Provide electro-hydraulic, front mounted adjustable flip ramps (also known as edge-of-dock levelers), including maintenance struts, at all 30-inch docks.

2-3.8.2 Dock Levelers

Provide Air-Bag type dock levelers at all 47-inch high docks.

Levelers shall be 7 feet wide x 8 feet deep and recessed into the concrete mail platforms in a 2-foot deep pit.

2-3.8.3 Dock Door Seals

2-3.8.4 Bumpers

At leveler locations install dock bumpers along the face of platforms at truck positions.

On docks with flip ramps, bumpers shall be integral with the flip ramps.

2-3.8.5 Dock Restraints

Provide automatic truck restraints at all doors servicing tractor trailers as noted in 2-3.8.

2-3.8.6 Back-Up Signal Lights

Provide LED back-up (Stop/Go) lights at each dock location serving tractor trailers. Lights are to be located on interior and exterior sides of each adjacent wall. Sequence of operation to be:

When a truck is backed into a dock stall and dock restraint bar is engaged the inside light shall turn green and exterior light shall turn red. This signal will signify that it is safe to open the overhead door.

When the door is opened it will activate a limit switch allowing the dock leveler to function and causing the dock light to be activated.

The outside light should stay red until door is closed and restraint/chocks are released.

Inside and outside lights should always be opposite colors unless both are flashing red indicative of a trouble in the system.

2-3.8.7 Door Number Signs

See 2-7.5.2 for dock door numbering requirements.

2-4 Support Areas

2-4.1 Employee Entrance

To ensure a more secure facility and assist in monitoring employee and visitor circulation, there is to be only one employee entrance, centrally located, immediately accessible to employee parking. Develop the building's security system to enforce one main entry. The card reader access control system and CCTV should be designed to maintain a secure perimeter.

The entrance to the employee facilities area shall be via a secure lobby containing access controlled turnstiles. Number and direction of turnstiles shall be designed to efficiently move employees in and out of the facility. The turnstiles shall provide a means of preventing tailgating.

The entrance to the administrative offices shall be via the secure lobby by means of an access controlled door.

2-4.2 Toilet Facilities

Arrange men's and women's restrooms in a consistent orientation with respect to each other throughout the facility.

Design multiple-occupancy toilet rooms so that the interior of the rooms is not visible from hallways or other interior spaces.

Provide lay-in tile ceilings in all toilet rooms. At contiguous male/female toilets, insulate and extend all perimeter and common walls 24 inches above finish ceiling height to assure privacy.

Toilet partitions shall be plastic, floor mounted, designed to withstand heavy duty use and the regular actions of the maintenance and custodial personnel and meet the flame spread/smoke development requirements of the applicable code.

The Solicitation A/E shall determine scope of what is supplied by the National Sources for Custodial Products and parties responsible for installation.

2-4.3 Locker Areas

Locate locker areas near the toilet facilities and designated employee entrance. Locker rooms are to be open as shown on the standard plans and standard detail G2-4-3b.

Locate lockers near the designated employee entrance, along corridor walls or placed within alcoves, allowing the lockers to be flush to the adjacent walls. This includes all maintenance lockers.

Locker areas shall be made accessible and be provided with accessible lockers as required by Handbook RE-4. The total number of lockers to be installed at employee entrance and in supervisor's locker areas shall be equal to the full complement as identified in USPS Form 929.

2.4.4 Lunchroom / Break Area

2-4.4.1 Lunchroom

Locate the Lunchroom near employee lockers; design with a generous amount of day lighting with suitable Venetian type mini blinds matching others in building. The design and layout of lunchroom seating shall be based on the peak usage of this area in the USPS Form 929 and shall be designed by USPS national vendor, Allsteel. The vendor offers two options: "Plymold Jupiter" for cluster units, and "Allsteel Vicinity" for tables and chairs. Vendor will provide and install under direct purchase by District Postal Operations Activation Coordinator (POAC).

In the seating area, provide the following:

- Garbage disposal at sink, if permitted by local codes.
- Designated area with duplex electric receptacles for refrigerators and freezers for employee use. Provide one dedicated receptacle for every 150 peak tour employees for full-size refrigerator/freezer. Provide duplex receptacles every 30 inches on center above the countertop for microwaves and other countertop appliances. Maximum of (2) receptacles wired per circuit.
- One marker board, 4 feet x 6 feet.
- One tack board, 4 feet x 6 feet.
- Separate built-in under counter recycling bins (minimum 30 gallon capacity each) shall be provided with labels for glass, aluminum and plastic.

For facilities with fewer than 799 employees (peak hour complement), provide a break room with snack vending.

For facilities having 800 to 999 employees (peak hour complement), provide a central lunchroom with supplemental full-service (hot and cold) vending. No grill to be provided.

Use the following for planning the Lunchroom with supplemental full-service hot and cold vending.

- Stand-alone freezer (by vendor)
- Stand-alone refrigerator (by vendor)
- Ten 120v receptacles to service the food preparation and delivery areas.
- Three stainless steel sinks to support the food preparation area including hot and cold water, garbage disposal and all associated code required items such as grease interceptors.
- 30 lineal feet of wire shelving units (3 shelves high) in the Dry Storage room.
- Floor drains and all utility hook ups as required for vending.
- Appropriately labeled recycling bins if recycling pick up is provided.
- Wall and base cabinets.
- 120 square feet of secured vending storage within the Lunchroom complex.

For facilities having 1000 or more employees (peak hour complement), provide a central lunchroom with supplemental full-service (hot and cold)

vending and a grill. A complete, fully functional, efficient, cost effective and potentially profitable food service is to be provided including such items as all architectural elements including doors, hardware, signage, casework, finishes and storage; HVAC; water and waste; fire protection; electrical; and lighting.

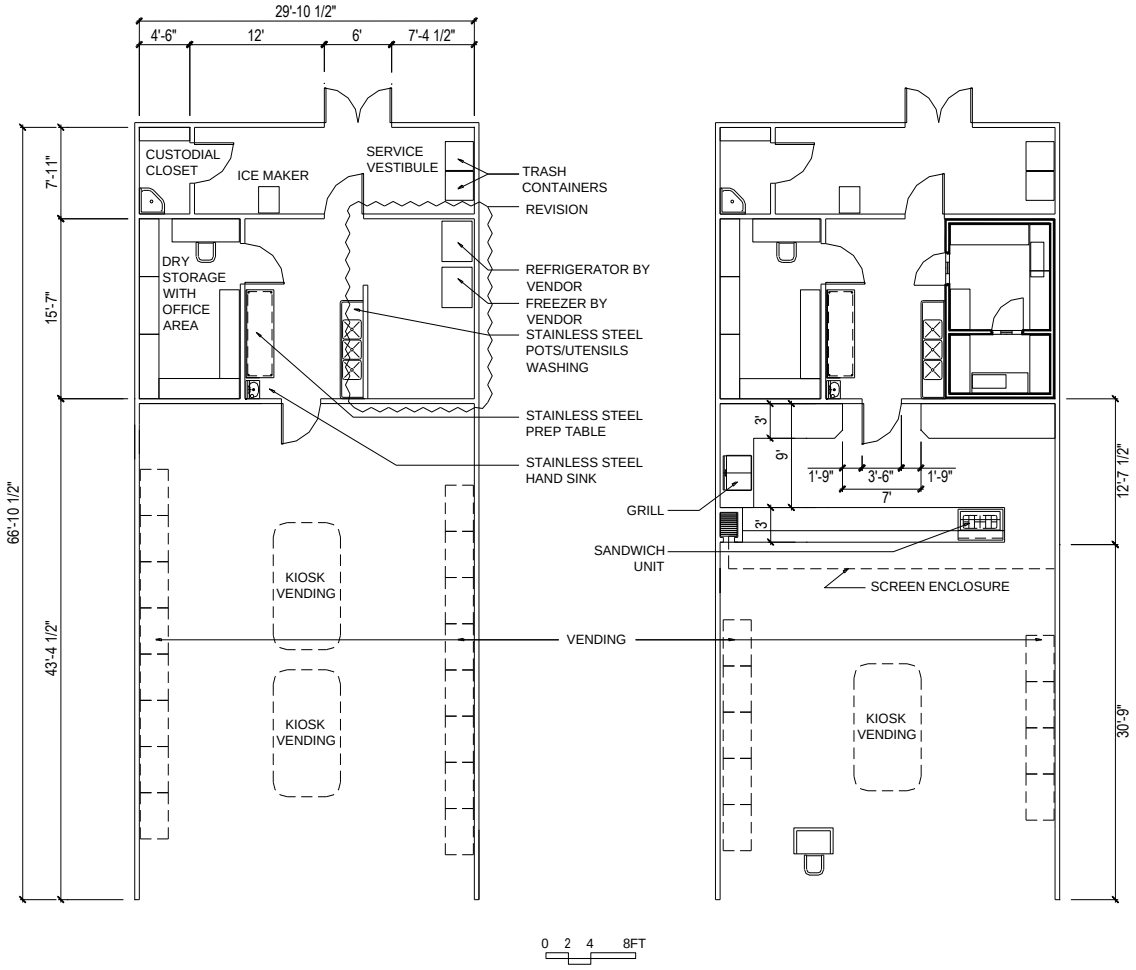
Plumbing and plumbing fixtures shall comply with USPS RE-4 and all applicable standards, codes and regulations including those for separate hand washing sinks near prep areas and splash protection. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Use the following for planning the Lunchroom with supplemental full-service hot and cold vending and a grill. In any of the three food service approaches, base the actual design on the estimated peak population in the food service are and specific requirements of local vendor(s), codes and standards, etc.

- 70 linear feet of stainless steel countertop work space including the griddle/grille area.
- One 850 cubic foot commercial walk-in freezer.
- One 650 cubic foot commercial walk-in refrigerator.
- One griddle/grille with 15 square feet of cooking space.
- One commercial convection oven.
- When grill is included, provide a code-compliant hood ducted to the outside and an appropriate fire suppression system.
- (4) 208/240v and (20) 120v receptacles to service the food preparation and delivery areas.
- Three stainless steel sinks to support the food preparation area including hot and cold water, garbage disposal and all associated code required items such as grease interceptors.
- A cashier station, including data and power.
- 30 lineal feet of wire shelving units (3 shelves high) in the Dry Storage room.
- One cold sandwich unit approximately 3 feet deep by 5 feet wide.
- Floor drains and all utility hook ups as required for vending.
- A wire screen enclosure to secure the room.
- Appropriately labeled recycling bins if recycling pick up is provided.
- Wall and base cabinets.
- 120 square feet of secured vending storage within the Lunchroom complex.

Provide a dedicated food service entrance at grade level where site constraints allow. If site prohibits the use of an on grade entrance provide an accessible ramp meeting the requirements of USPS Handbook RE-4, Standards for Facility Accessibility.



FOOD SERVICE
LUNCHROOM WITH SUPPLEMENTAL HOT AND COLD VENDING

FOOD SERVICE
LUNCHROOM WITH SUPPLEMENTAL HOT AND COLD VENDING AND GRILL

Food Service Prototype Layouts

2-4.4.2 Administrative Lunchroom/Break Area

In the break area, provide the following:

- Sink with hot and cold water.
- Garbage disposal.
- Wall and base cabinets with laminated counter workspace.
- Designated area with electric receptacles for refrigerators, freezers, coffee makers, and microwave ovens for employee use. Provide one receptacle for each full-size refrigerator/freezer, and countertop mounted receptacles every 30 inches for microwave ovens and coffee makers.

2-4.4.3 Exterior Break Areas

Provide two exterior break areas of 900 square feet each, one designated as smoking and one designated as non-smoking. These areas shall be separated by such distance (a minimum of 50 feet) that smoke from the “smoking” area does not impact the “non-smoking” area.

Access from lunchroom to the smoking break area shall be through a vestibule to prevent smoke transfer. Vestibule is to be compliant with RE-4 standards for facility accessibility. The smoking area shall be at least 25 feet away from other lunchroom or any other facility exterior doorway(s), and from air intake grills on exterior wall.

These areas shall consist of a concrete slab on grade, with a prefabricated translucent polycarbonate covering providing significant day-lighting while protecting the users from any precipitation.

Break areas shall have exterior partitions consisting of full height chain link fencing with vinyl privacy screening inserts. Provide one alarmed exit door/gate for access to the site from each area.

Adjacent to door leading to exterior non-smoking break area, install “no-smoking” sign in conformance with standard detail G2-7-5z2. Adjacent to door leading to exterior smoking break area, install “designated smoking area, smoking anywhere except in a designated area is prohibited.” Sign shall include international smoking allowed symbol.

2-4.5 Administrative Offices

Furnishings are provided and installed by USPS. A layout of open office systems furniture will be provided to allow coordination of power and telecommunications requirements. The A/E shall coordinate with the USPS and install all electrical and data to the point of connection.

DBE shall provide Venetian type window mini blinds for administrative offices at both exterior and interior windows.

2-4.6 Custodial Storage Room

Provide mop/broom holder with integral shelf, and heavy-duty adjustable shelving unit. Shelving unit shall run the length of one wall and shall consist of two 18 inch deep shelves.

2-4.6.1 Custodial Closets

Custodial Closets shall be located at each set of toilet rooms and throughout the Facility as required by PS 929. The size of the Custodial Closets listed in the PS 929 form are an estimate, not a minimum.

At each Closet, provide floor mounted mop basin, mop/broom holder with integral shelf and heavy-duty adjustable shelving unit. The mop basin must be equipped with a backflow prevention device (e.g., vacuum breaker). Shelving unit shall be 6 feet long and consist of two 18 inch deep shelves. Closet shall be adequately sized to accommodate a custodial cart.

Provide lay-in tile ceiling in all closets. Insulate and extend the common walls with male/female toilets 24 inches above ceiling height.

Provide 4-foot high fiberglass reinforced panels (FRP) on all walls of custodial closets.

2-4.6.2 Flammable Storage

The Solicitation A/E shall determine requirements for flammable storage cabinets, including code requirements, if any, such as the need for enclosed rooms, rated walls, and venting requirements, and shall identify their locations. Cabinets will be purchased by POAC from local start-up funding.

2-4.10 Satellite Vending Machine Areas

Satellite vending machine areas are located either along the Workroom/platform perimeter or within the Workroom, whichever is more convenient to employees. Lay out the area with protective galvanized

highway type guardrails on workroom side to allow for maximum visibility from workroom/platform investigative cameras. Coordinate with the OSL. Provide each vending area with water supply, floor drain, electric drinking fountain, electrical outlets and a stand-up counter. Locate vending machines against hard wall surfaces where possible.

Size of vending and design of seating to be completed by Solicitation A/E.

2-4.12 Conference and Training Rooms

Design rooms to accommodate the following, as required: multimedia projection equipment (including screens for video); audio, teleconferencing and computer training systems.

Provide one 4-foot high by 6-foot long marker board in each conference room and each Training Room.

2-4.14 Battery Charging Areas

The battery charging areas are used for charging and maintaining the batteries used in mail-handling mobile equipment (or PITs, Powered Industrial Trucks).

The USPS is moving toward the use of sealed gel batteries and hydrogen fuel cell technology. However, lead acid batteries are still used. The Solicitation A/E shall verify with the USPS Project Manager which battery technology will be used by the facility as part of the solicitation development, and design battery charging areas accordingly.

Battery charging areas are to be located in designated areas on the Workroom/platform floor. Area space requirements are provided in the USPS planning documents. Verify with Project Manager the number of total battery racks needed and arrange racks to allow fork lift circulation within the Battery Charging Area.

Battery charging areas must be protected from weather and/or outside environmental conditions. If necessary to ensure adequate environmental control, a battery charging area may be placed in a separately enclosed room. However, within a larger environmentally controlled space (e.g.: workroom, enclosed platform, etc.) the charging area should be open to the larger space.

The area is to be clearly designated as a battery charging area. Floor striping shall be included as part of the means to designate the area.

The following are to be provided:

- Floor mounted battery racks. Acid resistant racks required with the use of lead acid batteries.
- Bridge crane. Capacity to be determined by the Solicitation A/E.
- Fire extinguisher.
- Acid resistant flooring over the entire battery charging area if lead acid batteries are used.

All requirements shall be coordinated with USPS and developed in accordance with OSHA, NFPA, ANSI and other applicable standards and codes. Exact quantity of batteries to be charged is to be determined by the Solicitation A/E.

Battery charging equipment, and portable eye wash units when gel cell batteries are used, will be provided by USPS. Space for the portable eye wash units shall be allocated in the battery charging area. DBE shall install the USPS provided equipment.

See Mechanical 4-3.1.6 for emergency combination deluge shower and eyewash fountain for use with lead acid batteries. The Solicitation A/E must determine criteria for adequate ventilation in the battery charging area based on NFPA 70E and applicable building codes.

Provide floor drainage leading to acid neutralization pits for battery charging areas if required by local jurisdiction. If required, acid neutralization pits must be sized at the minimum size required to meet the regulatory standard. Verify with the Office of Sustainability regarding the required regulations and proper sizing of the unit. When acid neutralization pits are provided, the drainage and associated floor slopes are to accommodate the entire battery charging area.

2-4.15 Hazardous Materials Area

Provide a relatively square alcove adjacent to the Workroom/platform area, close to the designating parcel post operation. The entire area shall be observable via CCTV system. Within the Hazardous Materials Room provide the following items: a fume hood and exhaust system (to carry fumes outside the facility) complete with a vapor proof light; a stainless steel table with curbed work surface with an open base and a 10 gallon chemical waste container; a combination emergency shower and eye wash unit with a floor drain; a lavatory with hot and cold water; and signage to prevent any dumping of hazardous chemicals into sewage system.

2-4.17 Supervisor/Manager, Distribution Operations

Provide a 4-foot high safety glass view window for the full width of the wall (excluding doors) between the office and workroom/platform. The minimum window panel width shall be 2 feet. The sill shall be 36 inches above the finished floor. Provide horizontal Venetian mini blinds on the office side of the window.

2-4.18 Contract Drivers Room

Provide Contract Drivers Rooms such that drivers do not have to walk more than 20 dock positions to get to the room, therefore, the room would be no more than 20 dock positions from the end or have no more than 40 dock positions between them.

For each room, provide two unisex toilet rooms, with toilet, sink, and mirror, as indicated on the standard drawings. Provide electric water cooler and space for two vending machines with dedicated outlet, two sets of tables with 4 chairs each (8 chairs total). The room shall have direct access to the exterior. Provide a door connecting the room with the workroom/platform floor, secured with an access control device on both the workroom/platform sides. Provide panic hardware and localized alarm if the door is a designated emergency exit.

Install a vertical sliding service window connecting the room to the workroom/platform. Window to be satin anodized extruded aluminum, 15 inches wide x 30 inches high with fixed upper panel, sash balance, ¼-inch clear tempered glass, and keyed lock. Provide black plastic laminate countertop projecting 8 inches out from both sides at 38 inches above finish floor.

2-4.19 Stamp Distribution Office (SDO)

An SDO is to be provided only if required by the 929. This area receives and distributes stamps and retail products to Associate Offices, Stations, and

Branches. Within the area prescribed in the 929, provide an open space. Within the open space, record keeping and filing of orders will take place.

If the SDO is located within a 24 hour facility it will not require a vault but will require an IDS, card reader access if an access control system is present, and a security camera(s) focused on all entries/exits to the SDO. The SDO should not be located adjacent to exterior walls, windows or doors.

Provide full height gypsum security wall and security ceiling construction for perimeter walls and ceilings of open space (or extend walls to underside of structure).

Wire mesh cages and ceiling are also acceptable (or extend cage walls to underside of structure).

If the SDO is in a non-24 hour facility it will require a risk assessment by the USPIS to determine the need for a vault and/or other security countermeasures.

If a vault is provided, it is to be cast-in-place concrete, or a prefabricated modular steel vault, with vault door, humidity control and pre-action sprinkler system, etc. Provide gypsum wallboard furring at vault walls exposed within the space unless the exterior of the vault is finished for an office environment.

2-4.21 Business Mail Entry Unit (BMEU)

The numbers and locations of Mail Evaluation Readability Lookup Instrument (MERLIN) automation units, floor scales, etc., are shown on BMEU Standard drawings but the Solicitation A/E shall confirm with Plant.

2-4.23 Consolidated Computer Room (CCR)

Consolidated Computer Rooms are to be a minimum of 2,500 square feet Floor surfaces shall be covered with resilient flooring, sealed concrete floors are not acceptable. In critical computer rooms where it is determined to be essential, static control resilient flooring may be included only with an approved Deviation. Ceiling tile shall be vinyl faced unperforated and impervious, clean room Class 5 (Class 100) certified and be installed a minimum of 10 feet above floor.

Systems located in this room include but are not limited to RBCS/IPSS, NDSS, RPMS and telecommunications equipment.

The room should have provisions for physical access control with restricted access.

Provide 24 hour supplemental HVAC system.

In addition to the fire protection system called for in Chapter 4- Mechanical 4-5.1 sprinkler systems, provide halocarbon clean agent fire extinguishers.

Module 2A

2-4.23.1 Telecommunications Room (TR)

Telecommunications Rooms (TR) are to be sized per the specific equipment requirements or a minimum of 9 feet x 12 feet clear interior space. All floor surfaces shall receive resilient flooring; sealed concrete floors are not acceptable. Ceiling tile shall be vinyl faced unperforated and impervious, clean room Class 5 (Class 100) certified and be installed a minimum of 10 feet above floor.

TRs located in the administrative/support areas are not to be placed contiguous to the workroom. This is to avoid contamination by workroom dust.

Provide 24 hour supplemental HVAC system.

In all cases, TRs must be carefully coordinated with USPS Engineering (OSL layout), building structure, utilities etc.

The room should have provisions for physical access control with restricted access.

Provide halocarbon clean agent fire extinguishers.

2-4.24 Time and Attendance Control System (TACS) Room

The solicitation A/E shall verify with the Project Manager and POAC the need for a TACS if it is listed in the PS 929 form.

The TACS room requires a window (3 feet x 3 feet) to be located contiguous to the unsecured side of the Lobby, as shown on the MPF Drawing Set.

Requirements for workers in the TACS Room include a normal open office lighting and HVAC environment. Security includes locks on doors and all storage, as employee records are stored at each facility.

2-4.26 Building and Grounds Storage

Each facility shall have one (1) Building and Grounds Storage room.

Provide paved access and curb cuts from the Building and Grounds Storage to roadway.

The Building and Grounds Storage room shall be separated from the interior of the building with a full-height fire-rated partition. The partition rating shall be the greater of 1 hour, or as required by applicable codes and regulations. No openings larger than 8 inches square shall be permitted in this partition. Provide fire and smoke stopping, as necessary. Solicitation A/E shall determine what materials are to be stored and the quantities required.

Access to the exterior shall be through one 10 feet wide x 10 feet high insulated overhead sectional door and one 3 feet wide x 7 feet high insulated personnel door.

2-4.30 Stockroom

This room shall have a 4-foot wide opening with a 14 gauge stainless steel counter 24 inches deep and located 42 inches above finished floor. The opening shall be closed by means of a lockable rolling grill.

2-4.32 Biohazard Detection System (BDS)

When an AFCS operation is part of a project, a Biohazard Detection System is included by USPS Engineering.

If there is a BDS, plan the location for the spare BDS cabinet and the refrigerator in the same room as fire alarm control panel, or other secured room designated by POAC.

2-4.33 Shop

To the extent practical, combine shop spaces prescribed in the 929 into one space so the local facility can use the shop most efficiently.

2-6 Exterior Envelope

2-6.1 Walls

2-6.1.1 Materials

Building exteriors are to provide architectural interest through the use of reveals and color integral to the building material. Painting of precast, tilt up or other exterior masonry shall be considered by Design A/E and determined by C.O. before issuing solicitation. Other finishes or treatments can be considered during the Value Engineering process. At the base of the building, materials selected must have the durability to withstand typical abuse from vehicles and maintenance equipment (including snow removal). Metal building options must meet all insulation requirements in both roof and wall construction. Roll insulation (or insulation scrim) may not be exposed to view.

Design of platform walls at loading docks must pay particular attention to impact resistance and durability.

On the interior of workroom/platform walls where insulation is exposed (if allowed by code), the insulation shall be rigid and protected to the height of 8 feet. Provide minimum 4-inch high vinyl cove base at all non-concrete rigid wall or protected insulation panels.

All requirements above should meet or exceed the requirements listed within the current version of ASHRAE 90.1. A/E shall confirm compliance with the current version of ASHRAE 90.1 concerning exterior envelope components and systems.

2-6.1.2 Windows

Solicitation A/E to consider clerestory windows in Workroom based on a life cycle cost analysis. Analysis to be presented to project manager prior to finalization of design.

No burglar-resistant glazing and security film is required in 24-hour facilities.

Glazing requirements are as follows:

- Thermal Transmittance (U-Factor) shall be based on ASHRAE Fundamentals Handbook (2005). [0.46 equivalent to double glazed, ½-inch airspace, low-e (0.15), thermal break metal frame or 0.65 equivalent to double glazed, ½-inch airspace, low-e (0.40), metal frame

All requirements above should meet or exceed the requirements listed within the current version of ASHRAE 90.1. A/E shall confirm compliance with the current version of ASHRAE 90.1 concerning fenestration.]

2-6.2 Roof

2-6.2.1 General

Assure safety of roof and drainage system from excessive water loads caused by blocking of outlets by airborne trash, freezing, etc.

No burglar bars are required on roof openings on 24-hour facilities.

2-6.2.2 Roof Components

a. Roof System

Provide an Energy Star rated roofing system in accordance with the Mail Processing Facilities Specification. On flat roof assemblies utilize sloped structure with rigid, flat insulation, providing tapered insulation only at

crickets and drain sumps. In all cases, roof types and components utilized shall meet or exceed the requirements listed within the current version of ASHRAE 90.1. A/E shall verify compliance with the current version of ASHRAE 90.1.

b. Roof Insulation

Provide multiple layer roof insulation in all Zones. No roofing insulation is to be exposed on exterior or interior.

c. Roof Drains

Provide primary roof drains and overflow scuppers. Provide secondary overflow drains where roof area and configuration determines need. Drain sizes and locations as determined by applicable code. Roof design shall not allow ponding of water.

All roof drains constructed under slabs shall be tested to assure water flow is completely unobstructed and flow rates are correct.

d. Walkways

Provide an appropriate 4-foot wide walking surface, compatible with the roof membrane and/or metal roof, to provide a direct route to and around all roof-mounted equipment. Walking surfaces shall be designed so as not to restrict drainage and shall be provided at all sides of equipment (4-foot minimum width). If rooftop equipment will require maintenance work within 10 foot of the edge of the roof, provide minimum 3 foot 6 inch high parapet or railing.

e. Roof Hatch & Vertical Material Lift

On the interior of the building, provide a vertical electro-mechanical or hydraulic lift, and roof hatch. The lift shall be mounted flush to the floor. The lift shall meet all applicable standards, codes, and regulations including OSHA.

The lift will be designed and constructed to safely hoist limited materials, not to exceed 1000 pounds, through the roof hatch to the roof.

The Solicitation A/E shall recommend three acceptable manufacturers and models.

If the local facility has a moveable lift that can be safely used with the roof hatch, this possibly may be substituted for the vertical electro-mechanical lift. Solicitation A/E to determine if lift is appropriate, safe and meets all applicable standards, codes and regulations.

Elimination of the requirement for a vertical material lift may be allowed only with an approved Deviation that provides for an alternative means of moving equipment and materials to the roof.

Locate a stair and its own roof hatch for the use of personnel. Locate this near the lift.

f. Heat and Smoke Vents

Where heat and smoke vents are required by applicable codes and standards, provide hatch-type vents mounted the code minimum (or 12 inches – which ever is more) height above the roof surface with insulated aluminum curb, welded or sealed mechanical corners and integral condensation gutter and flashing. Hatch to be weather-tight and have integral cap flashing to receive roof flashing system.

Fabricate with automatic opening double glazed acrylic or polycarbonate dome type lids. Lids shall be designed to have weather tight seal in wind uplift condition.

Provide units which have been tested and are UL listed and FMG approved. Gravity or drop-out vents which function by heat melting the acrylic dome are not acceptable. Provide white or frosted domes to prevent glare. Domes shall provide a minimum 60% light transmission. Coordinate location of vents with ducts, utilities, etc. to avoid obstructing daylight. Provide fall protection screens, railings or grilles at all roof openings to satisfy OSHA Standard 1910.23 and local regulations.

g. Skylights

Do not use roof skylights in new construction. Skylights increase both roof maintenance costs and the potential for roof leaks. In regard to compliance with energy requirements, utilize the performance or calculated path under ASHRAE 90.1 using design strategies that avoid the use of skylights. Refer to Standard Design Criteria, Section 0-2.2 Compliance with Energy Requirements, for details.

2-6.3 Energy Conservation

To meet the explicit requirements to maximize energy-efficiency and minimize life-cycle costs, multiple alternative designs must be considered in order to justify a 'best' final selection. To meet the overall energy reduction goals, the design shall incorporate the following: Standardized BAS systems to allow remote management and control in MPF buildings.

U-factors shall be taken from the current version of ASHRAE 90.1 based on geographic zone and building construction type or local code whichever is more stringent. Follow guidelines of the current version of ASHRAE 90.1 Roof Systems.

The A/E shall determine local utility and/or state and local government incentives, grants, and rebate programs to defray the cost of energy savings related projects and include this information in the solicitation.

2-7 Miscellaneous Building Components

The A/E shall determine applicable requirements for fire ratings of walls, ceilings, etc.

The following shall have a minimum 14 feet 6 inches of clear height.

- Mail Processing Equipment Storage
- Custodial Storage
- Stockroom
- Tool and Parts Room

Rooms located in spaces with 14 feet 6 inches or 20 feet clear heights such as custodial closets, general (or office) supplies or storage, etc. shall have acoustic ceilings at 8 feet-6 inches high.

See Appendix M1-D for finish schedule.

2-7.1 Interior Partitions

If economical, in instances where the administrative/support space is located entirely within the workroom/platform envelope, the wall separating the workroom/platform from the administrative/support area may be 10 feet. The ceilings over the administrative/support shall be properly insulated to provide acoustic and thermal comfort.

2-7.1.1 Partition Types

a. Security Walls

Interior security walls that separate public areas from USPS work areas must have vertical studs spaced 16 inches on center to underside of structural framing and covered on both sides with 5/8-in gypsum board. At these locations, provide security ceilings including the public side of the entry vestibule between the exterior entry doors and turnstiles.

Provide security walls and ceilings for any spaces related to USPIS and/or OIG covert entries, corridors, IO, etc., except lookout gallery (LOG) breakouts. Construct breakouts with 8-inch CMU to bottom of the adjoining LOG.

b. Mail Processing Equipment Storage

Walls of this room are to be gypsum wallboard construction.

Side(s) of the Mail Processing Equipment Storage room adjacent to the workroom/platform shall be open as the structure permits.

Side(s) of the room adjacent to the workroom/platform shall be sufficiently protected by floor-mounted metal guardrails to protect against forklift impacts.

2-7.2 Doors and Hardware

See Appendix M2-A MPF Door Schedule for more information.

2-7.2.1 Doors

a. Sectional Knockout Doors

Overhead doors 8 feet wide x 8 feet high will be required. One overhead door 10 feet wide x 10 feet high shall be provided at one dock to facilitate the movement of equipment in and out of the MPF. The Solicitation A/E shall determine the location of this door. Doors shall be manually operated.

b. High Speed Roll Up Doors

High Speed electrically operated doors are to be utilized between Workroom and Platform when impact doors are impractical, or the space does not allow for impact door swings and most traffic is motorized forklifts or two motors to allow for improved operations.

2-7.2.2 Hardware

a. General

All doors designated for emergency egress only shall have the following features:

- Local alarm and horn with strobe light above the door, reference Module 1, paragraph 5-7.6 for emergency exit only doors.
- Locksets shall be ANSI Grade One “Locks and Trim” A 156.13. Lever handles shall be cast or forged. Finish to be satin stainless steel US 32D. Provide heavy duty door closers complying with ANSI/BHMA A156.4.

b. Security

A computerized access control system and turnstiles are required. Provide deadbolt/mortise lock at all exterior doors and doors leading from public space(s) to the Workroom/Platform.

Provide security components at openings identified in Module 2A, Exhibit 5-7.4a.

Module 2A

c. Keying

A lockable key cabinet shall be provided and sized to hold all keys for the facility. The key cabinet should be installed in the maintenance office in MPF.

2-7.3 Vertical Circulation

2-7.3.2 Stairs and Ladders

Provide permanent, safe, OSHA and code compliant means of access to all roof and roof-mounted equipment, including mechanical equipment and roof drainage systems requiring maintenance.

Provide stairs for primary roof access and at all roof elevation changes in excess of 30 inches.

If ladders are used anywhere, they must be OSHA and code compliant. Note that OSHA's newest regulations require personal fall protection on fixed ladders of 24 feet or taller that are installed on or after November 19, 2018. Traditionally designed "cages" will not be considered compliant.

2-7.4 Protective Barriers

P2-7-4e→e1

See Module 1 for the general requirements for protective barriers. For Mail Processing Facilities with customer service functions, see Module 2B for protective barriers required for customer service areas.

All interior and exterior walls, not constructed of masonry or concrete, in the Workroom, on platforms or loading docks, or anywhere else that will be subject to damage from MTE, fork-lifts, PITs, and AGVs must be protected by galvanized highway-type guardrails, placed tight against the walls. In addition, protect walls with FRP or aluminum panels in accordance with the expected impact level as per Module 1.

In prefabricated structures, protect the exterior metal panel system from damage by fork-lifts with steel angles attached to the floor below the guardrail.

Interior and exterior concrete masonry or cast concrete walls may be protected with multiple rows of plastic lumber bumpers at the appropriate heights, but guardrails may be used instead if the walls may be subject to high levels of impact.

Guardrails may be used to protect other elements, such as columns, machinery, and equipment, and be used to separate functional areas, but if the guardrail is not against a wall and may impacted from both sides, then it must be double sided.

Service areas, such as break areas, satellite vending areas, equipment storage, and maintenance areas, that are within or adjacent to the Workroom, must be protected on all the sides that are open to the Workroom. Use overlapping barriers, positioned to be compliant with Handbook RE-4, to permit employee access.

All swinging doors that open into areas where MTE, fork-lifts, PITs, and AGVs may be present must be in a recessed alcove that is at least as deep as the width of the door, or the widest door leaf for double doors, regardless of whether the door swings in or out.

Protect interior columns exposed to vehicle or machinery traffic by means of concrete encasement at the base of the columns. However, columns next to large automation equipment, but not adjacent to MTE, fork-lift, PIT, or AGV

traffic, do not need concrete protection. Coordinate closely with the Operational Space Layout to determine the locations of these columns.

Do not locate electrical panels or floor-mounted bollards in areas where MTE, fork-lifts, PITs, and AGVs may be present. However, other elements, such as piping, conduit, roof drains and similar items, must be protected from MTE, fork-lifts, PITs, and AGVs by either recessing them or using other forms of protection.

In non-vehicle traffic areas where bollards are used, and are spaced more than 18 inches clear, provide chains between the bollards, and attach the chains to the bollards using fence post clamps. Chains and clamps must have a minimum 1750-pound capacity.

In mechanical and maintenance corridors, or other areas where the gypsum wallboard walls may be damaged, line the walls with fiberglass reinforced plastic (FRP) panels to a height of 48 inches above the floor. If the potential level of impact is high, then aluminum panels may be considered as per Module 1.

See the BDS Standard Detail Library for details regarding guardrails, column encasement, bollards, dock door protection, platform stair railings, etc.

2-7.5 Building Identification and Signage *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

All room identification signage and signage at egress doors shall be RE4 compliant tactile signage, with raised characters and Braille.

2-7.5.2 Platform Dock Door Numbering

Dock door numbers shall be visible on both interior and exterior side with door in any position. On the exterior, the numbers shall be placed in clear view centered on the door above the dock canopy, or wherever they would be the most visible from a distance. The signs shall be a minimum of 16 inches x 24 inches with 12 inch high x 2 inch wide reflective numbers. On the interior, install door number signs in clear view above any obstructions. Place them on doors if “high-rise” doors are installed. In addition, place numbers above doors on wall that will be readable with door in closed position.

2-7.5.4 Exterior Signage

Module 4C

Exterior signage shall be provided for all applicable aspects of site and building. It shall comply with this document and with criteria in Module 4C, Exterior Signage. *(Also refer to Module 4C)*

The Solicitation A/E developing the site-specific Solicitation will provide site location plans showing the location of selected sign types, scaled elevation drawings showing the location of building attached sign elements and power requirements, fabrication design control drawings for all custom signs, landlord approval services, and a completed order form for site signs.

The Solicitation A/E’s design work includes showing locations of the monument sign (“Corporate Horizontal Illuminated Wall Sign”) or official rectangular “Corporate Horizontal Illuminated Wall Sign” if necessary, directional signs, BMEU sign if applicable and DOT traffic control signs.

For exterior signage, refer to Signage Pricing Forms in the Direct Vendor folder. All exterior signs shall be purchased through the USPS direct vendor in accordance with Specification Section 101404.

2-9 Criminal Investigative Systems

The following MPF facilities require a Criminal Investigative System:

- MPF's with workrooms under 60,000 square feet may require an CIS consisting of a CCTV system and an CIO if 10 year projected complement exceeds 28 carrier routes.
- MPF's with workrooms 60,000 square feet and larger require a CIS that consists of a CCTV system and an CIO.

2-9.1 Criminal Investigative Office (CIO)

Mail Processing Facilities require a secondary covert entrance vestibule, with breakout door into the workroom/platform, at the opposite side of the workroom/platform from the CIO.

2-9.2 Evidence Rooms

Evidence rooms are intended for temporary secure storage of evidence or contraband, typically in separate lockable cages within the room. Coordinate specific room size requirements with USPIS.

The evidence room must be constructed with security walls and security doors. The security doors must be must be minimum 16-gauge steel (reinforced hollow metal core) or 1 3/4-inch solid wood core, in 16-gauge frames, with 14-gauge hinges. Door shall be equipped with UL437-rated high-security series deadbolt, heavy-duty automatic closer and storeroom lockset. Keying for the deadbolt must not be on any master keying system. Only the evidence custodian and backup should have access to the key.

The security or demising wall must have (at a minimum) nominal 2-inch by 4-inch wood or 3-5/8-inch, 20-gauge metal upright studs spaced 8-inches on center and covered on both sides with 5/8-inch (minimum) gypsum board and reach up to the structural deck above or provide a security ceiling matching the requirements for the wall construction. As an alternative, the studs may be spaced 16-to-24-inches on center if a layer of 5/8-inch (minimum) plywood, number 13 cold-rolled flattened expanded metal, or a 22-gauge cold-rolled steel sheet is installed under the gypsum board on the exterior side. Provide resilient floor tile and vinyl base.

The room must include an IDS, zoned separately from the rest of the IDS, with door contacts and a motion sensor and must have mechanical, electro-mechanical, or electronic access control. Duct and vent penetrations shall not exceed 96 square inches and shall provide 100% exhaust for evidence room, including special filtration, if deemed appropriate. Refer to SDC Mod. 2A 5-9.2 for electrical requirements, as well as Handbook AS-504 Space Requirements, and the project-specific Form 929.

2-9.3 Holding Cells

Holding cells or rooms shall be rectangular in shape with no dividing walls or partitions, a minimum of 60 square feet, with quantity to be determined by USPIS based on anticipated requirements.

The holding rooms must be constructed with security walls, security ceiling if the walls do not extend to the structural deck, and security doors. The security doors must be must be minimum 16-gauge steel (reinforced hollow metal core) or 1 3/4-inch solid wood core, in 16-gauge frames, with 14-gauge hinges. Outward swinging doors shall have non-removable pins. Provide 96 square inch opening with security glass in door. Door hardware shall be tamperproof, provide high security mortise deadlock with minimum 1

inch bolt throw keyed both sides; door pull ingress side, push plate egress side.

The security or demising wall must have (at a minimum) nominal 2-inch by 4-inch wood or 3-5/8-inch, 20-gauge metal upright studs spaced 16-inches OC and covered on both sides with 5/8-inch (minimum) gypsum board with a layer of 9 gauge expanded metal behind the gypsum board on the cell side of the wall. The gypsum board on the cell side shall be the impact resistant type. The expanded metal shall be securely anchored to the studs at 12-inches on center. The walls shall extend to the structural deck above or there shall be a ceiling constructed in the same manner as the security wall. Ceiling height shall be 9 feet minimum. No windows are permitted other than the door window. Provide resilient floor tile and vinyl base. All paint finishes must be Epoxy.

Provide sound attenuating insulation between the studs in the wall cavity and acoustic sealing on top and bottom of each side of the walls as required to develop an STC rating of 45 for the room. Provide seals and sweeps for doors accessing the room to maintain the STC rating.

Duct and vent penetrations shall not exceed 96 square inches. Sprinkler heads must be flush pendant with a tamper-resistant escutcheon, and a retaining flange that prevents sprinkler movement away from wall or ceiling.

Lighting shall be recessed penal-grade vandal resistant, 70 FC and 40 FC. Provide lighting level of 30 FC average maintained. Emergency lighting must be provided. Locate switch outside of room. No outlets or switches are permitted in room. Each holding cell to have a vandal resistant ceiling mounted CCTV camera.

Provide a metal bench approximately 60 inches long by 20 inches wide, securely fastened to the wall or floor at a height of 16 inches. All fasteners used must be non-removable from the room interior.

Module 2A - Mail Processing Facilities

Chapter 3 - Structural

3-1 Introduction

3-2 Design

3-2.2 Foundation Design Criteria
3-2.3 Design Loads
3-2.4 Column Design/Framing Systems

3-3 Computations

Chapter 3 - Structural

3-1 Introduction

The requirements set forth in this section are based on single-story structures. In the event that multi-story construction is required due to site-specific conditions, provide a written deviation request regarding appropriate design to the USPS for approval prior to design.

3-2 Design

3-2.2 Foundation Design Criteria

Foundation design must be in accordance with site-specific recommendations dictated by a registered geotechnical engineer.

3-2.2.1 Ground Floor Design Criteria

Based on recommendations from the geotechnical report, design ground floor as a non-structural slab-on-grade or a structural slab supported by elements such as grade beams and deep foundations. In both cases, include in the design strength and serviceability requirements, and minimize the potential for cracking of the slab to the fullest extent possible based on current ACI design and construction standards. Owner expectations include long-lasting, durable floors that remain serviceable for the life of the structure. Workroom/platform floors are subject to frequent (24-hours a day, 7-days a week) hard-wheeled material-handling vehicles. For structural floors (i.e. slabs-on-piles), significant amounts of additional reinforcement beyond that required by ACI 318 will almost certainly be required to maintain serviceable cracks.

(a) Strength requirements:

(i) Design of non-structural slabs-on-grade must be in accordance with ACI 360.

(ii) Design of structural ground slabs (i.e. slab-on-piles) must be in accordance with ACI 318.

(b) Serviceability requirements:
Concrete floor and slab construction must be in accordance with ACI 302 and must include but not be limited to the following considerations:

(i) General – MPF are subject to frequent vehicular traffic with hard wheels and emphasis is placed on long-lasting, durable floors with stable joints that maximize functional efficiency and vehicle driver safety.

(ii) Classification: ACI 302 Class 6 Floor – Exposed surface with normal to hard steel-troweled finish subject to frequent vehicular traffic and hard wheels. Special considerations include good uniform subgrade, joint layout, and curing. Special dry-shake hardener is not required.

(iii) Do not use any vapor barrier under concrete slab-on-grade unless recommended by geotechnical report due to soil conditions or when the slab will be covered with a flooring system which may

include but not limited to: resilient tile, ceramic tile, and epoxy floor coating.

(iv) Non-structural Slabs-on-Grade

A 6" unreinforced slab may be utilized when recommended by the geotechnical report. The concrete strength and mix design must be determined by DBE (A/E) based on the specification section 033000 and the following criteria: (1) the soil condition and geotechnical report recommendations, (2) sub-base design, (3) availability of material and local conditions, (4) crack free slab as practical, (5) cost effective design and (6) stringent construction quality control/assurance requirements.

(v) Structural Slabs

Slabs supported by deep foundations such as piles are highly restrained and will almost certainly require more reinforcement for serviceability than is required by ACI 318 for strength considerations. In addition to strength design, conduct a service load stress design that accounts for slab self-weight, uniformly distributed live loads, and shrinkage. Top bar reinforcement must be sized and distributed such that the maximum computed service load stress shall not exceed 25-ksi. While ACI 318 strength design provisions allow for banded type reinforcement, give consideration to additional distributed top reinforcement for crack control.

(vi) Specified slab minimum flatness/levelness tolerance (F_F/F_L) must be 35/25.

(vii) The structural engineer must work with the concrete material supplier to optimize the mix design to the extent practicable with the goal of minimizing shrinkage while maintaining the necessary workability, pumpability, placeability and finishability. Evaluate and optimize the concrete mixture with regard to aggregate blending, coarseness factor, 0.45-power chart, and mortar fraction. Specify that the total air content must not exceed 3%.

(viii) A preconstruction meeting shall be held with all stakeholders present to review the design requirements, construction methods, quality assurance and quality control procedures. Review concrete mix design(s) during the standard submittal process for compliance with ACI 302 recommendations.

(ix) Provide contraction joins in slabs on ground at column lines and intermediate between column lines at 15 feet on center each way maximum spacing. All contraction and construction joints that receive an exposed finish shall be sealed with a two-part semi rigid epoxy and have a minimum Shore A hardness of 80, when measured with ASTM D2240. Sealant in isolation joints must be a two-part elastomeric type, polyurethane base.

(x) Reinforcement must consist of deformed steel bars, welded wire fabric or polypropylene fibers. Provide plate dowels across all joints. Specify that welded wire fabric, if used, be delivered in flat sheets and installed with adequate supports.

(xi) All concrete slabs must be protected and cured for a minimum of seven days, and all exposed concrete slabs must be sealed or sealed and hardened using a liquid compound compatible with the curing method used.

3-2.3 Design Loads

3-2.3.1 Minimum Design Loads

Solicitations for new or expansion projects must request an Alternate Proposal from GC for including additional 15 PSF to roof design live load above workroom and platform. If cost difference is approximately $0.5/sf, award the Alternate as part of base contract to allow flexibility for future mechanization layout changes.

3-2.4 Column Design/Framing Systems

3-2.4.1 Column Design and Bay Sizes

Locate columns to minimize effect on USPS operations.

3-2.4.2 Additional Requirements

Building columns must be wide-flange or square hollow structural sections.

In general, provide lateral stability for the structure (to resist wind and seismic loads) by means of moment resisting steel frames along column lines in each direction. Shear walls and/or vertical X-bracing may be used at locations that do not affect facility functionality and only with the explicit approval of the USPS Project Manager.

Roof deck must be galvanized. Structural steel framing, joists, and joist girders must be shop primed.

Maintain 20'-0" clear height from finished floor to underside of lowest structural member or horizontal utility in the workroom/platform.

Provide a rubbed (sacked) finish on all exposed cast-in-place concrete (except slabs). Finish must not show wood grain or other forming irregularities. Form tie holes must be parged over and rubbed to match adjacent concrete surfaces.

Provide a shake on aluminum oxide or silicon carbide abrasive aggregate finish for all exposed concrete stair treads and landings. Provide cast safety nosing (minimum 3" x 3/8") with cross-hatched abrasive surface and integrally cast anchors at each exposed concrete stair tread.

3-3 Computations

Submit structural computations for review. Prepare calculations for all load-carrying members in a neat, orderly and clear manner. Include the following:

1) Table of Contents
2) Design criteria and assumptions.
3) List of appropriate technical references.
4) Cut sheets and/or related data for special items unique to the design.
5) If computer program generated output is included, include a brief narrative and/or list of assumptions specific to the computer model(s). Hand-written notes on computer output are suggested to highlight conclusions. Also, include a CD-ROM or DVD with copy of the final model(s) and naming convention for each structure.

Final drawings and computations must be signed and sealed by the Engineer of Record.

Module 2A - Mail Processing Facilities

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope
4-1.2 Codes and Standards
4-1.3 Mechanical Commissioning
4-1.4 Mechanical Measurement and Verification (M&V)

4-2 HVAC

4-2.1 Energy Conservation
4-2.3 Outside Design
4-2.4 Inside Design
4-2.5 Space Specific Requirements
4-2.6 Design Loads
4-2.7 Thermal Transmittance (U-factors)
4-2.8 Computations
4-2.9 Zoning
4-2.10 HVAC Controls
4-2.11 Heating Systems
4-2.12 Air Handling Systems
4-2.14 Advanced Metering
4-2.15 Miscellaneous HVAC Requirements

4-3 Plumbing

4-3.1 Water Supply Systems
4-3.2 Sanitary Drainage Systems
4-3.3 Plumbing Fixtures
4-3.4 Storm Drainage
4-3.5 Building Fuel Systems
4-3.6 Compressed Air Systems
4-3.7 Miscellaneous Plumbing Requirements
4-3.8 Computations
4-3.9 Storage Tanks

4-4 Miscellaneous HVAC/Plumbing Components

4-4.1 Motors and Controllers
4-4.2 Pumps, Piping and Fittings
4-4.3 Insulation
4-4.4 Sound and Vibration Control

4-5 Fire Protection

4-5.1 Sprinkler Systems

4-6 Not Used

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope

The design criteria within this document specify mechanical requirements for design and construction of new MPF. For expansion of an existing MPF, a Life Cycle Cost Analysis must be performed to determine the most cost effective solution for mechanical systems for the new space. Refer to Module 3, R&A Criteria. The mechanical systems must provide year-round control of temperature, humidity, air circulation, ventilation, and air cleaning to the degree required to ensure the safe and efficient use of space by occupants and equipment.

Whenever unique problems or conditions not covered herein are encountered, the A/E must follow generally accepted industry practices as reflected in the latest issue of the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) handbooks and the National Institute for Occupational Safety and Health (NIOSH) Criteria for a Recommended Standard for Occupational Exposure to Hot Environments. Refer potential solutions and their recommendations to USPS Design and Construction (D&C) Authority for final approval.

The A/E must provide a complete mechanical, plumbing and fire protection design for the facility in accordance with the issuance of site specific program requirements. The A/E shall be responsible for the complete performance and installation of all systems; the provided systems must be fully coordinated between disciplines, trades and existing conditions, functional and consistent with the architectural design developed for the building along with site specific facility functional requirements.

The solicitation A/E must determine all loads of mechanization and automation equipment such as heat gains, compressed air, etc. The A/E must verify mechanization and automation equipment loads prior to final design and prior to ordering equipment to ensure that any changes that may have occurred have been properly evaluated or accounted for in the design.

4-1.2 Codes and Standards

Design MPF in accordance with the requirements set forth by the applicable national, state and/or local codes and standards enforced at the time of design. In addition, follow the design criteria contained in this document. Where two or more codes, standards or USPS criteria are in conflict, the more stringent shall apply.

Design all new Postal facilities to comply with the Energy Policy Act (EPAct) of 2005 and the “Energy Independence and Security act of 2007” in accordance with the Mail Processing Facilities Design Criteria and the current version of ASHRAE 90.1. When the latter two standards are in conflict, follow whichever is more stringent, unless explicitly excluded within the Mail Processing Facilities Design Criteria. These mandates require that all new facilities be designed to exceed the baseline energy consumption as calculated by ASHRAE Standard 90.1 by 30 percent or the greatest extent practicable.

For projects that have a significant impact on the cost of energy, an ECC-S* (Energy Compliance Certification – Standard) package must be completed and submitted to Facilities Program Management, Energy/Standards Team Leader at the 30% design phase to get project approval, and again at project acceptance, which occurs after Commissioning and Measurement & Verification are completed.

The calculation of proposed building energy consumption and the baseline building energy consumption must follow the requirements as defined in the current version of ASHRAE Standard 90.1 Appendix G Rating Performance Method. These requirements apply to both new construction and additions greater than 20,000 square feet.

The A/E must submit the following with the 30% and 100% design levels as a minimum, and as specified by the Project Manager. Forms and drawings submitted must be stamped by a Professional Engineer.

- Performance Rating Report**
- Building Envelope Compliance Documentation**
- HVAC Mandatory Provisions**
- Service Water Heating Compliance Documentation**
- Lighting Compliance Documentation**
- Equipment selections and alternatives documented in a life cycle cost analysis (LCCA). The LCCA must utilize the:
  - Latest edition of NIST Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program.
  - Current USPS economic factors for the LCCA. These factors can be obtained from the USPS Intranet and will be provided by the USPS (USPS Memorandum titled “Decision Analysis Report Factors/Cost of Borrowing/New Facility Start-up Costs Update”).
- Building heating and cooling load calculation summary output from the load simulation program.
- Provide an electronic archive of the building models from the software system used to perform the simulations along with a brief description of the software and release version used to perform the simulation.

Notes:

* The most up-to-date version of the ECC-S Workbook (which contains the ECC-S Form) can be obtained from the USPS Project Manager. A sample copy of the ECC-S Form can be found in BDS folder G.2, Energy and Sustainability.

** ASHRAE 90.1 Appendix G Compliance Forms are available at: *www.ashrae.org/standards-research--technology/standards-forms--procedures*.

Energy consumption for the purposes of calculating the 30 percent savings must include space heating, space cooling, ventilation, service water heating, lighting and all other energy consuming systems normally specified as part of the building design except for receptacle and process loads.

The energy consumption levels for both the baseline building and proposed building must be determined by using the Performance Rating Method found in Appendix G of the current version of ASHRAE 90.1 except the formula for calculating the Performance Rating in paragraph G1.2 must be modified regarding exclusion of receptacle and process loads to read as follows:

Percentage improvement = 100 x $[(B_1 – P_1)/ B_1]$ where,

B_1 = ASHRAE Compliant Baseline building consumption (w/o receptacle and process loads)

P_1 = Proposed building consumption (w/o receptacle and process loads)

Kitchen ventilation systems must be considered as part of the ASHRAE-covered HVAC loads subject to the 30 percent savings requirements, rather than as process loads.

Materials, equipment, and systems must be designed and installed to comply with the EPA Safe Drinking Water Act.

Where required by the building code, provide seismic bracing and anchors. Comply with SMACNA Seismic Restraint Manual.

4-1.3 Mechanical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services. The information below is specific to Mail Processing Facilities for new construction, expansions, and alternate quarters projects.

4-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation for Design/Build (DB) and Design/Bid/Build (DBB) projects. However, development of a Commissioning Plan must commence no later than at the 10% design stage for special projects such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generator Projects.

For Design/Build (DB) projects the A/E preparing the solicitation documents must include an outline of the Commissioning Plan so that the DB contractor is informed of the extent of the commissioning that will be required for the project. The A/E and the Design/Build Entity (DBE) are responsible for coordinating with the commissioning agent as necessary to assist in completing the Commissioning Plan. The DBE is also responsible for providing assistance from their subcontractors, such as testing and balance, BAS controls, HVAC, plumbing, etc., to confirm that the functionality of the new equipment meets the original design intent, operates efficiently, and demonstrates that all of the required features of the new system are functioning as specified in the design documents.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” must be utilized to develop the Commissioning Plan and associated Test Procedures. In addition, the appropriate USPS specifications sections, i.e. “220800 - Commissioning of Plumbing”, “230800 - Commissioning of HVAC”, and “250804 - Building Automation System (BAS) Commissioning”, must also be utilized.

Also, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

4-1.3.2 Commissioning Requirements

When commissioning systems or equipment, it must be performed on a sampling basis. See Module 1, 4-1.3.1 Observation and Testing Requirements, for the sampling rates for each system.

The degree of commissioning that will be required for the project must be determined by the USPS Project Manager and the solicitation A/E, but for any type of MPF project that includes the following systems, they must be commissioned:

- HVAC Systems, including associated Chillers, Cooling Towers, Heat Exchangers, Pumps, Air Handling Units, Variable Frequency Drives (VFD)
- Building Automation System (BAS)
- Enterprise Energy Management System (EEMS)
- Compressed Air Systems

The Project Manager may also decide to require other mission critical systems and equipment to be commissioned, such as:

- Chillers
- Cooling Towers
- Heat Exchangers
- Sewage Ejector Pumps
- Water Pumps
- Air Handling Units
- Variable Frequency Drives (VFD)
- Fire Protection Systems
- Plumbing Piping Systems

4-1.4 Mechanical Measurement and Verification (M&V)

See Module 1, 4-1.4 Mechanical Measurement and Verification (M&V), for general information about Mechanical M&V.

Any Mail Processing Facility project, including new construction, expansions, and alternate quarters, that has a component or system where one of the primary objectives is reducing energy consumption, then that component or system must be measured and verified to determine actual energy savings performance at construction completion.

The performance of HVAC systems and compressed air systems installed as a part of a new MPF project, or an expansion project, must be measured and verified. Special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electric Generation, must also be measured and verified.

The USPS prohibits the use of any refrigerant that contains CFC (chlorofluorocarbon) or HCFC (hydrochlorofluorocarbon) that is on the EPA Regulatory Phase-out Schedule.

All packaged and split systems purchased for new construction or replacement must utilize SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends.

4-2.1 Energy Conservation

4-2.1.1 Conservation/Environmental Measures

The following measures must be considered by the A/E when designing systems and selecting equipment:

- Cooling equipment, heating equipment and domestic water heaters must carry the Energy Star label when available in the market.
- Systems must not be oversized because such systems are not energy efficient or cost-effective.
- Part load performance must be analyzed and kept as high as practical. To keep part load efficiencies high while providing redundancy, multiple smaller systems must be used. Analysis demonstrating this part load performance must be provided to the USPS.
- Block loads (building heating and cooling requirements) must reflect the basic building requirements without adding safety factors and must utilize peak coincident loads to take into account plant/system diversity.
- Provide systems that avoid reheating and/or re-cooling for humidity control.
- Provide automatic controls to de-energize heating, cooling, and fan equipment when not needed.
- Analyze estimated energy consumption including peak consumption. If more roof or wall insulation is justified to reduce peak consumption or reduce size of mechanical equipment, make recommendations to the USPS.
- Ensure that VAV System sequences of operation include supply air temperature reset based on VAV zone demand in order to avoid the need for reheat of supply air at VAV boxes. Reheat of air that has been mechanically cooled is a waste of energy.
- Provide the most efficient heating and cooling systems available considering the building operation and local weather conditions, e.g. evaporative cooling or pre-cooling systems in dry weather conditions. Also, consider air-air heat exchangers or heat wheels for preheating or pre-cooling ventilation air requirements. Most efficient systems must be based upon life cycle cost analysis of acceptable options.
- Systems must use commercially available non-ozone depleting refrigerants approved under EPA's SNAP Program, which currently includes many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends. The use of CFCs and HCFCs is not permitted.

- Refer to Standard Design Criteria, Introduction, Section 0-2.2 Energy Conservation, for detailed energy mandate statement.

4-2.1.2 Equipment Performance

Select HVAC equipment efficiencies based on Exhibit 4-2.1.2a and the current edition of ASHRAE 90.1. When there is a conflict, use the stricter of the two. For systems larger than those shown, select following ASHRAE 90.1. In all cases, the highest efficiency units commercially available, beyond the recommendations of ASHRAE, must be used if life cycle cost effective for the USPS. The USPS Project Manager must make the final determination based on the A/E's analysis.

Exhibit 4-2.1.2a
HVAC Equipment Efficiencies

UNIT SIZE	SPLIT SYSTEM EFFICIENCY STD. (including heat pumps)	PACKAGED SYSTEM EFFICIENCY STD. (including heat pumps)
< 5 tons	15.00 SEER	14.00 SEER
≥ 5 Tons < 10 tons	11.00 EER	11.00 EER
≥ 10 Tons < 20 tons	11.00 EER	11.00 EER
≥ 20 Tons	10.00 EER	10.00 EER

4-2.3 Outside Design

The design must be based on weather data provided in the current edition of the ASHRAE Fundamentals Handbook based upon Exhibit 4-2.3a.

Exhibit 4-2.3a
Weather Data

SEASON	BASIS[1]
Summer	1% column for Cooling DB/MCWB 1% column for Dehumidification DP/MCDB
Winter	99% column Heating DB 99% column for Humidification DP/MCDB

Keyed Notes:

1. DB = Dry Bulb Temperature, MCWB= Mean Coincident Wet Bulb Temperature, DP = Dew point Temperature, MCDB = Mean Coincident Dry Bulb Temperature.

For locations not listed in the ASHRAE Fundamentals Handbook, design must be based on local climatological data obtained from the U.S. Department of Commerce, Environmental Science Services Administration, or from Air Force Manual AFM 88-29, Engineering Weather Data.

4-2.4 Inside Design

Unless noted otherwise in Exhibit 4-2.4a below, if the indoor relative humidity within a facility generally cannot be maintained naturally at a minimum of 20% RH in the winter, provide humidification for the occupied spaces. In those cases, design humidification systems to maintain a 20% relative humidity. Include water filtration when local water source is considered "hard" or mineral content would cause system maintenance issues. Some

humidifiers require hard water for proper operation and therefore, filtration must be as required by the humidifier manufacturer.

Design conditions for spaces must be in accordance with Exhibit 4-2.4a, where applicable.

Exhibit 4-2.4a
Inside Design Space and Temperature Conditions

SPACE[2]	SUMMER[1]	WINTER[1]
Computer Rooms	See section 4-2.5.2	See section 4-2.5.2
Telecommunications Rooms	See section 4-2.5.4	See section 4-2.5.4
Enclosed Mail Platforms	No Cooling Ventilation Only	45°F DB (See notes 3 & 4)
Workroom[5]	78°F DB and 55% RH	65°F DB

Keyed Notes:

1. DB = Dry Bulb temperature, RH = Relative Humidity; RH values shown in table are intended to be design values, not maximums or minimums.
2. The operating hours, conditions, and population at various times of the Facility used for analysis must be developed in conjunction with Plant personnel. These assumptions must be stated in reports to USPS.
3. Per MS-49, Energy Conservation and Maintenance Contingency Planning TL-3.
4. Platform must meet all applicable ASHRAE ventilation and outside air standards and must be designed to meet all OSHA standards including but not limited to Wet Bulb globe temperature. Special consideration must be given to use of economizer cycles in appropriate climates.
5. In Workrooms that do not operate 24/7, when unoccupied, setback inside design conditions for heating to 55°F and cooling to 85°F.

4-2.5 Space Specific Requirements

4-2.5.1 Non-Heated Spaces

Prevent freezing of piping located in non-heated spaces by providing minimum heating to 40°F or heat trace.

4-2.5.2 Computer Rooms

The Solicitation A/E must provide anticipated USPS equipment loads (UPS, servers, switches, lighting, etc.) in the space and occupancy load based upon input from USPS personnel. The A/E must utilize this information along with specific location weather data and other appropriate air-conditioning load information to determine the air-conditioning loads to the space.

A separate means of control for the Computer Room must be provided to maintain space temperature and humidity at 72°F and 40-50% RH, respectively (with the ability to be controlled at a temperature of 77°F degrees and 40-50% RH by the user). Uninterruptible cooling must be provided that will meet the ANSI/TIA/EIA 942 classification for Tier 3 (99.9% Up-Time Reliability) of n+1 redundancy. The A/E must utilize psychometric analysis in addition to load analysis to properly size the equipment taking into account necessary part-load (compressor staging, hot gas bypass, etc.) performance to provide equipment that will operate most efficiently and effectively during all load conditions.

Design of the computer room air-conditioning and rack layout must meet the current requirements and recommendations of ASHRAE's Thermal Guidelines for Data Processing Environments based upon the space design, racks and equipment configuration. The A/E must utilize equipment that is highly energy efficient (high EER value, premium efficiency motors, soft start, etc.) due to the 24 hour operation of the space and the controls must be provided such that the availability of setback temperatures for low heat load capabilities can be applied to increase long term energy savings. Temperature and humidity sensing to control air-conditioning must be at the top portion of the racks, where the actual control is desired. The systems must utilize environmentally friendly SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends. Design of the air distribution (ductwork, air devices, etc.) for the air-conditioning system must be such that hot aisle return and cold aisle supply methods are utilized to maximize cooling efficiency and system effectiveness. The A/E must reduce air bypass (recirculating hot air or loss of cold air) by coordinating with USPS operational personnel to utilize rack system blank-off panels, cable cutout fill in systems or other appropriate methods.

4-2.5.3 Battery Charging Areas

See Architectural 2-4.14.

4-2.5.4 Telecommunication Equipment Room

The Solicitation A/E must provide anticipated USPS equipment loads (UPS, servers, switches, lighting, etc.) in the space based upon input from USPS personnel. The A/E must utilize this information along with specific location weather data and other appropriate air-conditioning load information to determine the air-conditioning loads to the space.

A separate means of control of the Telecom Room must be provided to maintain space temperature and humidity at 75ºF with a low end humidity level of 20% RH, respectively (with the ability to be controlled at a temperature of 77°F degrees and 40-50% RH by the user). If sufficient data is provided regarding the temperature and humidity level requirements of the equipment in the space that differ significantly with the values above, then those values can be used after notifying the Solicitation A/E and USPS. The A/E must utilize psychrometric analysis in addition to load analysis to properly size the equipment taking into account necessary part-load (compressor staging, variable refrigerant flow, variable speed fans, hot gas bypass, etc.) performance to provide equipment that will operate most efficiently and effectively during all load conditions.

Where 24/7 operation of a facility allows use of the buildings normal air-conditioning system(s) to be utilized, separate systems would not be required provided that separate temperature control is provided and load analysis indicates that the environmental requirements necessary for the equipment are met.

The A/E must utilize equipment that is highly energy efficient due to the 24 hour operation of the space and the controls must be provided such that the availability of setback temperatures for low heat load capabilities can be applied to increase long term energy savings. The systems must utilize environmentally friendly non-CFC/non-HCFC refrigerants. Design of the air distribution (ductwork, air devices, etc.) for the air-conditioning system, where applicable, must be such that hot aisle return and cold aisle supply methods are utilized to maximize cooling efficiency and system effectiveness. The A/E must reduce air bypass (recirculating hot air or loss of cold air) by

coordinating with USPS operational personnel to utilize rack system blank-off panels, cable cutout fill in systems or other appropriate methods.

4-2.5.5 Lunchrooms and Breakrooms

For lunchrooms with a grill, provide kitchen hood exhaust system and associated fire suppression system. Also, provide a grease trap at the hood with an alarm. Provide a compensating kitchen hood with makeup air system containing heat, if required.

4-2.5.6 Criminal Investigative Office (CIO)

Criminal Investigative Offices must be considered a separate zone of the adjacent HVAC system. The Criminal Investigative Office must have independent temperature control utilizing dedicated motorized dampers or VAV boxes as appropriate for the adjacent HVAC system.

4-2.5.7 Platform

Provide one gas unit heater or radiant heater for each pair of overhead dock doors.

4-2.5.8 Workroom 010 Operation

When there is a 010 Loose Mail Operation, USPS Engineering will provide a VFS (Ventilation Filtration System) on the 010 equipment. The VFS will have significant heat output and electric power requirements. Solicitation A/E must verify the heat output and power requirements.

Also when there is a 010 operation, provide pressure sensors, as necessary, and balance the air system so that Workroom/Platform air does not commingle with air of the following spaces: Employee Support (including Lunchroom), Maintenance Support, Administration and the part of the BMEU that is separate from the Workroom. Balancing must be locked. Pressures in the following areas are to be balanced so that pressures are maintained from highest to lowest: Support and Administration, Workroom/Platform. Provide two clearly labeled manual switches on the energy management and control system. These are to shut down the air handlers in the Workroom/Platform.

4-2.6 Design Loads

4-2.6.1 Heat Gain from Equipment

Base heat gains from equipment on the actual loads released to the space. For office areas, include 1 personal computer per employee in calculations.

The Solicitation A/E must determine site specific heat gains from USPS equipment including mechanization and automation.

4-2.6.2 Heat Gain from Occupants

For office space, heat gains from occupants must be in accordance with ASHRAE standards. For the Workroom/platform, use 345 BTU/hour/person sensible heat gain and 435 BTU/hour/person latent heat gain. If actual occupancy of the Workroom/platform is not known, use 300 sq. ft/occupant.

4-2.7 Thermal Transmittance (U-Factors)

U-factors for all buildings must be taken from the current version of ASHRAE 90.1 based on the geographic zone and construction method for the roof, walls, glazing, and floor.

To cost effectively meet the energy conservation requirements (refer to 4-2.1 Energy Conservation), it may be necessary for the A/E to recommend U-factors lower (i.e., higher R-value) than those listed in ASHRAE 90.1. The A/E must provide a study to justify the actual U-factors used in the design.

Design walls, roofs, glass, floors and other building components including HVAC and lighting systems to provide a maximum overall U-factor (maximum heat loss coefficient). Provide U-factors to assure thermal comfort of occupants and account for radiant temperature losses. Base R-value of insulation on diminished thermal performance as the insulation ages.

4-2.8 Computations

Provide the following computations as well as any other applicable computations as required for proper sizing of the systems to USPS for review:

a. Heating Capacity Sizing

   Base the heating capacity on maximum instantaneous overall building envelope (block) heating load.

b. Cooling Capacity Sizing

   The cooling capacity must be based on maximum coincident peak building envelope (block) cooling load plus loads from occupants, lighting, and equipment.

c. Individual Zone Heating and Cooling Loads

   The individual zone loads must be based on the time of day which its individual peak occurs.

d. Ventilation

   Provide minimum and maximum ventilation requirements for the total building. Provide minimum ASHRAE recommended positive building pressurization during all operational conditions to prevent excess intrusion of unconditioned air. Workrooms must be considered with fully closed doors when calculating for pressurization requirements.

e. Static Pressure Drop

   Provide static pressure drop calculations for sizing of fans and air handling units.

f. Psychrometric Analysis

   Prepare a psychrometric chart study for each type of air handling unit. The study must include the following:

   - Outside and inside design temperatures.
   - Temperature rise caused by return-air.
   - Temperature rise caused by fans.
   - Return and outside air mixture conditions.
   - Coil air entering and exiting conditions.
   - Bypass and exiting air mixture conditions.
   - Space sensible heat ratio lines.
   - Air volumes (supply, return, exhaust, etc.)

g. Heating Capacity Sizing

   Credit should be taken for 50 percent of the Workroom/Platform lighting load, 50 percent of Postal mechanization and automation for both fixed and no fixed loads (if applicable), and up to 100 percent of the HVAC motor loads provided the heat is made available to the occupied space.

h. Individual Zone Heating

   For calculating the heating at loading dock areas, take into account that up to 75 percent of the loading dock doors may be open, with 8’ x 8’ x 53’

long trailers in position at these doors; assume that infiltration via the dock seals is negligible.

In calculating the additional heating load necessary for the loading dock, due to the heat loss via the exterior surfaces of these trailers, use an average U-factor of 0.85 over the entire trailer surface.

4-2.9 Zoning

Arrange zoning according to occupancy, hours of operation, equipment, lighting heat gains, exposure, etc., to provide maximum comfort, efficiency, and energy conservation for the total system.

System design and zoning must be such that simultaneous operation of both heating and cooling will not be required except when allowed by the current version of ASHRAE 90.1.

Provide separate HVAC unit and controls for Criminal Investigative Unit Offices.

Group all offices and support areas with similar internal and external loading for control of temperature.

4-2.10 HVAC Controls

4-2.10.1 General Requirements

The Building Automation System (BAS) must communicate utilizing certified BACnet protocols and network standards and must be designed to comply with the requirements of ANSI/ASHRAE Standard 135-2016 “BACnet - A Communication Protocol for Building Automation and Control Networks”, including all published addenda. Design the BAS to control space conditions, monitor and maintain heating, ventilation, and air-conditioning systems, and to conserve energy. Manufacturer’s proprietary communication protocols will not be accepted, without an approved deviation. The individual products used must conform, at a minimum, to the requirements for BACnet Operator Workstations (B-OWS), BACnet Building Controllers (B-BC), BACnet Advanced Application Controllers (B-AAC) and BACnet Application Specific Controllers (B-ASC) as specified in ANSI/ASHRAE 135-2016, BACnet Annex L. Both WEB Servers and Operator Work Stations must meet the B-OWS requirements.

The Enterprise Energy Management System (EEMS) provides the ability to remotely monitor energy consuming facility-level equipment (HVAC, lighting, compressed air) in USPS buildings, including building utilities. The primary interface between the EEMS and the building is through the facility’s Building Automation System via the USPS network, accessible through a web connection on any computer, inside or outside the postal network. Following the BAS and EEMS specifications of the BDS will ensure compatibility. Other requirements are as follows:

a. The objective for the building automation system’s network of controllers is that they be manufactured by the same supplier to simplify troubleshooting and maintenance over the life of the system.

b. A/E must submit Protocol Implementation Conformance Statements (PICS) for each controller, Operator Workstation and WEB Server (WEBS) utilized.

c. No gateways must be used for communication to controllers installed. Provide BACnet compliant hardware and software to meet the BAS functional specifications.

d. Non-BACnet-compliant or proprietary equipment or systems for use as part of the BAS must not be acceptable and are specifically prohibited.

e. BACnet communication gateways between separate non-compliant BAS systems and the BAS (computer room unit's manufacturer's controllers, energy monitoring equipment, etc.) must be allowed.

f. Native BACnet communication buses must serve WEBS, B-OWS, B-BC, B-AAC and B-ASC.

g. Implement time synchronization via BACnet time synchronization services.

h. Configure alarm prioritization in accordance to the applicable categories as specified in ANSI/ASHRAE 135-2016, BACnet Annex M. Configure notification classes in a manner that distinguishes between the facilities involved and to meet any other operational needs requested by the USPS.

i. Alarms must be BACnet alarm objects and use BACnet alarm services.

j. Additional site specific BACnet requirements will be provided in the Solicitation.

k. BAS communication with the Enterprise Energy Management System (EEMS) must be established and demonstrated.

l. New, upgraded, or replacement BAS's must comply with the following Specification Sections:

- Section 250504 - Building Automation System (BAS) General
- Section 251104 - Meter and Submeter Devices
- Section 251404 - BAS Equipment, Software, and Programming
- Section 250804 – Building Automation System Commissioning

Equipment supplier must provide a complete set of as-installed schematic diagrams, diagnostic and trouble-shooting software, and a complete parts listing.

Remote field panels must be furnished as required to meet system requirements and to minimize the length of wiring runs from sensors and actuators. All remote field panels must be able to handle start/stop commands, control point adjustments, damper positioning, digital alarm and status inputs, and any intermix of analog inputs such as temperature, humidity, pressure, etc. required for a complete system.

Rooftop Air Handling Units and any packaged equipment must include BACnet compatible controllers at the I/O level with all necessary sensors, controllers and actuators. The designer must limit the number of points monitored in accordance with USPS specifications, unless otherwise specified by the Project Manager. Locate space sensors in the spaces served and provide with tamper proof covers.

The BAS must have the capability of utilizing the USPS Wide Area Network (WAN) to allow remote monitoring, adjustment and management from a centrally located EEMS monitoring station. This functionality must be provided using a WEB Server that allows interaction with the building's BAS by a standard WEB browser using standard TCP/IP communications. A computer, through a WEB browser, would function as an Operator Workstation.

For administrative areas, provide wall mounted thermostats with tamperproof covers for zone VAV terminals.

Prepare control diagrams with sequence of operation and point listings for all systems and place on contract drawings.

The control system must monitor the facility energy demand (kW) and energy consumption (kWh). The control system must include demand limiting and

demand shedding capabilities designed to limit the facility peak demand by reducing facility cooling levels. Sequences of operation must be designed to be in compliance with the requirements of the current version of ASHRAE 90.1, “Energy Standard for Buildings Except Low-Rise Residential Buildings”

The system must contain pre-programmed algorithms in an open architecture environment to control and monitor all of the following equipment applications and control strategies:

- Unitary heating systems.
- Unitary cooling systems.
- Boilers.
- Dampers.
- Valves.
- Filters.
- Heat pumps.
- Air handling systems.
- Steam, hot water, and chilled water systems.
- Pressure independent variable air volume systems and terminal units.
- Circulating pumps.
- Variable volume pumping systems.
- Ventilation units, including energy recovery systems.
- Unit heaters.
- Optimum start/stop control.
- Demand limiting control.
- Time of day scheduling.
- Calendar scheduling.
- Heating plant optimization.
- Cooling plant optimization.
- Night set back.
- Ventilation control.
- Indoor Air Quality (IAQ) control.
- Comparative enthalpy control.
- Pressure/Flow control.
- Provide power monitoring for main building service entrance.

Outside air introduced to the space must be through the air-handling units where it can be effectively controlled. Airflow monitoring devices must be used on VAV systems to monitor and control the flow of outside air into the building. The amount of outside air must vary to match the building occupancy throughout the day while maintaining proper building pressurization. Design Sequences of Operation to comply with the requirements of the current edition of ASHRAE 62.1, “Ventilation for Acceptable Indoor Air Quality”.

Locate the EEMS system head end equipment in the proximity of the Manager, Maintenance and Supervisor, Maintenance Operations. The exact location is to be determined by local staff.

4-2.11 Heating Systems

4-2.11.1 Boilers

Heat generating equipment must be the highest efficiency equipment available that is proven to meet ASME CSD-1 for boilers in the size range of 400,000 BTUH input to 12,000,000 BTUH input. For boiler systems under 400,000 BTUH, coordinate with the USPS Project Manager for CSD-1 requirements. The use of multiple, smaller, condensing boilers is recommended.

Select boilers based on part load requirements of the building and provide staging controls to minimize the number of operating boilers while maintaining space comfort.

Select primarily 2-way control valves to allow variable speed pump control, matching flow rate delivered with building demand and number of boilers in operation. Ensure that minimum pump flow is maintained to prevent dead-head pump operation. Appendix M3-A is the Boiler Replacement Guide, which should be used for boiler replacement projects.

4-2.12 Air Handling Systems

4-2.12.1 Air Distribution System

Design ductwork in accordance with the latest SMACNA and ASHRAE criteria. The design analysis submitted must include pressure loss calculations for all duct runs, volume control devices, and air diffusers.

Ductwork must be insulated only as necessary to avoid condensation. Install insulation on the exterior of the ductwork.

Horizontal ductwork in workroom/platform areas must be exposed and installed a minimum of 20'-0" from the floor to the underside of the ductwork. Vertical branch ducts serving a single diffuser may drop down to approximately 10 feet above the floor. Ductwork must be run above the ceiling whenever suspended ceilings are used. Ceiling diffusers must be coordinated with luminaires in administrative areas. Throw pattern for diffusers must be indicated on design drawings. Ductwork at the fan outlet must be sized to the fan outlet area for at least one equivalent duct diameter. Duct transitions between fan outlet and the duct distribution system must be a maximum of 15^{o}. No elbows may be used within 3 wheel diameters of the fan outlet.

Workroom/platform primary air supply must consist of vertical ductwork from each rooftop unit connecting to a square vertical plenum with registers capable of providing a 360 degree air discharge into the space. Provide horizontal supply branch ductwork to areas where air supply from the main plenum discharge will not provide adequate air circulation. Return air to the rooftop unit must consist of vertical ductwork with return openings above and away from the supply air discharge.

Office and support areas primary air supply must consist of ducts from each unit to VAV terminals. VAV air terminals must vary the volume of air supplied to the room. Air plenum above the ceiling may be used for return air. If a return air plenum is used, the A/E must design the system such that air can be effectively returned from all areas of the facility served by a particular HVAC unit and the building envelope must be properly sealed against infiltration.

Ceilings must be marked to indicate the location(s) of terminal boxes. When terminal boxes are located above gypsum board ceilings, they must be located close enough to ceiling for easy access. Access panel(s) must be installed to provide full access to terminal boxes.

Low-velocity ductwork (below 2,000 fpm) must be used to minimize fan power consumption for all constant volume systems and after each VAV box or zone damper. Design VAV systems utilizing the static regain method. Design low velocity ductwork using the "equal friction" method with friction loss rate of not more than 0.08 in. water column per 100 ft. of duct, unless otherwise noted.

4-2.12.2 Unit Heaters

Use thermostatically controlled unit heaters or radiant heaters for the heating of areas that are listed to be heated but not air conditioned or where quick response is required to compensate for the opening and closing of doors in cold climate areas. Select the heater type for each application based on the initial cost and annual energy consumption.

Provide gas-fired unit or radiant heaters in mechanical rooms, loading docks and similar areas. Provide cabinet type electric heaters for entryways and vestibules.

4-2.14 Advanced Metering

Electric, Gas and Water Metering

Provide advanced electric, gas, and water metering in every new building, and it must be of the “pulse count/pulse initiator” type metering. The pulse technology must consist of a set of dry contacts that open and close with the rotation of the dial set on the utility’s mechanical meter. This type of metering is installed by the gas or water utility company and must be the first option considered. It is a low cost approach with revenue grade accuracy. In the event this approach is not available, other options may be considered and implemented, if specifically required by the USPS Project Manager.

Metering Other Fuels

Buildings that use fuel oil and steam must incorporate advanced metering into the design. Meter data must report to the building automation system.

Refer to Module 1, Chapter 4, Section 2.9.1, for BAS system integration and coordination.

4-2.15 Miscellaneous HVAC Requirements

4-2.15.1 Indoor Air Quality Standards

These standards encompass control technologies that provide for the health and safety of building occupants by controlling thermal conditions and contaminant levels in the building interior. At a minimum, the following considerations must be made when planning a system:

- Design must be guided by site characteristics including, but not limited to, ambient air quality, temperature and humidity, exterior air quality contaminants (e.g., auto/truck exhaust, in loading docks and parking areas, power generation, hydrocarbon exhausts, nearby sources), soil gas contamination, building operations, occupancy levels, and site location.
- Plans and Specifications must at a minimum be based on the latest published ASHRAE standards, specifically Standards: 52 (for filtration); 55 (for thermal comfort); and 62 (for ventilation).

The ventilation system design must, at a minimum, incorporate:

- Ventilation and exhaust rates per latest edition of ASHRAE 62 utilizing actual anticipated occupancy rates and not occupancy based on code defined area rates. This will limit the requirement for

excess ventilation air and will reduce the size of equipment required to properly condition excess ventilation air.

- Independent exhaust ventilation for toilet rooms, graphics/printing rooms, indoor trash and recycling areas, battery areas and any other likely sources of air contaminants (where applicable). Air from these rooms must not be re-circulated or comingled with the air circulation system supplying the building. Exhaust ventilation for these areas must be provided directly to the outside. Use demand Control Ventilation, if demonstrated to be a cost effective solution through life cycle costing, to minimize outside air when appropriate.

4-2.15.2 Exhaust Systems Emissions

Exhaust systems emissions must comply with local and Federal clean air regulations. Verify local requirements for regulation of emissions and advise the project manager of any permits and equipment requirements. Project specification must require the A/E to file all required applications with appropriate agencies. Obtain required final permits and have them submitted by the A/E to the Project Manager prior to the installation of plant equipment. The design must include all required monitoring equipment.

4-2.15.3 Equipment Location

Ceiling-mounted equipment inside the workroom/platform is not acceptable because of access and maintenance limitations and objectionable noise.

Locate equipment to avoid the use of prime floor space, to prevent objectionable noise in the occupied spaces, and to maintain satisfactory exterior appearance of the building.

4-2.15.4 Building Pressurization

Design the building HVAC systems to maintain a positive pressure inside the administration/office spaces and a neutral pressure on the workroom floor, relative to the outdoors. Workrooms must be evaluated with fully closed doors, ventilation required for actual occupancy load, and Workroom exhaust air when calculating for pressurization requirements. The objective is to limit pressurization requirements and the associated outdoor air treatment in these large industrial type spaces to the minimum allowable requirement.

Pressurize platform areas with unconditioned air (where geographically possible without adversely affecting the conditioned environment) to prevent any vehicle exhaust fumes from entering the building through dock doors.

4-2.15.5 Intake Location

Install outside air intakes away from pollutant exhaust sources (toilet room exhaust, kitchen exhaust, and vehicle exhausts, etc.)

4-2.15.6 Demand Control Ventilation and Economizers

Mail Processing Facilities must utilize Demand Control Ventilation (DCV), if demonstrated to be a safe and cost effective solution, in conjunction with enthalpy based economizer technology, where applicable, when heating and cooling a building, in accordance with the current version of ASHRAE 90.1 and local building codes. DCV regulates fresh air for occupants in a building by measuring the CO_2 levels inside the space then adjusting the amount of fresh air that gets delivered to the space. An economizer is a controls logic that opens outside air dampers to allow a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather, usually in the spring and fall. DCV and economizers can be used interactively to control the same damper(s) on an RTU or Air Handler to either bring in fresh air for occupants or outside air for cooling/heating based

on the outside air temperature, humidity, and sensors and set points in the space. The advantage that DCV controls offer is that many times the fresh air requirement is adequately met by normal daily building activity such as dock doors opening and closing, air infiltration thru cracks and seals, etc. Under those conditions unconditioned outside fresh air is not needed, which reduces energy costs. If DCV is used, fresh air dampers should be completely closed, except where minimum building pressurization due to facility exhaust requires some ventilation air, until activated by the CO_2 sensors.

Specify economizers in an HVAC design in accordance with the current version of ASHRAE 90.1 geographic zones. If justifiable through life cycle cost analysis, incorporate Demand Control Ventilation into a facility based on the current version of ASHRAE 62.1 “Ventilation for Acceptable Indoor Air Quality.

If DCV is recommended, the A/E must demonstrate the benefits when applied to the typical USPS mail processing environment. Whether or not DCV is utilized, outside air brought in by the HVAC system on to the workroom floor/dock areas must limit excessive outdoor air that would require significant amounts of conditioned air relief during most operational conditions.

4-2.15.7 Evaporative Cooling

In hot, dry climates, evaporative cooling systems should be evaluated and implemented to provide cooling for the Workroom/platform when justified by life cycle cost analysis.

4-2.15.8 Testing and Balancing

Replace air filters with new air filters. Balance, test, and adjust air conditioning systems prior to occupancy of the building. Provide test reports indicating compliance with the design documents to the USPS Project Manager prior to the final acceptance inspection.

Prior to commencing air and water balancing (if applicable), the testing organization must have been approved by the Project Manager and must be a certified member of the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

4-2.15.9 Construction Ventilation

Keep contaminants generated during construction to a minimum to eliminate their accumulation in building materials and release into the building after occupancy. As per NIST and EPA guidelines, the building must be continually vented with a minimum of 1/2 air change per hour during construction. This procedure must be excluded in humid areas of the Southeast, where high outdoor air humidity would adversely impact porous building materials. In these cases, the air-conditioning systems with ventilation air must be operated for at least two (2) weeks prior to building occupancy. Where possible, install a temporary exhaust air system. Fit temporary ventilation systems with the appropriate filter for the existing conditions. Change filters as specified by the manufacturer. Finally, protect all building air movement equipment and ductwork from contaminants during the construction process. Document these activities as part of maintenance program requirements.

4-2.15.10 Post Construction Ventilation

In order to allow for initial off-gassing of the facility, project specifications must require significantly greater levels of fresh air intake and exhaust during installation of interior finishes, caulking, and other products that generate

odors or fumes. Further, the HVAC system must be continuously operated for one (1) week prior to occupancy with maximum outdoor air setting while maintaining the design conditions inside the space. After construction, testing and balancing of the HVAC system must be done to ensure peak performance. One week prior to planned facility acceptance, replace air handling unit filters.

4-2.15.12 Personnel Cooling Fans

Ceiling, wall-mounted, and column-mounted fans may be used in delivery units, manual distribution operations, docks, trailers, elevated keying areas, and administrative offices. Since these fans must not to be installed until mail processing equipment has been installed, personnel fans must be procured and installed locally as part of the one-time capital expenditures outside of the general construction contract.

The feed sections on the following types of equipment have some form of pinch belt where bio-hazards could likely escape from either letters or flats. To lower potential exposure or spread of air-borne contamination in areas where individual letters are processed, do not provide fans directed at the feed sections of the following equipment:

- AFCS.
- DBCS.
- CSBCS.
- AFSM 100.
- FSM 1000 (once the AFF/OCR is installed).
- Flats Cancellers.

4-2.15.13 Roof Top Piping Management Plan

The A/E must complete a rooftop piping management plan and submit it to the USPS Project Manager for review. In some cases, it may be beneficial to provide condensate drain piping to the interior of the facility to prevent long complex runs of condensate piping on the roof, or to avoid heavy snow loads and freezing conditions. Route condensate piping as appropriate when considering the climate and local code requirements for the facility location.

4-3 Plumbing

4-3.1 Water Supply Systems

4-3.1.1 General Requirements

Plumbing design engineer shall obtain chemical analysis of water supply from utility or other source prior to designing the domestic water system so that any necessary water treatment components are properly provided in the design to ensure compliance with applicable codes.

Incoming water supply must be divided to supply domestic and fire protection systems or must be separate services, as required by the water company and local authorities. The domestic water supply must be metered, while the fire protection water supply must be metered only if required by the local water company. Domestic water supply must have adequate pressure to provide a minimum of 20 psi at the most remote hose bibb, 25 psi at the most remote flush valve fixture and 30 psi at the most remote emergency fixture. If water pressure is not sufficient to meet the supply requirements, provide a pre-packaged triplex water booster system with each pump sized for 50 percent of the calculated peak demand. Provide package with replaceable bladder type pre-charged tank.

4-3.1.2 Drinking Water

Potable water piping, fittings, fixtures and solder used for connections must be lead free in accordance with EPA, state, and local codes.

Provide electric water coolers throughout the facility, generally located in readily accessible open areas. Recess coolers into walls or alcoves wherever possible. Provide dual height water coolers.

Provide electric water coolers at the following locations where applicable:

- In Workroom/platform provide electric water coolers adjacent to restrooms, break areas, Satellite Vending areas, at a spacing not exceeding a radius of 200 feet, and as required by code.
- Near restrooms in the administrative/support areas.
- In lunchroom.
- In Contract Driver's Room.
- At the discretion of the USPS Project Manager, not more than six additional electric water coolers may be located in the workroom at strategic locations.

Solicitation A/E must determine locations of all water coolers.

4-3.1.3 Water Outlets

Provide valved and capped domestic cold water outlets, all with backflow prevention, with minimum 1/2 inch pipe at the following locations where applicable:

- Vending machine areas.
- Lunchroom.

At a minimum, provide the following spaces inside the building with hose bibbs (where applicable):

- Shops.
- Trash and Recycling area.
- Battery Charging Areas.

Exterior hose bibbs must be non-freeze type in Climate Zones 1, 2, and 3 except where factors, including altitude, cause freezing conditions. In Climate Zones 4 through 8 hose bibbs must be freeze protected. Reference the ASHRAE Climate Zone Map in Appendix M1-C to determine the Climate Zone at the specific project location. Protect all exterior hose bibbs from physical damage. Provide hose bibbs at the following areas (where applicable):

- One every 200 ft. around the periphery of the building. To the extent possible locate next to man doors.
- One close to the trash compactor.
- One every 75 feet from each roof top unit to service the unit. Measure the distance from the roof top units along the same paths as hoses will follow.

4-3.1.4 Domestic Water Heaters

Use high efficiency electric tank type water heaters, unless proven more economical to use gas fired type water heaters for the facility. Locate water heaters near the area served, but they may also be wall-mounted in custodial closets to increase usable floor area.

Avoid long hot water runs and hot water re-circulation systems to the extent possible. If long runs are required, hot water re-circulation systems must not be used for pipe runs shorter than 100 ft. A larger quantity of small point-of-use tank systems is preferred to a single system with long pipe runouts and the requirement for a recirculating system because higher energy usage due to line losses can be avoided.

For remote lavatories and hand sinks where it is not economical to connect to a centralized tank water heater, provide tankless point-of-use electric water heaters.

4-3.1.5 Water Conservation

The following water efficiency standards are required unless more restrictive values are required by codes:

a. The maximum water use allowed for a lavatory is 0.5 gal/min, kitchen faucets and showerheads is 1.5 gal/min.

b. The maximum water use allowed in gallons per flush for any of the following water closets and urinals is shown in Exhibit 4-3.1.5a.

Exhibit 4-3.1.5a
Maximum Water Use

FIXTURE	GALLONS OF WATER/ FLUSH
Gravity tank-type toilets	1.28
Pressure-Assist tank-type toilets	1.1
Electromechanical hydraulic toilets	1.1
Flush valve toilets	1.28
Urinals	0.13

4-3.1.6 Emergency Showers and Eyewash

Provide emergency combination deluge shower and eye wash fountain for battery charging areas with lead acid batteries. The local plant will provide portable eyewash fountains for battery charging areas with sealed gel batteries.

Provide emergency combination deluge shower and eye wash fountain for Hazmat area.

A/E must evaluate if tempered water is required to be provided at these fixtures based upon local climate conditions and OSHA requirements.

4-3.2 Sanitary Drainage Systems

4-3.2.3 Floor Drains

Provide three inch diameter floor drains as follows:

- Toilet rooms with 3 or more toilet fixtures (i.e. water closets and urinals).
- Adjacent to emergency deluge showers.
- Mechanical equipment rooms.
- Rooms that contain water piping in them (i.e. janitor's closets, piping with valves and backflow devices, rooms with humidifiers, etc.)
- Vending machine areas.
- Adjacent to air compressors.
- Trash and Recycling Areas.
- Hazmat Areas.
- Provide floor drainage leading to acid neutralization pits for battery charging areas if required by local jurisdiction. If required, acid neutralization pits must be sized at the minimum size required to meet the regulatory standard. Verify with the Office of Sustainability regarding the required regulations and proper sizing of the unit. When acid neutralization pits are provided, the drainage and associated floor slopes are to accommodate the entire battery charging area. To drain riding floor sweepers, provide a separate drain with a sedimentation pit that bypasses the acid neutralization pit.

4-3.3 Plumbing Fixtures

4-3.3.1 Fixture Types

a. General:

Provide plumbing fixtures in accordance with requirements of USPS Handbook RE-4, *Standards for Facility Accessibility by the Physically Handicapped*. All wall mounted fixtures must be provided with proper floor or wall supports as required.

b. Water Closets

White vitreous china office and industrial type floor mounted with elongated bowl, manual flush valve, siphon jet wall outlet, and white open front molded plastic seat.

c. Urinals

White vitreous china, bowl type with integral flush distribution, wall hung with integral trap and extended shields, blowout or siphon jet flushing action and manual flush valve.

d. Lavatories

White vitreous china straight back with single center set compression faucet, strainer drain, angle stops, complete with adjustable type P-trap with separate long tube to wall.

e. Mop Basins

In custodial closets and custodial storage, provide floor receptor type sinks, complete with faucet. Provide the mop sink with a stainless steel edge trim, mop hanger and hose kit.

f. Kitchen Sinks

Corrosion-resisting formed steel, complete with faucets, stopper type drain and P-traps.

4-3.4 Storm Drainage

Provide complete roof drainage system. Where downspouts are used, design storm drainage system to prevent accumulation of water on parking lots, walkways, and other paved areas.

4-3.5 Building Fuel Systems

4-3.5.1 Natural Gas

Natural gas is the preferred fuel for heating systems. Natural gas piping systems must conform to the National Fuel Gas Code, NFPA 54, International Fuel Gas Code, and applicable local codes. Gas piping and valves must not be located in confined spaces where leaking gas might collect and cause an explosion.

Utilize natural gas for unit heaters, duct furnaces at air handling units and for domestic water heaters if proven to be more economical than electric.

4-3.5.2 Propane

When natural gas is not available at the site, propane may be used to provide heating for the facility. Fuel storage tanks must be above ground. Tanks must be sized for 30 days of consumption during the month having the highest demand.

4-3.6 Compressed Air Systems

Solicitation A/E must determine all compressed air requirements, volumes and pressures for mechanization and automation processing equipment, the CFS and the VMF if included in the project (see “Automation Equipment Power & Air Requirements” in MPF Reference folder for planning data).

The A/E must complete a life cycle cost effective compressed air system for mechanization and automation processing equipment and the CFS and the VMF if included in the project. A/E must verify volumes and pressures with USPS and/or equipment vendors (see “Automation Equipment Power & Air Requirements” in MPF Reference folder for planning data).

Design the compressed air system to adjust pressures and air flows based on demand using automated digital controls. Compressors selected must have high part-load efficiency. All compressors supplying building air and/or mechanization air must operate as one system using a centralized control. Each compressor in the compressor group must energize/de-energize as needed based on the demand present. Compressor system must have advanced metering of individual compressors connected to the Building Automation System reporting pressure, flow, horsepower, and electrical demand. The output protocol must be BACnet IP, if available, otherwise ModBus RTU. These features must be built into any new compressed air

system with advanced controls but must be added to upgrade older systems (See Specification 251104).

The compressed air monitoring requirements connected to the Building Automation System are as follows:

- kW/kWh transducer on each compressor.
- A system-level air pressure transmitter.
- A system-level air flow meter.

Locate compressor rooms and areas on an exterior wall and mechanically ventilate to provide make up air and dissipate heat generated by equipment. Arrange compressors so that heat discharge from the air dryer of one unit does not feed the air intake of adjacent units. Provide sufficient space for servicing of the individual units in compliance with manufacturers guidelines.

Install two air compressors, two tanks, and two refrigerated air dryers, each sized for 100 percent of the total required capacity (including spare capacity).

Air receivers must be ASME certified and stamped for appropriate psi working pressures. Size air receivers to provide one minute minimum storage of the total required capacity. For facilities with Workrooms 500,000 square feet and larger, receiver may be sized for 30 seconds minimum storage. Receivers must meet the requirements of ASME Boiler & Pressure Vessel Code Section VIII for unfired pressure vessels and must contain the appropriate ASME code stamp.

Locate compressed air outlets for equipment adjacent to the equipment served so as not to require hose extensions. Compressed air drops to outlets must be sized as required to supply equipment served, but must not be less than ¾".

Outlets must be served by a looped air main sized to limit the pressure drop to 5 psi maximum for system discharge at the most remote outlet.

Provide isolation valves to isolate sections of the system. This is to assure parts of the system can be isolated while the rest of the system is back fed and the system remains operational. Provide a minimum of one isolation valve on each corner of the main loop. Also provide intermediate valves a minimum of one per 150 feet. Provide a manifold that connects compressors, dryers and oil water separators. Also isolate compressors, dyers and oil separators so if any one fails it can be repaired while air is passed through the other components. If the system has only one air receiver, provide a bypass.

FSM – 1000 equipment requires higher air pressure than most other equipment. Since this equipment uses minimal air volume, it is more economical to provide a small dedicate high pressure compressed air system for it rather than increase the operating air pressure of the main system to accommodate FSM- 1000 requirements. Therefore, when FSM – 1000 equipment is to be used, provide a separate compressed air system to supply it.

Provide sufficient floor drains in the compressor room for condensate.

Design acoustics so that sound from the compressed air system must not exceed 80 dbA in any location.

4-3.7 Miscellaneous Plumbing Requirements

Piping, except fixture runouts, must be completely concealed in finished spaces such as offices, office corridors, lobbies, and toilet rooms.

Fixture runouts must be kept to a minimum and must be chrome-plated.

4-3.8 Computations

Computations must include but not be limited to the following:

- Domestic Water System: Friction loss computations, based on actual piping layout, to determine whether or not a booster pump is required to meet the pressure requirements given in Section 4-3.1.1. A booster pump should only be provided where absolutely necessary. Larger pipe size, to reduce pressure losses, is preferred to smaller pipes and the use of a booster system.
- Compressed Air System: Compressor sizing and pipe friction loss computations to properly size the compressors, tanks, piping and branches.

4-3.9 Storage Tanks

Refer to the Storage Tank Standards in Module 4E for all matters pertaining to Storage Tanks.

4-4 Miscellaneous HVAC/Plumbing Components

4-4.1 Motors and Controllers

Motors must be of sufficient capacity to operate the driven equipment through its total range without exceeding the motor capacity. Motors 1 hp or greater in continuous service must be premium efficiency type as listed in Table 12-12 of NEMA MG-1 Standards. Motors connected to variable frequency drives must be inverter rated. Shaft grounding rings must be incorporated into motors 10HP and higher to prevent electrically induced bearing damage (EIBD) when VFDs are utilized on larger pump and fan motors.

Building equipment motors must be controlled and protected by combination fused circuit breaker switch type motor starters installed in motor control centers, except when design and economic considerations dictate the use of individual motor starters. Control voltages must not exceed 120 volt to ground. Three-phase running overcurrent protection must be provided and each starter must be supplied with a hands-off-automatic (HOA) switch.

Generally, design larger motors above 1/2 HP for 208 Volt or 480 Volt, single phase or 3-phase power, unless otherwise noted for specific equipment. Motors 1/2 HP and smaller must operate on 120 Volt, single-phase circuits.

Motors sized 1/2 HP and above must be fed from dedicated branch/feeder circuit breakers. Multi-motor branch circuits, limited to a maximum of (2) motors, may be utilized for fractional horsepower motors.

For individual three phase motors not furnished as part of package with motor starter, provide individually mounted magnetic, 3-phase, across-the-line combination type motor controller with fusible switch protector and phase loss/phase reversal protection, individual 120 Volt control power transformer, control devices HOA selector switch, push buttons, pilot light as required to suit intended motor control operation as required.

Provide manual, single-phase, 120 Volt, toggle type motor rated switches with thermal overload element for fractional horsepower equipment not requiring automatic control interfaces.

4-4.2 Pumps, Piping and Fittings

4-4.2.1 Pumps

Select and install pumps to match the head and flow requirements of the system.

In-line or close-coupled centrifugal pumps should generally be used for capacities up to 100 GPM. For larger capacities, use base-mounted pumps. Maximum pump speed for base-mounted pumps is 1750 RPM.

Provide mechanical shaft seals to reduce leakage and maintenance.

Provide drain lines from bed plates to open drains.

4-4.2.2 Piping

Provide adequate shutoffs and drains for all piping exposed to freezing conditions.

Conceal piping in lobbies, offices, and similar areas.

Protect piping in work areas from floor to 10' above floor from damage. Provide protective steel guards or bollards.

Water piping must not be installed above electrical equipment, including above the code required clear space around the equipment.

Provide dielectric couplings at junction of steel pipe and copper pipe.

Provide concrete thrust blocks at underground fittings and changes in pipe direction. For other locations provide braces and tie rods as required to reinforce joints.

Provide chrome-plated escutcheons on finished sides where exposed piping penetrates finished spaces.

Locate shut-off and control valves for easy access and operation. Where valves are located in enclosed spaces provide access doors. Access doors must be 16 inch x 16 inch minimum, and must be of cadmium plated or galvanized construction. Frames must be minimum 16 gauge and door panels minimum 20 gauge for nonfire rated doors and 14 gauge for fire rated doors. Where shutoff valves are located above lay-in ceilings, the t-bar grid should have a phenolic tag attached.

Clear height to underside of all horizontal utilities must be 20'-0" AFF minimum, unless noted otherwise.

Label piping systems in accordance with ASME A13.1.

4-4.2.3 Fittings

Provide isolating valves at each piece of equipment and locate them in such a manner as to not interfere with the removal or maintenance of equipment.

Apply drain valves of sufficient size to drain the branch quickly, at low points near each shut-off.

When open sight drains are not available, provide threaded hose connections at the valve.

4-4.3 Insulation

Provide thermal insulation on pipes, tanks, breechings, ducts, pumps, etc. when required to comply with safety or energy conservation standards and to prevent condensation.

Insulation thickness must be in accordance with the current version of ASHRAE 90.1. A/E must determine if additional thickness is required to reduce insulation surface temperatures to below 130ºF and to prevent condensation on cold surfaces.

Design hangers, anchors, and other supports so as not to damage vapor barriers or insulation, and they must not themselves permit condensation.

4-4.4 Sound and Vibration Control

Exercise care in the design, approval, and installation of mechanical equipment and components to obtain acceptable noise levels in occupied spaces. The Noise Criteria (NC) Level produced by mechanical equipment must conform to the latest OSHA standards and ASHRAE handbooks requirements.

Provide sound attenuating devices such as acoustical lining and sound attenuators in ductwork system to achieve the required maximum noise levels.

Select mechanical and plumbing equipment so that the noise level generated by the equipment does not exceed 85 dBA measured at a distance of three (3) feet in any direction from the equipment (see Exhibit 4-4.4a). Provide attenuating devices and acoustical treatments required to meet this criteria.

Exhibit 4-4.4a
Noise Levels

SPACE	NC LEVEL
Private Offices & Conference Rooms	30
Open Office Areas, Corridors, & Lobbies	35
Workrooms, Computer Rooms	45

4-5 Fire Protection

Perform a hydrant flow test to determine static and residual pressure of municipal water supply. If water service pressure is determined to be insufficient to meet fire protection requirements provide a packaged fire pump in accordance with NFPA 20, code and local Fire Marshal requirements. Fire department inlet connections must be as required by local authorities.

Provide a site fire hydrant system in accordance with NFPA 24, code and local Fire Marshal requirements.

4-5.1 Sprinkler Systems

Design the sprinkler systems in accordance with NFPA 13, Installation of Sprinkler Systems, using the hydraulic method for pipe sizing.

Where allowed by the state or local code, a building may be equipped with an NFPA 13 compliant (ESFR) Early Suppression Fast Response sprinkler system where appropriate. Install backflow prevention devices as required by local codes.

The A/E must provide a written comparative estimated cost analysis, to determine and verify that an ESFR system is more appropriate and cost effective than a Standard NFPA 13 sprinkler system and submit a written copy to the USPS project manager for approval.

Use dry systems for any area where freezing temperatures could occur.

Equip flow switches with a retard device to prevent false alarms due to pressure surges.

Sprinkler piping is deemed foreign to electric service equipment by NFPA code. As such, sprinkler piping must not be routed directly above electrical switchgear or transformers.

Provide a fully sprinklered building. Workroom, platform areas, lobbies and support areas (i.e., Mail Processing Equipment Storage, Custodial Storage, Stockroom/General Supplies, BMEU platform, and General Shop) must be protected for Ordinary Hazard Group 2 criteria, and must be hydraulically designed for a minimum density of 0.17 GPM/Sq. Ft. over hydraulically most remote 3,000 SF area. Office/Administrative areas shall be protected for Ordinary Hazard Group 1 criteria. Maximum square feet per zone must not exceed 52,000 SF per NFPA 13. Fire zone boundaries must be coordinated with, and to maximum extent possible, be configured with locations of fire walls, smoke partitions, curtain boards, smoke vents, HVAC system zoning and detection systems.

Protect the Consolidated Computer Room (CCR) and other data processing rooms specifically approved by the USPS with a double-interlocked pre-action sprinkler system using closed sprinkler heads and smoke detectors. The piping system must remain dry until water is required and system must be monitored with pressurized air. Locate each pre-action system valve/riser in a closet accessible from corridors and not from the room served.

Note that Telecommunication Rooms (TRs) do not require pre-action sprinkler systems.

The A/E must provide a cost analysis of providing a clean agent system such as FE25, Sapphire, etc. in lieu of the pre-action system. Final determination will be made by the Project Manager.

Fire zone boundaries must match or coincide with discrete areas such as Workrooms and platforms, storage areas, employee facilities, support areas and Administration.

Module 2A - Mail Processing Facilities

Chapter 5 - Electrical

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Chapter 5 - Electrical

5-1 Introduction

5-1.1 Scope

The design criteria within this document specify electrical requirements for design and construction of new Mail Processing Facilities (MPFs). The Architect/Engineer (A/E) must provide a complete electrical design that covers all phases of the project.

The A/E must determine all electrical loads from mechanization and automation equipment.

Refer to Standard Design Criteria Module 1, Chapter 5 for general electrical requirements.

5-1.2 Codes and Standards

5-1.2.2 Energy Conservation

Refer to Standard Design Criteria, Introduction, Section 0-2.2, Compliance with Energy Requirements, for detailed energy mandate statement.

Refer to Module 2A - MPF Design Criteria, Chapter 2 Architectural, Section 2-6.3 Energy Conservation, for detailed energy mandate statement.

Submit an Energy Compliance Certification (ECC-S) form to the Facilities Program Management, Energy/Standards Team Leader for all new facilities at the 30% design submission and again at project acceptance, after Commissioning and M&V have been completed.

5-1.3 Electrical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services. The information below is specific to Mail Processing Facilities for new construction, expansions, and alternate quarters projects.

5-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation for Design/Build (DB) and Design/Bid/Build (DBB) projects. However, development of a Commissioning Plan must commence no later than at the 10% design stage for special projects such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generator Projects.

For Design/Build (DB) projects the A/E preparing the solicitation documents must include an outline of the Commissioning Plan so that the DB contractor is informed of the extent of the commissioning that will be required for the project.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” and “260800 - Commissioning of Electrical Systems” must be utilized to develop the Commissioning Plan and associated Test Procedures.

In addition, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

5-1.3.2 Commissioning Requirements

When commissioning systems or equipment, it must be performed on a sampling basis, excluding lighting controls. See Module 1, 5-1.3.1 Observation and Testing Requirements, for the sampling rates for each system. The functional testing of the lighting control system is mandatory and must be tested in accordance with the current version of ASHRAE 90.1, 9.4.3.

The degree of commissioning that will be required for the project must be determined by the USPS Project Manager and the solicitation A/E. On any project, the Project Manager may require other mission critical systems to be commissioned, such as:

- Medium Voltage Switchgear and Unit Substations.
- Generators and Emergency Power Distribution System.
- Enterprise Physical Access Control System.
- Fire Alarm System.
- Security/Enterprise Physical Access Control CCTV System.
- Paging System.
- Electrical Advanced Metering.
- Electrical Distribution System Wiring.
- Uninterruptible Power System (UPS) for a Consolidated Computer Room

5-1.4 Electrical Measurement and Verification (M&V)

See Module 1, 5-1.4 Electrical Measurement and Verification (M&V), for general information about Electrical M&V.

Any Mail Processing Facility project, including new construction, expansions, and alternate quarters, that has a component or system where one of the primary objectives is reducing energy consumption, then that component or system must be measured and verified to determine actual energy savings performance at construction completion.

Special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electric Generation, must be measured and verified.

The performance of the interior and exterior lighting systems installed as a part of a new MPF project, or an expansion project, must be measured and verified to determine actual energy savings performance at construction completion. The lighting systems must be short-term measured for a week to ensure that:

- The energy consumption of the lighting system matches the estimated consumption (measurement).
- The schedules and actual use reflect the assumptions made during the design phase extrapolated to a yearly savings (verification). This must include an estimate on the number of times the system is overridden.

M&V must be performed after commissioning of the new system is complete. The estimated energy use projected during the design phase and the actual energy use measured after commissioning should be comparable. Also, the

total energy consumption that results from the project are to be submitted to the Facilities Program Management, Energy/Standards Team Leader in an ECC-S package for review, acceptance, and inputted into eFMS.

5-1.5 Electrical Computations

5-1.5.1 Fault Current (Short Circuit) Computations

In addition to a fault current study, a Registered Engineer must perform a circuit breaker and fuse coordination study to determine the required fuse sizes and trip setting for the circuit breakers.

5-1.5.4 Load Computations

If the load requirements stated in the Solicitation are higher, the site specific program requirements must be satisfied.

Receptacle Loads: See Exhibit 5-1.5.4a for a summary of additional receptacle load assumptions for Mail Processing Facilities.

Mail Processing Equipment Loads. Loads associated with mail processing equipment must use equipment manufacturer's nameplate data of specified equipment.

Exhibit 5-1.5.4a
Receptacle Loads for Equipment Sizing

AREA/Activity	LOCATION /DESCRIPTION	Minimum Design Load: Service Equipment (VA/SF)	Minimum Design Load: Distribution Equipment (VA/SF)
Support Areas	Consolidated Computer Room (CCR)[1]	0.25	0.5
	Computer Room[3]	.5	1

Keyed Notes:

1 Load value indicated is for general purpose receptacles. Communication equipment load requirements need to be added per site specific program requirements, see section 5-4.

5-2 Power Distribution

5-2.1 Incoming Electrical Service

Incoming electrical service must consist of the incoming power supply line(s), transformer(s), when required, meter and fused main disconnect switch(es), or main circuit breaker(s).

Provide the most optimal electrical service based on a 20-year energy and life-cycle cost analysis of available Voltage levels, electric rates, ownership and location of service transformers, metering, etc.

USPS maintenance staff is trained and authorized to maintain equipment up to 600 Volts. Outside maintenance contractors are required for higher Voltage equipment.

Provide overcurrent and short circuit protection equipment for incoming high Voltage feeders and primary service to meet utility company requirements.

During preparation of the Solicitation, the Solicitation A/E must determine the reliability of the commercial utility's incoming power service over a five year

period. The Solicitation A/E must make recommendation for electric service connection. Based on this assessment and recommendation, the USPS Project Manager must determine if any of the following options should be implemented:

a. Dual primary service with manual transfer, primary metering, medium voltage switchgear and unit substations.

b. Permanent on site emergency generator. Incorporation of permanent on site emergency generator(s) requires review and approval of the Vice President, Facilities. *(Also refer to Module 4E for requirements for storage tanks associated with on-site emergency generators.)*

The Solicitation A/E must publish findings regarding information stated above in the Solicitation.

New MPFs and switchgear upgrade projects in MPFs must be provided with exterior switchgear for connection of a portable standby generator. Note that the design shall include the portable cables and storage container necessary for connection of the portable generator.

5-2.1.5 Advanced Metering

Knowing and understanding how energy is consumed in a building is necessary to manage and control energy costs. Advanced electric meters are those that have the capability to measure and record interval data and communicate that data to a remote location on at least a daily basis. These meters are separable from the standard electromechanical or solid state meters provided by the utility for billing purposes and are Contractor installed. Whole building (utility level) metering of electricity is required in all MPF buildings. Submetering of specific equipment within a building, if determined necessary by the Project Manager, must also be incorporated. See Specification 251104 “Metering Devices” for technical requirements.

Connect metering equipment to the Building Automation System for data collection, power quality analysis, trending, and load shedding purposes. The metering data must be collected by the monitoring and control system addressed in SDC Module 1, Section 4-2.9.3.

a. Electric Metering

   Provide advanced electric meters as an integral part of building switchgear for new construction, as required by ASHRAE 90.1, 8.4.3. Advanced electric meters must be programmable and capable of measuring kWh and other power characteristics (kw, amperage, power factor, etc.) on 5 – 60 minute intervals with built-in data storage. A fifteen (15) minute interval measurement must be programmed at installation. The data must be accessible on a real-time basis and downloadable to the Building Automation System for management of data.

5-2.2 Distribution Voltage Levels

Power distribution must be 277/480Y Volt, 3-phase, 4-wire secondaries with solidly grounded neutrals from the switchboards to the distribution panelboards.

5-2.2.2 Automation Loads

Power for mail processing / automation equipment must generally be 208 or 480 Volts, 3-phase, 4-wire plus separate equipment ground conductor. The A/E must coordinate exact circuit characteristics based upon the equipment manufacturer’s nameplate data of specified equipment. Refer to current applicable “USPS FSS Configuration Guidelines” and “Automation

Equipment Power and Air Requirements" in the Building Design Standards, Folder E, for further details.

The 208 and 480 Volt wiring and conduits feeding the workroom panels and equipment serving the mail processing equipment must be routed overhead to accommodate future changes to the fixed mechanization. These feeder conduits shall not be routed below the floor slab.

5-2.2.3 Segregation of Loads

The power feeders serving the following load categories must be segregated to allow the installation of submetering, per ASHRAE 90.1, 8.4.3:

- Interior Lighting
- Exterior Lighting
- HVAC System Equipment
- Receptacle Circuits
- Mail Processing Equipment
- Compressed Air System Equipment.

5-2.3 Main Service Equipment

Main Service Equipment (such as; medium Voltage switchgear line-up or unit substation) must be capable of carrying the entire electrical design load and must be indoor type, located in a dedicated electric room of the building. For medium Voltage primary service, provide the following:

- Shielded, single conductor copper cable with EPR 133 percent insulation and PVC jacket. Perform direct voltage, acceptance testing of the medium voltage cable in accordance with MPFS 2601513.
- Compression type cable splices and terminations and factory premolded stress cones as recommended by cable manufacturer.
- Nonmetallic tag at each cable pull, splice and termination point to identify phase, feeder designation and date of splice or termination.
- Fireproofing tape to feeder cables where two or more feeder cables pass through a common pull box or manhole.
- Medium Voltage service must not be run underground inside the building.
- Mount all freestanding service equipment on a 3 inch high concrete pad.

5-2.3.1 Design

Locate switchboards, transformers, etc. in electrical rooms or mounted on open platforms whichever are most cost effective. Transformers and electrical equipment must be accessible to qualified personnel at all hours.

Design electrical spaces in accordance with applicable codes and standards including NEC working spaces around equipment. Fire-resistant construction must be provided only if necessary. Locate the electrical equipment near the workroom/platform area perimeter walls, where possible, and place in the most cost effective location, such as in less costly low-bay space. Design for removal of the equipment without structural, piping or lighting changes in the building.

If open platforms are used, they must be 24 inches above the Workroom floor and include the following:

- Personnel safety guard rails.
- Wall/floor markings to prevent tripping hazards.

- Physical protection to protect the electrical equipment as well as maintain code required working space clearances.

5-2.3.2 Medium Voltage Switchgear Line-up

Medium Voltage switchgear, if justified, must be metal-clad, indoor type draw-out vacuum circuit breakers, including but not limited to the following:

- Utility metering section.
- Feeder circuit breakers as required.
- Space in switchgear for future feeder breaker(s) to serve building expansion.
- Lightning arresters and MOV type transient Voltage surge suppressors (TVSS) rated for use on specific Voltage in grounded neutral systems and suitable for protection of the associated equipment.
- A white laminated nameplate 1 in. x 3 in. with engraved black lettering (minimum height - 2/16 inch) on the front panel of each compartment.
- ½ inch wide, minimum, mimic bus complete with proper symbols and nameplated to represent the primary power supply and all elements in the compartments.

5-2.3.3 Distribution Transformers

Distribution transformers, if justified, must be the 3-phase type with a minimum of four 2-½ percent taps, two above and two below the rated Voltage. Set the transformers to provide normal 480/277Y Volts under full load conditions. Capacities selected must be based on a self-cooled rating to accommodate a minimum of 100 percent of total facility demand load, plus 20 percent spare capacity, as calculated herein. All indoor transformers must be dry type or cast coil with Class 155 insulation rating minimum. Oil-filled transformers, when used at exterior conditions, must be pad mounted. Provide standard NEMA accessories. Provide high temperature and low-oil-level sensors to indicate alarm conditions. All transformers must be the high efficiency type.

5-2.3.4 Unit Substations

When substations are justified in the design, provide double-ended substation with a normally open, manually switched secondary bus tie, interlocks and isolating switches to permit load transfer and operation of the building at reduced capacity in an emergency. Primary disconnect switches must be metal enclosed and air insulated with current-limiting fuses as required. Provide an interlock between the primary and main secondary disconnect. The switch must be test rated at 15KV for 13.2KV systems and 5 KV for 4.1 KV systems. Coordinate primary fuses with secondary protection. Interlock switch and fuse compartments so that the compartment door cannot be opened until the switch is opened and the switch cannot be closed until the compartment door is closed. Provide secondary lightning arresters and MOV type surge suppressers for the incoming service. Provide surge suppression with integral disconnect switch. Provide surge suppression only at the main service entrance and other mission critical equipment unless required otherwise.

Provide main circuit breaker compartments with a draw-out type power air circuit breaker and electronic (solid state) trip device with long time, short time and ground fault adjustable settings.

Provide tie circuit breaker compartment with a normally open, draw-out type power air circuit breaker, equipped similar to main circuit breakers to permit substitution in emergency situations.

Feeder circuit breakers must be molded case type circuit breakers with electronic (solid state) adjustable instantaneous, long time, short time and ground fault devices as required for proper coordination of loads served.

5-2.3.5 Automation Equipment Feeders

Provide dedicated feeder breakers for power distribution to USPS mail processing/ automation equipment.

For equipment supplied and installed by others:

- Provide feeders in accordance with requirements of the actual equipment being installed. All feeders serving the automation equipment must be “copper” only. Terminate power feed in junction box located at bottom of structural steel directly above equipment. The A/E must determine final location of junction box and provide power to termination points. Location of termination point indicated on the OSL plan is subject to 50 foot variation. The A/E will be responsible for additional modification of power feed to accommodate actual power termination point with no additional cost to the USPS. Coordinate exact location with USPS prior to installation.
- Extension of feeders from the junction box to equipment will be provided and installed by others. The length of feeder extension from the junction box to the equipment must be included in calculations to determine size of conductors in accordance with the requirements of the actual equipment being installed.
- The Design Build Entity must design electrical distribution system to limit harmonic distortion in automation equipment feeders to be less than the automation equipment manufacturer’s recommended harmonic contribution.
- No more than 5 pieces of automation equipment must be served from any one transformer. Locate transformers as close as possible to equipment they serve.
- Refer to “Design Standards” for new construction and expansion/modifications of existing USPS Facilities to accommodate Flat Sequencing System (FSS).
- Refer to Section 5-5.4.1 for applicable fire alarm shutdown requirements.

5-2.3.6 Infrared Viewing Panes (IR Windows) - Switchboards

Electrical equipment enclosures operating at voltages above 600 Volts shall be equipped with properly sized infrared viewing panes (IR windows) at all cable and bus connections to facilitate IR testing without removal of the deadfront enclosures, which separate personnel from the energized components. Installation of these windows will permit the required annual thermographic inspections to be safely conducted with the equipment energized and without the need for “PPE” protection.

Two types of IR viewing panes will be utilized: Opaque (non-transparent) viewing panes must be utilized in locations where a “visual” observation is not required or beneficial and clear (transparent) viewing panes must be utilized in locations where a “visual” observation is necessary and useful.

IR viewing panes must be factory installed by the switchgear manufacturer for new construction projects and must be installed by a manufacturer-

certified and trained IR viewing pane installer for existing switchgear installations.

The criteria listed below must be utilized to determine what electrical equipment and where IR windows should be placed for proper inspection by thermography.

a. Medium Voltage Metal Clad Switchgear

Metal clad switchgear designed in accordance with ANSI/EIII C37.20.2 is extremely compartmentalized with all bus and connections insulated. Thermographic inspections are therefore extremely limited by the nature of the switchgear design. For these reasons, IR windows must not be provided on the front panels of the metal clad switchgear.

The backside of the switchgear compartments contain cable or bus connections that can be thermographically inspected. One (1) IR window (3 inch round, transparent) must be provided for each single high compartment section and two (2) windows (3 inches round, transparent) must be provided for two high type sections.

Refer to MPFS Sections 261313 and 261414 for specific details.

b. Medium Voltage Interrupter Switches

The design of this equipment is such that all important electrical components and connections can be effectively accessed for thermographic inspection. Provide a single, transparent, rectangular window (9 inch W x 5 inch H) in the front top section; centered on the Phase “B” inter-phase barrier.

Provide a single transparent window (3 inch round) in the bottom front section of the switch to view the fuses and provide another rectangular window (9 inch W x 5 inch H, transparent) in the top rear section, centered on phase “B”, to view the cable connections at the top of the enclosure. Note that nonfusible, interrupter switches need not be equipped with a viewing pane in the bottom front section.

Refer to MPFS Sections 261116, 261317 and 261414 for specific details.

c. Dry and Cast Coil Type Power Transformers

Typically, the high voltage and primary tap connections are located on the high voltage side of a power transformer. Provide a single, opaque, rectangular window (9 inch W x 5 inch H) to view the high voltage power and tap connections on this side of the transformer.

Secondary windings are typically welded to the secondary bus at the top of the core and coil unit, therefore loose or overheated connections are extremely rare and need not be thermographically inspected.

The secondary (low voltage) connections are typically made by bolted connections at the low voltage end of the transformer. Provide a single, rectangular, opaque IR window (9 inch W x 5 inch H) at the secondary side of the transformer to access these bolted connections.

Refer to MPFS Sections 261116, 261216 and 261414 for specific details.

d. Low Voltage Switchgear Equipment (600 Volt or less)

Low Voltage switchgear equipment manufactured under ASNI/IEEE C37.20.1 offers a number of challenges to thermographic inspection, due to its compact designs and compartmentalization. The front portion of the switchgear generally contains draw-out circuit breakers. Typically, from

the front looking back, there are doors, panels, breaker mechanisms, and insulating barriers before one gets to the current carrying components and the main contacts. It is therefore not possible to evaluate a power circuit breaker by means of thermographic methods. Also of significant interest is the primary disconnect connections at the rear of the breaker, but the bus stabs are located behind the breaker and cannot be seen, making it largely impractical to attempt the application of a thermographic inspection. IR viewing windows must therefore not be provided for low voltage switchgear equipment.

e. Motor Control Centers (Medium and Low Voltage)

The IR viewing window is an Underwriter's Laboratory recognized component and carries the "UR" (UL recognized) label, but presently is not UL recognized for use in motor control centers that are manufactured per UL 347. IR viewing windows must not be installed within medium or low voltage motor control centers.

f. Uninterruptible Power Supplies (UPS's)

IR viewing windows shall be provided by the UPS manufacturer during fabrication. Each breaker position within the UPS shall be equipped with an opaque 3 inch round infrared window centered on the cable to lug terminations. Refer to Module 2A, 5-4.3.9 and MPFS section 261414 for specific details.

5-2.4 Switchboards and Panelboards

5-2.4.1 Switchboards

Service entrance style main switchboard(s) must be of the dead front, free standing type, designed in accordance with UL Standard 891. Provide at least two spaces for future feeder positions. Provide full size equipment grounding bus and neutral bus. Provide secondary lightning arresters and MOV type Surge Suppressers for the main incoming service. Provide surge suppression with integral disconnect switch. Provide surge suppression protection only for main service entrance equipment and other mission critical pieces of equipment, unless required otherwise.

Provide main circuit breaker compartments with a draw-out type power air circuit breaker and electronic (solid state) trip device with long time, short time and ground fault adjustable settings.

Provide tie circuit breaker compartment with a normally open, draw-out type power air circuit breaker, equipped similar to main circuit breakers to permit substitution in emergency situations.

Feeder circuit breakers must be molded case type circuit breakers with electronic (solid state) adjustable instantaneous, long time, short time and ground fault devices as required for proper coordination of loads served.

Switchboards downstream of the incoming service must be of the dead front, free standing type design in accordance with UL Standard 891. Provide molded case circuit breaker devices. Coordinate protective elements to provide a fully selective system. Provide at least two spaces for future feeder positions in each switchboard. Provide full size equipment grounding bus and neutral bus. Provide MOV type surge suppressers only for mission critical equipment, unless required otherwise. Provide integral disconnect switch for disconnecting means.

Provide an advanced power meter(s) on the main service entrance feeders to the building. The meter must be integrated and mounted within the main switchboard. Power meter as a minimum must measure electrical parameters for each feeder phase as well as system total. Parameters must include as a minimum, amperage, volts, kW, power factor, VA, VAR, kWh, THD. Power meter is to include a communication port to the Building Automation System through a Modbus RTU or TCP/IP connection. Coordinate the power monitoring with the BAS design.

a. Infrared Viewing Panes (IR Windows)

In many cases, switchboards utilize multiple molded case circuit breakers as feeder devices. It would be of interest to view the load cable connections at each breaker, but the number of IR windows required to inspect all the molded case breakers tends to be excessive and becomes an economic burden for the value received. The front and rear panels of low voltage switchboards can be easily opened and thermographically inspected by personnel suited with the appropriate “PPE” while energized. For these reasons, IR viewing windows must not be provided in low voltage switchboards, unless the switchboard is classified as an ARC Flash Hazard Risk Category (HRC) of “Dangerous”.

Equip all switchboards classified within an HRC of “Dangerous” with IR viewing panes. Equip each breaker position of the switchboard with an opaque, 3 inch round infrared window. Locate the IR window on the front or rear of the switchboard, (depending on the lug connections) centered on the cable to lug connections of the breaker.

Refer to MPFS Sections 261116, 261414 and 262413 for specific details.

5-2.4.2 Panelboards

Equip panelboards with a “door within door” feature to allow easy access to the breaker terminations.

Arrange circuitry of automation equipment on panelboards to balance effects of harmonic distortion to the maximum extent possible.

In panels (that feed mechanization and/or material handling panels), feeder circuit breakers serving the mechanization and/or material handling panels must be provided with supervised, shunt trip coils. These shunt trips must be powered from and interlocked with the building fire alarm system to de-energize the mechanization and/or material handling panels in case of fire. Coordinate with the design of the mechanization and/or material handling panels to avoid duplication of shunt trips. Refer to Section 5-5.4.1 for applicable fire alarm shutdown requirements.

a. Location and Protection

Do not locate panelboards in aisle space. Locate panelboards in the Workroom/Platform on walls or columns at the center of the load or area served, and protect them with guardrails, bollards, or other type of protection.

5-2.5 Secondary Dry-Type Transformers

Workroom/platform transformers must be trapeze mounted on the building structure with vibration isolators or platform mounted on the Workroom/platform columns near the panelboards. Locate transformer 8 feet above finished floor measured to bottom of the transformer to limit damage from workroom/platform operation.

5-2.6 Motors and Controllers

Building equipment motors must be controlled and protected by combination fused switch or circuit breaker type motor starters installed in motor control centers, except when design and economic considerations dictate the use of individual motor starters.

Solicitation A/E must determine if there are any mission critical pieces of mail processing equipment that should be equipped with surge protection.

5-2.7 Wiring Methods and Materials

5-2.7.1 Conduit

In Workroom/platform, clear height to underside of horizontal conduit runs, cable trays and all other utilities must be 20'-0" AFF minimum, unless noted otherwise.

5-2.7.5 Grounding

Install a counterpoise system around the building. The counterpoise system must consist of a buried loop of copper wire, not smaller than #4/0 AWG, stranded copper cable which encircles the building and is buried a minimum of 30 inch below final grade (BFG). As a minimum, connect every other perimeter column to the ground loop conductor. Ground rods must be driven along this loop at 100 foot intervals and cross-connections installed every 300 feet, to connect building steel and equipment to the ground grid such that each major piece of equipment, including the main switchboard and main water supply or structure, have common ground paths.

All perimeter and interior steel columns must be bonded to the ground loop conductor if a building lightning protection system is deemed necessary.

All connections and joints must be the exothermic weld type. The individual ground grids must be tied together with an interconnecting ground wire. Connect building steel and conductive enclosures of electrical equipment to the ground system.

The resistance of the counterpoise grounding system shall not exceed 5 ohms. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening ground rods or installing ground enhancement materials; then retest to demonstrate compliance. Furnish written report of all tests.

Soil resistivity testing is required by the Contractor prior to installation of the counterpoise. The A/E shall ensure the soil testing has been performed in accordance with MPFS 264101.

5-2.7.7 Equipment Grounding

In addition to the grounding conductor in equipment feeders, ground all USPS equipment to the building ground grid or to the nearest grounded structural steel.

5-2.7.9 Busways

Busways must be totally enclosed, low impedance, 5 wire, copper type equipped with all necessary, factory fittings, power takeoffs, hangers and accessories. Provide busway in accordance with Article 368 of the NEC. The drawings must include the following information:

- Continuous Amp rating.

- Service: Phase, wire, volts, with internal ground.
- Available short-circuit current at input end in amps rms symmetrical.
- Maximum voltage drop and power factor at output end and whether load is distributed along run or concentrated at end of run.
- Bus bar material (copper only).
- Location of all fittings. Provide expansion fittings as required by the manufacturer.
- Limiting dimensions of busway width and depth where passing through walls or floors or around obstructions.
- Mounting position of busway (flatwise, edgewise, or vertical riser).

5-2.8 Convenience Outlets

5-2.8.1 Type and Location

Provide NEMA specification grade, 2-pole, 3-wire, 20-ampere, 125 Volt, duplex grounding type outlets with nonconductive faceplates at 24 in. AFF to bottom of outlet, unless otherwise noted, in accordance with the following schedule: Maximum of six (6) convenience outlets wired per 20 Amp, 120 Volt circuit, unless otherwise noted (see Exhibit 5-2.8.1a).

Exhibit 5-2.8.1a
Outlet Requirements

LOCATION	OUTLET REQUIREMENTS
Workroom:	
Workroom[1]	Provide quadraplex outlets (double duplex) on every column and at 50 ft. centers along the perimeter walls. Outlets are to be utilized for cord connected back-pack vacuums. Mount outlets at 54 in. AFF. Column mounted outlets must be in the web and not on the flange. Maximum of (4) quadruplex outlets wired per circuit.
Dock Door Monitors (formerly known as Container Tracking System)	Provide outlet controlled by “on-off” toggle switch for 70 inch monitor. Locate every 4 dock doors, unistrut mounted, adjacent to T/O.
Support Areas:	
General/Maintenance Shops	Wiremold w/ duplex at 8 ft. -0 in. on center at 48 in. AFF (top of outlet), continuous at all walls (min. 2 circuits).
Consolidated Computer Room (CCR)	See Section 5-4 Communications.
Other:	
Mechanical, transformer, electrical equipment and storage rooms	One per 20 linear feet of wall (not less than 2 per room).

Keyed Notes:

1 Duplex receptacles mounted within 8 feet of a fire extinguisher shall be equipped with stainless steel; locking coverplates. Quadraplex receptacles mounted within 8 feet of a fire extinguisher shall be equipped with die-cast metal, lockable coverplates.

5-2.8.3 Twist Lock Receptacles

The Solicitation A/E must determine if twist lock receptacles are required in workrooms. If twist lock receptacles are required, the Solicitation A/E must indicate drop cord locations in the solicitation documents.

5-2.8.4 Clocks

Mail Processing Facilities, due to their large size, must be provided with a wireless, synchronized, GPS clock system consisting of a master clock with wireless transceiver/transmitter, roof mounted antenna, repeater and secondary wireless analog clocks. Refer to MPFS Section 275313.

The secondary clock must be capable of receiving a signal from any other secondary clock, the master clock or wireless repeater and must include automatic calibration as well as a diagnostic function.

The repeater must receive a time signal via TCP/IP from the master clock and transmit to each wireless secondary clock.

The master clock must have a digital LED display and shall contain a transmitter capable of transmitting data to the wireless secondary clocks.

A federal assignment for the transmit frequency utilized for this clock system must be requested through Raleigh, ITSC.

Clocks on workroom perimeter walls must be 16 inch diameter, shatterproof and must be located 200 feet on center. Where the distance between opposite perimeter walls exceed 200 feet, provide additional clocks on intermediate columns.

The Solicitation A/E must specify the location and number of clocks in the Solicitation.

5-3 Lighting

5-3.1 Interior Lighting

Refer to USPS MPF Specification "Section 265100 - Interior Lighting" for available luminaire/lamp options for interior luminaires.

5-3.1.1 Workroom and Enclosed Platform Lighting and Controls

Design the workroom lighting system, consisting of individual luminaires and groups of luminaires, to achieve the required illumination levels for the four lighting groups described below. Each of the following lighting groups is present in every MPF workroom lighting design:

- Task Light Group (TLG)
- Ambient Light Group (ALG)
- Areas of Travel Light Group (AOTLG)
- Egress Lighting Group (ELG)

All luminaires shall be automatically controlled by luminaire mounted occupancy sensors, unless otherwise indicated. The occupancy sensors

must be appropriate for the luminaire mounting height within the workroom or platform.

The occupancy sensors within the workroom/platform shall be luminaire mounted, passive infra-red type and must automatically turn the “TLG” and “ALG” lighting groups off within 20 minutes of the last detected presence within the Workroom.

The maximum to minimum footcandle uniformity for each of the lighting zones must not exceed 3:1, unless otherwise noted.

Task Light Group (TLG)

The luminaires in this illumination group provide 50 fc of Task lighting for 1) Equipment operator stations, and/or 2) Areas within a zone that require a higher light level for visual acuity. The TLG lighting is provided by luminaires located in task-specific areas apart from the normal Ambient Light Group grid pattern. “TLG” luminaires must not be mounted lower than 8 ft.-0 in. AFF.

- Refer to equipment task lighting drawings for specific Mail Processing equipment included within the in the Building Design Standards, Folder E -Prototype Specific Requirements, MPF, Mail Equipment and Task Lighting Diagram.
- Task Lighting Group (TLG): Refer to “FSS” Guidelines for SAMP and FSS Task Lighting requirements included in the Building Design Standards, Folder E - Prototype Specific Requirements, MPF, FSS Requirements.

Ambient Light Group (ALG)

This illumination group must provide 25 fc for operational zones where work is performed that requires less visual acuity than that needed for Task lighting. This will be the primary lighting provided for workroom/platform activities.

- Ambient lighting provided by AOTLG luminaires must be integrated into the ALG design. AOTLG luminaires must remain on when TLG and ALG zone luminaires are controlled off.

Areas of Travel Light Group (AOTLG)

This illumination group requires a minimum average of 12.5 fc for areas of travel such as aisles and walkways when all other lights are turned off. Maintain the minimum average of 12.5 fc’s at all times The maximum to minimum uniformity ratio for this lighting group must not exceed 8:1.

Luminaires within the “AOTLG” shall not be automatically controlled and must be energized 24 hours per day.

Egress Light Group (ELG)

Emergency Lighting condition. This is a condition in which power to the facility or the lighting circuitry is interrupted. During these conditions, an average of 1 fc must be maintained along all emergency egress routes in accordance with the National Fire Protection Agency 101 Life Safety code. The column mounted, emergency battery units within the workroom must provide this emergency egress lighting.

Lighting Requirements

The solicitation A/E must develop the following:

- Layouts of areas where task lighting is applicable.
- Lighting plan showing each Lighting Group.

A/E must include, as part of the 30% Design submission, a photometric plan for each lighting level group for the entire workroom floor and platform area indicating the proposed lighting layout with point-by-point footcandle levels on a maximum 5 ft. X 5 ft. grid pattern. A/E must assume AOTLG luminaires are illuminated 24/7, and ALG and TLG are automatically controlled by integral, luminaire mounted occupancy sensors. Provide statistical summaries to demonstrate the following:

- Average maintained footcandles
- Minimum footcandles
- Maximum footcandles
- Uniformity factor (The calculations of the uniformity factor in the Workroom space must not include the lighting in the Workroom/Platform perimeter aisle). Photometric analysis must take into consideration obstructions such as HVAC ducts.

Criteria for acceptance of the Workroom lighting system must be based on light meter readings taken in one or more representative lighting zones covering a minimum area of 10,000 square feet. The USPS Project Manager must approve the representative area(s) chosen.

5-3.1.5 Emergency Lighting

Locate a minimum of (1) emergency light in each electrical room.

5-3.1.6 Footcandle Levels and Power Density

Refer to Exhibit 5-3.1.6a for footcandle and power density levels that must be met in the selection of luminaires

Exhibit 5-3.1.6a
Footcandle Levels and Power Density

AREA	LOCATION /DESCRIPTION	AVERAGE MAINTAINED FOOTCANDLE (FC) LEVEL (At 2'-6" AFF unless otherwise noted)[4,5]		UNIFORMITY	LAMPS[1]	MAX. POWER DENSITY(W/SF)
		Horizontal	Vertical			
Workroom Platforms	Workroom	12.5[3]/25[3]/50[2,3]	5	8:1, 3:1	LED	0.5[6]
	Enclosed Mail	12.5/25	5	3:1	LED	0.5[6]
Support Areas	General Shop	50		3:1	LED	1.0
	Consolidated Computer Room (CCR)	50		3:1	LED	1.0[6]
Parking Garages/Covered Parking Lots [7]		1.0	0.50	10:1	LED	0.25

Keyed Notes:

1 Lamping: LED = Solid State LED.

2 Provide Task Lighting as necessary at equipment operation locations in order to achieve 50 footcandle. Refer to equipment task lighting drawings for specific Mail Processing equipment included in the Building Design Standards, Folder E-Prototype Specific Requirements, MPF, Mail Equipment Task Lighting Diagram.

3 Indicates lighting control groups for illumination in Workrooms. 12.5 fc's is for the Areas of Travel Light Group (AOTLG), 25 fc's is for the Ambient Light Group (ALG), 50 fc's is for the Task Light Group (TLG).

4 As defined by the IESNA, Maintained Footcandle Level is to be interpreted as "Average Maintained Footcandle Level" for all interior rooms, measured at 2 ft. -6 in. above floor per Postal standards.

5 Final acceptance must be based on measurement of initial lighting levels, not maintained lighting levels.

6 This value represents a ~25 percent reduction in the values established in ASHRAE/IESNA STANDARD 90.1 using the space-by-space method.

7 Provide lighting controls to achieve automatic shutoff, bi-level illumination and daylight controls as dictated by the current version of ASHRAE 90.1.

5-3.1.7 Interior Luminaire Application

Refer to Exhibit 5-3.1.7a for the selection of interior luminaires to ensure quality of materials, ease of maintenance and good performance. Note that mail processing equipment requires task lighting where equipment operators are stationed.

Refer to the Building Design Standards MPF Specification Section 265100 – Interior Lighting for Postal luminaire type descriptions.

Exhibit 5-3.1.7a
Interior Luminaire Application

AREA	LOCATION/ DESCRIPTION	POSTAL TYPE	LUMINAIRE DESCRIPTION	CONTROLS NOTES
Workroom	Workroom	W6 W1/W2 EM3	Cable/chain or pendant hung, industrial, LED high bay with wide beam distribution. Task Lighting: 8'/4' Cable/chain hung, industrial LED strip light. Industrial 2-head emergency lighting unit with battery.	1,2
Platform	Enclosed Mail	W6 W1/W2 EM3	Cable/chain or pendant hung, industrial, LED high bay with wide beam distribution. 8'/4' cable/chain or pendant hung, industrial, LED strip light. Industrial 2-head emergency lighting unit with battery.	1,2
Support Areas	Maintenance Areas/Shop	CL1/CL3 EM3	Surface or chain mounted, LED strip light. Industrial 2-head emergency lighting unit with battery	3,4
	Consolidated Computer Room (CCR)	A1/A2 EM2	Recessed lensed. LED troffer. Architectural 2-head emergency lighting unit with battery.	3,4

Controls Notes:

1 Provide occupancy sensor control. Sensor must have zero to thirty minutes adjustable delay.

2 Refer to lighting level group criteria for controls.

3 Provide occupancy sensor control with “manual on”.

4 Where ceiling heights of 10 ft. – 0 in. AFF or less are present, provide integral battery units (1100 lumen at 90 minutes) within luminaires.

5-3.1.8 Ride-Thru Lighting

Provide column-mounted, battery units within the workroom platform areas of facilities equipped with a permanent emergency generator. This battery lighting must provide minimal ride-thru illumination until the life safety lighting loads fed from the generator are energized. The intent is to provide battery lighting for the workroom and enclosed platform(s) during the transfer from normal to emergency.

5-3.2 Exterior Lighting

5-3.2.1 Parking and Maneuvering Areas

There are two options for positioning light poles at the back of all trailer parking spaces, see Module 1, Chapter 1, section 1-2.4 for more information.

5-3.2.2 Parking Garages or Covered Parking Lots

Lighting levels in parking garages or covered parking lots must comply with state and local ordinances and recommendations made by the Illuminating Engineering Society of North America (IESNA). Refer to Exhibit 5-3.1.6a for recommended footcandle levels and power density.

Provide lighting controls to achieve automatic shutoff, bi-level illumination and daylight controls as dictated by the current version of ASHRAE 90.1.

5-3.2.6 Exterior Footcandle Levels and Power Density

Refer to Exhibit 5-3.2.6a for footcandle and power density levels that must be met in the selection of exterior luminaires.

Exhibit 5-3.2.6a
Exterior Footcandle Levels and Power Density

AREA	LOCATION/ DESCRIPTION	AVERAGE MAINTAINED HORIZONTAL FOOTCANDLE (FC) LEVEL (at Grade unless noted otherwise)	LAMP TYPE [3]	POWER DENSITY [2] (W/SF = Watts per sq. foot) or (W/LF = Watts per linear Foot)		
		Horizontal		Zone 2	Zone 3	Zone 4
Exterior	Fuel Pump Island[1]	20.0	LED	0.4 W/SF	0.6 W/SF	0.7 W/SF

Keyed Notes:

1 Uniformity ratio for fuel pump island lighting must not exceed 2.5:1.

2 It is assumed that the majority of Postal sites are categorized as exterior lighting zones 2, 3 or 4. The exterior lighting power allowances for Postal sites within exterior lighting zones 0 and 1 must comply with ASHRAE 90.1, Table 9.4.2-2. Per ASHRAE 90.1, Table 9.4.2-1, the exterior lighting zones are described as follows:

Lighting Zone 0	Undeveloped areas within national parks, state parks, forest land, rural areas and other undeveloped areas as defined by the *authority having jurisdiction.*
Lighting Zone 1	Developed areas of national parks, state parks, forest land, and rural areas.
Lighting Zone 2	Areas predominantly consisting of *residential* zoning, neighborhood business districts, light industrial with limited nighttime use and *residential* mixed use areas.
Lighting Zone 3	All other areas.
Lighting Zone 4	High activity commercial districts in major metropolitan areas as designated by the local

	jurisdiction.

3 Lamping: LED – Solid State LED.

5-3.2.7 Exterior Luminaire Application

Refer to Exhibit 5-3.2.7a Exterior Luminaire Application chart for the selection of exterior luminaires to ensure quality of materials, ease of maintenance and good performance.

Refer to MPF specification section 265600 – Exterior Lighting for Postal luminaire type designations.

Exhibit 5-3.2.7a
Exterior Luminaire Application

LOCATION/ DESCRIPTION	AREA	POSTAL TYPE	LUMINAIRE DESCRIPTION	NOTES
Fuel Pump Island	Exterior	PL1	Full cut-off luminaire with solid state LED array mounted under the fuel pump island canopy.	1

Luminaire Application Notes:

1 Luminaires shall be controlled by photo-sensor and occupancy sensor. The occupancy sensor shall dim the luminaires to approximately 50 percent when no activity is detected. When activity is detected, the luminaires shall return to full output with an adjustable time delay set at (10) minutes.

5-4 Communications

5-4.1 Scope

5-4.1.1 Terminology

The telecommunications industry has revised the terminology used to describe various commonly used components. Exhibit 5-4.1.1a summarizes the changes in the MPF terms.

Exhibit 5-4.1.1a
Terminology Matrix

Outdated USPS Terminology	New USPS Terminology
MDF/Main Telephone Room	Consolidated Computer Room (CCR)
Telecommunications Closet (TC)	Telecommunications Room (TR) (enclosed Architectural space)
Telecommunications Closet (TC) (column mounted)	Telecommunications Enclosure (TE) (housing / case – NEMA 12 enclosure)
Multi-Port Zone Box	Consolidation Point (CP-1)
Multi User Telecommunications Outlet (MUTOA)	Consolidation Point (CP-1)
No previous terminology (USPS specific)	Consolidation Point Fiber Optics (FP-1)

5-4.2 Telecommunications Entrance Facility (TEF)

To connect to these networks, the Postal facility's primary communications service entrance must consist of, at a minimum, four 4-inch conduits run underground (minimum 36 inch BFG) from the Telecommunications Entrance Facility (TEF) to the service provider's point of connection within an unpaved area. Provide (3) cell, mesh inner ducts with individual pull wires for each conduit. Conduit(s) may be run below slab and stubbed up into the building

with rigid metal conduit. Final connection of the conduit must be made by the service providers. A metallic locating strand must also be present in all conduits. Seal each end of all conduits to prevent intrusion of gas and or liquids entering the building through them. The sealant must be of a type which can be easily removed and replaced. Expandable foam sealant is not acceptable.

The TEF shall be provided with a Primary Bonding Busbar (PBB) for bonding of all protectors and the outside plant cabling. This PBB shall be bonded to the building grounding electrode system using minimum #1/0/AWG/CU bond conductor and shall be located as close as practical to the electrode system location to keep the Telecom Bonding Conductor (TBC) as short and straight as possible. Refer to MPF specification section 271100. The TEF may be located within the CCR for MPF's depending on the specific site conditions.

5-4.3 Telecommunications - Structured Cabling System

The Structured Cabling System (SCS) is an infrastructure wiring system that carries both voice and data. At a minimum, depending on facility size and type, the SCS is comprised of telecommunication outlets (T/O), horizontal cabling, and a main cross connect (MC) within the Consolidated Computer Room (CCR). For larger or more complicated facilities, additional components are required: Telecommunications Rooms (TRs), Telecommunications Enclosures (TEs), horizontal cross connects (HCs), cable backbone systems, and campus cable systems.

MPF Specification Section 270500 and related sections reflect the structured cabling requirements outlined in this section of the Module 2A.

The space, power, and HVAC requirements for the CCR and the TRs/TEs vary depending on their complexity. The main cross connect is located in the Consolidated Computer Room (CCR).

5-4.3.1 Backbone and Horizontal Cable Design

Backbone cabling must connect the MC in the Consolidated Computer Room (CCR) with each HC in the Telecommunications Rooms or Column-Mounted Telecommunications Enclosures.

Telecommunication Room (TR) and column mounted Telecommunications Enclosure (TE) locations must receive a minimum of (24) strand, armored, tight buffered, single mode, Fiber Optic Cabling for data.

Provide (25) pair category 3/5e UTP backbone cabling terminated on appropriate copper patch panel between the CCR and each TR/TE for the purpose of analog voice needs (i.e.: MPE OSS connections, modems, faxes, etc.).

Provide category 6 UTP horizontal cabling terminated on category 6 copper patch panels for data connections.

Provide category 6A UTP horizontal cabling terminated on 24 port category 6A copper patch panels for wireless data connections.

5-4.3.2 Telecommunication Outlets (T/O)

T/Os must be mounted at the locations shown in Exhibit 5-4.3.2a.

All T/O's shall be quad-plex, unless otherwise noted.

Exhibit 5-4.3.2a

Telecommunication Outlet Requirements

LOCATION	TELECOMMUNICATION OUTLET (T/O)[1] REQUIREMENTS
Workroom Floor (WRF)	Provide one T/O at every interior column of the WRA @ 78 in. AFF. T/Os must be placed in the web of the columns (not on the flange) on the opposite side of the power outlet. Refer to the OSL[1] for determining the location of T/Os.
Dock Doors	Provide one T/O for every three dock doors along with one T/O at the very beginning and one at the very end of each outer dock door. T/Os to be wall mounted and adjacent to a power outlet. Refer to the OSL for determining the location of T/Os.
Raised Supervisor Platforms	Provide two six-plex T/O's centrally mounted on handrail.
Raised MPE Supervisor Positions	Provide two six-plex T/O's.
Mail Processing Infrastructure Workstation (MPIW)	One six-plex T/O per wall.
Wireless Access Points (WAP)	Provide one duplex, category 6A T/O for every WAP as specified by Raleigh Wireless Predictive WAP Placement. Refer to MPF Specification Section 272133 for specific details.
Enterprise Physical Access Control System (ePACS)	Provide a duplex drop at all locations that ePACS devices/equipment will be installed.
Dock Door Monitors (formerly known as Container Tracking System)	Provide one duplex T/O mounted on unistrut to support 70 inch monitor. Bottom of 70 inch monitor to be at 12 ft. AFF. Locate T/O every 4 dock doors. Refer to MTSC MMO 001-16 and IT RFA 16-0022 and 16-0026.
Support Areas:	
Consolidated Computer Room (CCR)	Provide a minimum of (16) six-plexes T/Os mounted at the ladder/basket tray at 7'- 6" to 8'–0" AFF [2] or as directed by USPS. USPS will specify exact placement. Provide six-plex T/O's above each of the MPE cabinets on the backside of the ladder tray/wire basket so that the cable drops down to the back of the MPE cabinets. Provide a minimum of two individual ladder rack/basket tray runs for the length of the room in each direction. Provide one six-plex T/O per "ET" workdesk/bench location. Two six-plex T/O's per wall of CCR. Coordinate location during CCR design.

LOCATION	TELECOMMUNICATION OUTLET (T/O)[1] REQUIREMENTS
Lunchroom	Provide one T/O for every three Job Bidding Kiosks (The Solicitation A/E must determine number and location of kiosks and indicate Kiosks on the solicitation documents).
Satellite Maintenance areas	Provide one T/O per wall for each Satellites Maintenance Area.
Open offices (regardless of sq. ft.)	Provide one T/O per individual modular furniture workstation. T/Os to be installed on the walls or in consolidation point boxes in the ceiling. In addition, provide a minimum of two wall or column mounted T/Os for office equipment adjacent to a power outlet. Refer to the FF&E plan for the exact locations.
EAS Manager's Office	Provide two T/Os on separate walls adjacent to the power outlets.
VMF Areas:	
Misc. Areas	Provide T/Os in the offices, the stockroom, the stockroom office, the lunchroom, and the training room as required for similar spaces noted within Module 1, Exhibit 5-4.3.2a.
Service Bays	One duplex T/O for pendant mounted WAP within each Bay as specified by Raleigh Wireless Predictive WAP Placement.
Supervisor Office	One six-plex T/O at desk location.

Keyed Notes:

1 Operational Space Layout (OSL) provided by USPS.

2 If 84 in. cabinets are used, then 7 ft. -6 in. is the recommended ladder tray height.

5-4.3.3 Consolidation Point (CP-1)

Type 1 CP, Workroom ceiling (CP-1): Provide and terminate (12) Category 6 cables to one 12 port Category 6 patch panel, mounted on a 89D bracket, in a 12 in. H x 12 in. H x 6 in. D sheet steel, NEMA 12 enclosure with hinged and lockable door and rubber gasket. Alternate size: 14 in. H x 16 in. W x 6 in. D. Door must be oriented so that it opens in a horizontal manner. Enclosure may not be mounted in a manner so that the door opens downward. The patch panel must match the requirements of the cable specified.

Design CPs to comply with TIA-568-*X* requirements.

- Locate the CP at a minimum of 49 feet from the HC.
- Design the CP so that the Unshielded Twisted Pair (UTP) patch cable assemblies connecting the CP to the MPE must be no more than 72 feet long. Total cable length limitations from CP-1 to HC, per TIA/EIA, must not exceed 230 feet.

The Solicitation A/E must determine exact CP site requirements as per the Operational System Layout (OSL) and incorporate into the Solicitation. Each

CP must be clearly labeled on the drawing to identify the MPE it is intended for and the HC where it is terminated. CPs shall be mounted at 14 ft. AFF or as directed by the local maintenance manager. Locate and provide type-1 CPs as shown in Exhibit 5-4.3.3a Final quantities and locations to be coordinated with USPS IT.

Exhibit 5-4.3.3a
MPE Type and Requirements - CP

MPE TYPE[1]	REQUIREMENTS[3]	TYPE-1 CONSOLIDATION POINT
AFCS CIOSS ALPS APPS DIOSS EPPS SAMP USS	(1 CP-1 / AFCS) (1 CP-1 /CIOSS) (1 CP-1/ALPS) (1 CP-1 / APPS (1 CP-1/DIOSS) (1 CP-1/EPPS) (1 CP-1/SAMP) (1 CP-1/USS)	One type-1 CP anchored to building structure. Coordinate placement with other building structures and utilities.
Note 2 DBCS AFSM-100 APBS HSTS, LCTS LCUS, HSUS LCREM SWYB USS EPPS SPSS	 (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE) (1 CP-1 / 2 MPE)	One type-1 CP anchored to building structure. Coordinate placement with other building structures and utilities.

Keyed Notes:

1 Refer to Operational Space Layout (OSL) for MPE types used.

2 There should be no more than two (2) MPE per Type-1 CP. MPE must be in close proximity to share a common Type-1 CP to meet the maximum 72 ft. copper patch cable limit; if outside this limit a second or separate CP-1 shall be required.

3 Refer to Merrifield Engineer H-3 for all MPE Data Drop Requirements. http://web.eng.usps.gov/enggroup/esm/softdev/support/supporthome.htm

All final MPE connections must be coordinated and installed by the local Plant and/or a non USPS Facilities Group vendor. Coordinate with Operational Systems Layout (OSL) project drawings.

CP-1 may be used for special application in large office and administrative areas. CP cabling will terminate starting on the first copper patch panel.

5-4.3.4 Fiber Optic Consolidation Point (FP-1)

Type 1 FP, Workroom Ceiling (FP-1): Provide, install and terminate (1) 6 strand, armored, tight-buffered, single mode, fiber optic cable using SC style connectors, wall mountable fiber enclosure and coupler panels inside of a 12 in. H x 12 in. W x 8 in. D sheet steel NEMA 12 enclosure with a hinged lockable door and rubber gasket. Alternate size: 14 in. H x 16 in. W x 6 in. D. Door must be oriented so that it opens in a horizontal manner. Enclosure may not be mounted in a manner so that the door opens downward.

The Solicitation A/E must determine exact FP site requirements as per the Operational Systems Layout (OSL) and incorporate into the Solicitation. Label each FP clearly on the drawing to identify the MPE it is intended for,

and the CCR, where it is terminated. Fiber optic consolidation points shall be mounted at 14 ft. AFF or as directed by the local maintenance manager. Locate and provide type-1 fiber optic consolidation points as shown in Exhibit 5-4.3.4a. Final quantities and locations to be coordinated with USPS IT.

Exhibit 5-4.3.4a
MPE Type and Requirements - FP

DEVICE TYPE[1]	REQUIREMENTS[2]	TYPE-1 FIBER CONSOLIDATION POINT
FSS	(1 FP-1 / 1 FSS)	One type-1 FP anchored to building structure. Coordinate placement with other building structures and utilities.

Keyed Notes:

1 Refer to Operational Space Layout (OSL) for MPE types used.

2 Refer to Merrifield Engineer H-3 for all MPE Data Drop Requirements. http://web.eng.usps.gov/enggroup/esm/softdev/support/supporthome.htm

5-4.3.6 Cable Pathways

Where T/Os are provided in the Workroom area and are to be column mounted, provide a conduit (minimum 1 inch diameter) to a cable tray or TR/TE to protect the cable from damage due to activities in the workroom. Coordinate the mounting height of telecommunication outlets with power outlets.

Where wall mounted TOs are not possible or practical due to use of modular furniture, provide conduit stub-ups to route cables to the base of the furniture, where the conduit will transition into a surface mounted box attached to the furniture.

Interbuilding conduits shall be a minimum of three 4-inch diameter, buried minimum of 36 inch BFG, equipped with heavy wall rigid galvanized steel conduit elbows and risers and marked with red magnetic warning tape, refer to Module 1, 5-2.7.2. Conduits shall adhere to the 40% fill ratio and each conduit shall be provided with, (3) cell, mesh innerduct with individual pull strings.

5-4.3.8 Telecommunications Room (TR) *(Refer to Module 2B)*

The Telecommunications Room (TR) is the room that houses the horizontal cross-connect (HC) that serves as a transition point between the backbone and horizontal cable systems. The TR provides a controlled environment to house voice, data equipment, and connecting hardware.

Certain projects may require separate Telecommunications Rooms and HC's for the horizontal cabling needs of the OIG and USPSIS. Separate HC's shall be provided in those instances and shall be interfaced with the MC utilizing (25) pair CAT-3/5e copper and (24) strand fiber backbones. Design A/E shall coordinate these provisions with the local OIG special agent, local Postal Inspector or PSS.

MPF's may require TR's in addition to the Consolidated Computer Room (CRR) to maintain the total cable distribution distances under 295 feet. All TRs within MPF's must be a minimum of 9 ft. x 12 ft. clear interior space with ventilation, sufficient lighting, lockable doors and minimum ceiling height of 10 ft. A.F.F.

One armored fiber optic cable will be required from each HC to the MC. TIA-569-*X* specifies additional general requirements for the TR. USPS AS 504, Space Requirements Handbook, identifies space requirements.

The TR must adhere to the following specification list:

- Floor mounted equipment rack spacing formula: One rack mount unit (RU) equals 1.75 in. All high-density 48 port patch panels require 2 RU's. All horizontal wire managers equal 2 RU's. One horizontal wire manager is required between each patch panel. Place one horizontal wire manager at the top of each equipment rack.
- One 7ft.H x 19 in. W x 3ft.D floor mounted equipment rack will support up to 40 RU's. If more than 40 RU's are required, add additional 7 ft. H x 19 in. W, 3 ft. D floor mounted equipment racks. The TR for MPF's shall be sized to accommodate a minimum of (4) floor mounted equipment racks.
- Equip each rack with a Tripp-Lite #RS-1215RA rack mounted power strip equipped with twelve power outlets and plastic cover over the power button to prevent accidental outages. Mount each rack mounted power strip in the middle of each equipment rack.
- All floor-mounted equipment racks must have 36 inches of free and clear space from the front of any installed equipment racks as well as 36 inches free and clear from the furthest rearward mounted piece of equipment installed in any rack.
- Allocate a minimum of 16 RU's within the floor-mounted equipment rack for LAN and WAN electronic components to be supplied and installed by the USPS.
- Complete grounding and bonding of all provided hardware and cabling must be completed in accordance with the TIA-607-*X* specifications as well as the NFPA-70 NEC and any applicable codes. Provide Secondary Bonding Busbar (SBB) within each TR. The SBB shall be bonded to the SBB, within the CCR, using a minimum #1/0/AWG/CU bond conductor. The SBB shall be utilized for all bonding needs within the TR's. Refer to MPF Specification Section 271100.
- Provide an overhead cable or basket tray system, suspended from exposed structure above. Installation guidelines are covered in USPS MPF 260533, MPF 270500 documents and related sections.
- Maximum total cabling distances must not exceed 295 ft. for a standard telecommunications outlet. This distance is to include all horizontal and vertical distances plus required service loops.
- Provide a minimum 3 KVA at 120 Volt input/output of uninterruptible power with 30-minute backup rack mounted in the bottom of the right hand side HC equipment rack in each TR room.
- Terminate armored fiber optic cables connecting each TR to the CCR in a rack mounted interconnect center.
- Continuous temperature and humidity controls may be required to maintain telecommunications equipment within manufacturer's recommendations.
- Provide one (1) 30 Amp, 120 Volt single receptacle wall mounted directly behind the UPS and (2) dedicated, 120V nominal, non-switched, AC, duplex, 20 Amp outlets in each TR.
- Each rack shall be provided with an installation kit and isolation pads for securing and isolating the rack to and from the floor.

5-4.3.9 Consolidated Computer Room (CCR)

The Consolidated Computer Room (CCR) serves as the point of demarcation for incoming communications services and the interface point between the TEF and the Structured Cabling System within MPF's. The CCR is defined as an "Information Technology Equipment" room. Provide all requirements as stated in NFPA 75.

Within the CCR, provide space for incoming services equipment and Local Area Network equipment. All horizontal cabling within the specified distance limitations established by TIA-568-*X* will terminate on patch panels in this room. All data fiber optic backbone cables will terminate in this room. The room design must follow the TIA-569-*X* standards. Information on equipment and sizing of equipment (such as patch panels) is included in these standards. Note that the complete layout for the CCR shall be prepared by the A/E and included within the solicitation documents.

The CCR must adhere to the following specification list:

- Provide a minimum of two sheets of 4 ft. W x 8 ft. H x ¾ in. D smooth, void-free, fire retardant plywood for backboards. Paint plywood either white or light gray finish. Provide quadraplex power receptacle and quad T/O each mounted 6 ft. AFF and centered within each sheet of plywood. Additional 4 ft. x 8 ft. plywood sheets may be required by RITSC IT SME.
- Floor mounted equipment rack spacing formula: One rack unit space (RU) equals 1.75 inches. All high-density 48 port patch panels require 2 RUs. All horizontal wire managers equal 1 RU. One horizontal wire manager is required between each patch panel. Place two 2RU horizontal wire manager at the top of each equipment rack.
- One 7 ft. H x 19 in. W x 3 in. D floor mounted equipment rack will support up to 40 RUs. If more than 40 RUs are required, add additional 7 ft. H x 19 in. W, 3 in. D floor mounted equipment racks. Typically, the CCR will require a minimum of (9) equipment racks to support the voice, fiber, copper patching and PFE equipment connections.
- Each equipment rack will receive 7 ft. H x 8 in. W x 8 in. D vertical wire managers on the front and a 7 ft. H x 8 in. W x 8 in. D vertical wire manager on the rear (double-depth) and on each side (i.e. two (2) racks will receive three (3) vertical wire managers).
- Equip each equipment rack with a "Tripp-Lite" RS-1215RA rack mounted power strip equipped with (12) power outlets and a plastic cover over the power button to prevent accidental outages. Mount power strip at bottom of the last 48 port copper patch panel wire manager.
- All floor mounted equipment racks must have 36 inches of free and clear space from the front of any installed equipment racks as well as 36 inches free and clear from the furthest rearward mounted piece of equipment installed in any rack. Fiber optic cables supporting HCs (backbone) must all terminate in a rack mounted Fiber Optic Distribution Center (FDC) mounted in the uppermost portion of the floor mounted equipment racks. USPS to specify final termination point. Each 24-strand fiber cable shall be terminated on a 1 RU FDC panel. Four (4) RU FDC panels are not acceptable.
- Provide necessary rack or racks for all fiber optic backbone terminations.
- Provide a minimum of two, four post, floor mounted, Postal Furnished Equipment (PFE) racks for LAN, WAN electronic components. PFE racks shall be enclosed type with mesh louvered sides and plexiglass, hinged door. USPS to specify equipment rack locations. Supply four (4) 1-RU wire managers per rack in addition to the two 2-RU wire managers at the

top of each rack and the 1 RU wire manager between the copper patch panels.

- Grounding and bonding of all contractor-provided hardware and cabling must be completed in accordance with the TIA 607-*X* specifications as well as the NFPA-70 NEC and any applicable codes. Provide Secondary Bonding Busbar (SBB) within the CCR if the “TEF” is not located within the CCR. The SBB shall be bonded to the PBB at the TEF using a minimum #1/0/AWG/CU bond conductor. The SBB shall be utilized for all bonding needs within the CCR. Refer to MPF specification section 271100.
- All metallic ladder tray, basket tray, equipment racks or enclosures must be bonded to the SBB using a #6 AWG stranded bond wire with green insulation using 2-hole compression type fittings for basket tray installation. Burnish all painted surfaces for paint removal to achieve maximum ground connection.
- Each rack will receive a separate #6 AWG bond wire home run to the SBB.
- An overhead cable or basket tray system, suspended from exposed structure above, must be provided. Installation guidelines are covered in USPS MPF Specification Section 270500 and related sections.
- All T/Os in this room must terminate on patch panels in this room.
- Vendor must provide a minimum quantity of thirty-two (32) 10/24 mounting screws per CCR rack for the installation of USPS PFE active electronic components. This quantity does not include screws used to mount copper/fiber patch panels or wire managers.
- Each rack shall be provided with an installation kit and isolation pads for securing and isolating the rack to and from the floor.
- Resilient Quartz flooring is typically provided in the CCR. The floor surface of the CCR shall be covered with static control resilient flooring if the “CCR” is determined to be a critical computer room. Note that installation of static control resilient flooring requires an approved Deviation. Refer to specification section 096536 for specific grounding provisions.

Provide a static type Uninterruptible Power Supply (UPS) system with an external maintenance bypass circuit and 30 minute battery backup to power all equipment in the Consolidated Computer Room (CCR). The UPS shall be floor mounted set upon a 3 inch high concrete housekeeping pad. Distribution for the UPS must be via 120/208V, 3-phase, 5-wire type panelboards fed from stepdown transformers or power distribution units containing integral stepdown transformers. The UPS must be sized based on actual equipment data (plus 50percent spare capacity) if available. Otherwise size the unit for 25 VA per square foot of Consolidated Computer Room Area. The Design A/E must provide construction specifications for the procurement and installation of the UPS when justified.

The specifications shall include the features described herein.

The UPS shall operate as an on-line, non-redundant, double-conversion, reverse transfer system in the following modes:

- Normal: The critical AC load is continuously powered by the UPS inverter(s). The rectifier/charger(s) derives power from the utility AC source and supply DC power to the inverter(s), while simultaneously float charging the reserve battery(ies).

- Emergency: Upon failure of utility AC power, the critical AC load is powered by the inverter(s) which, without any switching, obtain power from the battery plant. There shall be no interruption in power to the critical load upon failure or restoration of the utility AC source.
- Recharge: Upon restoration of the utility AC source, the rectifier/charger(s) power the inverter(s) and simultaneously recharge the battery. This shall be an automatic function and shall cause no interruption to the critical AC load.
- Bypass: If the UPS system must be taken out of service for maintenance or repair, the static transfer switch shall transfer the load to the external bypass source. The transfer process shall cause no interruption in power to the critical AC load.
- Off-Battery: If the battery only is taken out of service for maintenance, it is disconnected from the rectifier/charger(s) and inverters by means of external disconnect circuit breaker(s). The UPS shall continue to function and meet all of the specified steady-state performance criteria, except for the power outage back-up time capability.
- The final installation of the UPS shall require factory commissioning to include load bank testing at full load for (4) four hours. The Raleigh SME shall be present to witness the load bank test.

IR viewing panes shall be provided by the UPS manufacturer during fabrication in accordance with specification section 261414, Infrared Viewing Panes (IR Windows). Each breaker position within the UPS shall be equipped with an opaque 3 inch round infrared window centered on the cable to lug terminations.

All materials of the UPS shall be new, of current manufacture, high grade and shall not have been in prior service except as required during factory testing. All active electronic devices shall be solid-state. All power semi-conductors shall be sealed. Control logic and fuses shall be physically isolated from power train components to ensure operator safety and protection from heat. All electronic components shall be accessible from the front without removing sub-assemblies for service access. Basis of Design: Liebert #NX Series or equal unit by Eaton/Powerware.

5-4.3.10 Telecommunications/Enclosure (TE)

The Telecommunications Enclosure (TE) is an enclosure that houses the horizontal cross-connect (HC) that serves as a transition point between the backbone and horizontal cable systems. A TE is required when the horizontal distribution distance (Including vertical rise and fall of cabling as well as service loops) exceeds 295 feet for a standard telecommunications outlet or 230 feet if serving a consolidation point.

One armored fiber optic cable will be required from each HC to the MC.

a. The Telecommunications Enclosures (TEs) supporting the Mail Processing (WRF) Workroom Floor environment must adhere to the following specification list:
   - Provide one (1) quadruplex power receptacle (four 120 VAC, 20 Amp outlets) per TE mounted on the side panel just above the top of the rack mounted UPS that will allow PFE to be mounted without obstruction.
   - Construction of steel or aluminum with plexiglass front doors. Cabinet must be rated NEMA-12, designed for front and rear access,

have forced fan with filtration for intake and exhaust ventilation, and adjustable vertical mounting rails. Fan mounted 5 inches from the top center of rear metal door with filter mounted 4 inches from the bottom center of the rear door. Fan must be oriented to flow filtered air into the cabinet to create a positive pressure within the cabinet and will be plugged into the power strip mounted inside of the cabinet. Dimensions: 86 in. H x 24 in. D x 24 in. W with 19 inch EIA rack width. Include a rack mountable 1.5 KVA uninterruptible power supply with 30 minute backup and a 6-foot power cord mounted on the back rail of the cabinet. The Telecommunications Enclosure and the installation of the enclosure must comply with area seismic zone rating.

- Platform solution, approved by the Structural Engineer, shall be provided to the USPS. Platform shall be designed to support a minimum of 1000 lbs. Enclosure shall be securely bolted to the platform at 9 ft.-0 in. AFF.
- Allocate 16 RUs within the rack for PFE and provide a second rack if required. Two units can be "ganged" together (inner side panels removed and doors adjusted to open from center) to form one TE for work room floor applications. The doors shall be adjusted to open in opposite directions from center. Cabinets shall be bolted together in such a manner to maintain NEMA-12 compliance, and the inner side panels will be removed from each unit creating an open pathway between cabinets. All copper connections will be placed in the left-most cabinet and the fiber along with the 1.5 KVA UPS will be installed in the right-most cabinet.
- Provide two 1-RU wire managers and one rack mount power strip with a minimum of six NEMA 5-15R outlets for USPS electronics, above rack mounted UPS unit. Mount power strip at bottom of the last 48 port copper patch panel wire manager.
- Grounding and bonding of all hardware and cabling must be completed in accordance with the TIA 607-*X* specifications as well as the NFPA-70 NEC and any applicable codes. Provide Secondary Bonding Busbar (SBB) within each TE. The SBB shall be bonded to the SBB, within the CCR, using a minimum #1/0/AWG/CU bond conductor. The SBB shall be utilized for all bonding needs within the TE. Refer to MPF specification section 271100.
- All metallic ladder tray, basket tray, equipment racks or enclosures shall be bonded to the SBB using a #6 AWG stranded bond wire with green insulation using 2-hole compression type fittings for basket tray installation. All painted surfaces shall be burnished for paint removal to achieve maximum ground connection.
- Maximum horizontal cabling distances shall not exceed 230 feet for both standard Telecommunications Outlets and Consolidation Points. This horizontal distance is to include all vertical distances plus required service loops. Total workroom floor coverage is required when designing the TE placements throughout the workroom floor environment.
- Provide a minimum of 32 mounting hardware sets (screws) per TE for the installation of USPS PFE active electronic components.
- All cabinet penetrations shall be fire-stopped using intumescent putty to maintain cabinet pressure and to allow for ease of future access.

Reference Section 078400 – Fire Stopping. The use of silicone foam style sealants is not allowed.

- Each TE must be labeled utilizing a minimum letter size of 18 inches of contrasting color, and installed on (3) visible sides of the TE.

5-4.3.12 Wireless Access Points (alternative to Fiber Optic Cabling)

An outdoor wireless mesh network solution connected to the Postal Service network and consisting of outdoor access points may be utilized to extend Wi-Fi coverage to remotely located cameras in certain applications. Cameras located remote from the main building (examples include, but are not limited to: remote employee parking areas, vehicle gates and guard shacks/booths), where the cost to trench is significant or where the area to be trenched spans a canal, body of water, tunnel or contaminated brownfield may be equipped for wireless transmission when justified and approved by deviation. Refer to Module 3, 5-4.3.12 and MPFS 272134.

5-4.8 Sound Systems

5-4.8.2 Call Bell Systems

Provide call bell at the Food Service entry. Provide a push button on the exterior wall adjacent to the Food Service entry door with a bell located in the Kitchen area.

5-5 Fire Protection

5-5.1 Fire Alarm System

Install fire emergency voice/alarm communication system (EVACS) in all MPF's.

- Alarm systems for MPF's typically over 60,000 square feet shall be equipped with supervised speakers, in lieu of horns, for generation of live and pre-recorded voice messages.

The fire alarm control panel (FACP) for MPF's operating 24/7 shall be located in a maintenance office that is constantly occupied. Per NFPA 72, central station remote monitoring is not required in MPF's where the FACP is "constantly" attended.

The fire alarm system for MPF's operating 24/7 shall be equipped with a "post alarm sequence" feature (per NFPA 72, 9.6.3.4) that allows the initial fire alarm signals to be received at the constantly attended, control panel location. Human action is subsequently required to delay the general alarm by 180 seconds after the start of the alarm processing. Solicitation A/E must verify acceptance of "post alarm sequence" with the AHJ.

5-5.1.2 Remote Monitoring

In accordance with NFPA 72, Chapters 24, 26 and 29, all MPF's not occupied 24/7 or those equipped with FACP's that are not "constantly attended" must be provided with central station remote monitoring. A digital cellular connection must be provided, as a sole means, to retransmit all "Contact ID-Point Address" alarm signals to the central station monitoring company. Note that a digital alarm communicator transmitter (mounted integral within the FACP), a third party, cellular communicator and a remote antenna are required for the cellular off-premise interface.

Remote monitoring is required as part of the construction contract, the contractor shall select a central station remote monitoring company that is UL listed and approved, and approved by the AHJ. The contractor shall pay for the first year of monitoring service and the cost of service after the first year will be borne by the USPS. Additionally, the contractor must furnish documentation of the company's qualifications to the USPS Project Manager.

Additional remote monitoring may be required for MPF's equipped with an area of refuge (area of rescue assistance) emergency communication system. In accordance with NFPA Chapter 24, all MPF's not occupied 24/7 or those equipped with a rescue assistance central control unit that is not constantly attended must be provided with central station remote monitoring separate from the fire alarm system monitoring. In those cases, an independent dedicated telephone line (in addition to the cellular connection required for the fire alarm system) supervised by the central station is required Provide digital dialer communicator per NFPA 72, section 24.10 and the AHJ.

5-5.4 Fire Alarm Interface

The fire alarm system must be interfaced with the following ancillary systems:

Egress doors, not equipped with free exit, controlled by the "Enterprise Physical Access Control System".
Fire Protection Sprinkler System.
Gas Solenoid(s).
Postal Automation Equipment.
Automated Guided Vehicles (AGV's).
NFPA 75 required Suppression Systems.
Air Handling and Ventilation Systems.
Smoke Control Systems.

5-5.4.1 Shutdown of MPE

Mail processing equipment and small material handling systems that operate in a limited area and do not penetrate wall partitions or firewalls must be shutdown by the fire alarm system only upon activation of a flow switch.

Mail processing equipment and building wide, large material handling systems that penetrate wall partitions or firewalls must be shutdown by the fire alarm system upon activation of a general alarm.

5-5.4.2 Shutdown of AGV's

Automated Guided Vehicle (AGV) control system must be shutdown by the fire alarm system upon activation of a general alarm.

5-6 Lightning Protection

NFPA 780 Standard for the Installation of Lightning Protection Systems (current version), must be followed. The Solicitation A/E must perform risk assessment calculation per NFPA 780 to determine lightning protection requirement for specific site location. Coordinate the design and installation of such systems with the bird deterrent system, if present.

5-6.1 Building Lightning Protection System

Provide a building lightning protection system equipped with underground counterpoise if the “expected lightning stroke frequency” (Nd) exceeds the “tolerable lightning frequency” (Nc) to the structure.

Unless otherwise directed by the USPS, the following values must be used:

- C_3 Structure Contents Coefficient =3.0 (Exceptional Value)
- C_4 Structural Occupancy Coefficient =1.0 (Normally Occupied)
- C_5 Lightning Consequence Factor = 5.0 (Continuity of Service Required)

Other factors and coefficients used in the Lightning Risk Assessment are site specific or construction dependent.

Coordinate details of attachment of roof mounted lighting air terminals and conductors with roof design. Attach roof mounted equipment using methods approved by roof manufacturer. Conceal all lightning protection down leads within new construction. The roof mounted lightning protection system shall be bonded to the underground counterpoise in accordance with NFPA 780.

The resistance of the lightning protection system shall not exceed 5 ohms. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening ground rods or installing ground enhancement materials; then retest to demonstrate compliance. Install rods at least 8 feet apart. Furnish written report of all tests.

5-6.1.1 Underground Counterpoise

An underground counterpoise is required for all MPFs to ensure equal ground potential throughout the facility. Provide the counterpoise regardless of a lightning protection system. Refer to paragraph 5-2.7.5. All perimeter and interior steel columns must be bonded to the counterpoise.

5-6.2 Ground and Surge Protection

The perimeter fencing shall be bonded to the counterpoise utilizing grounding electrodes at 100 ft. intervals and #2/AWG/copper electrode conductors.

5-7 Integrated Security and Investigative Platform (ISIP)

Three types of CCTV systems may be utilized in USPS MPF. Security/Access Control CCTV systems are typically utilized for surveillance and physical access control. Investigative CCTV systems consist of cameras for covert surveillance by Postal Inspectors and OIG Agents. If an MPF includes a retail section and is located in a high crime area, Robbery countermeasure/Retail CCTV cameras are required in the full service area of the retail space.

5-7.1 Robbery Countermeasure/Retail CCTV Cameras

The robbery countermeasure/retail CCTV system requirements are outlined within the Standard Design Criteria, Module 2B-Customer Service Facilities.

5-7.2 Security and Enterprise Physical Access Control CCTV System

All Mail Processing Facilities typically over 60,000 square feet require an Enterprise Physical Access CCTV Camera System.

Locate the Security and Enterprise Physical Access Control CCTV system monitoring station in the Maintenance Operations office or as designated by Postal Management and Postal Inspection Service, if investigative cameras are required.

Locate the ISIP CCTV head-end within the Criminal Investigative Office (CIO) for facilities provided with investigative cameras. The security and physical access control CCTV cameras and/or the robbery countermeasure cameras shall be wired to the ISIP head-end. Satellite monitoring stations shall be provided at multiple locations, as approved by the Local USPS Personnel, to attain 24 hour surveillance of the fixed cameras at the personnel and vehicle access points. Co-locate video intercom and exterior gate/door controls at these monitoring stations.

The system must, at minimum, view the areas shown in Exhibit 5-7.2a.

Exhibit 5-7.2a
CCTV Camera Viewing Areas

SPACE	CCTV CAMERA TYPE
BMEU - Customer Counter	One PTZ located in center of area
BMEU parking	Fixed
Employee Entrance[4]	Fixed
All access controlled employee entrances to the building	Fixed
Employee parking area(s)[1,2,3,4]	Fixed
Employee parking entrance gates[4]	Fixed
Employee parking exit gates[4]	Fixed
Entry to Administrative Area	Fixed
Exterior of all emergency “exit only” doors	Fixed
Exterior of Food Service Entry door	Fixed
Exterior of trash/recycling area[1]	Fixed
All truck entrance and exit gates and all gates to maneuvering areas[4]	Fixed

Keyed Notes:

1 Camera must be designated as investigative to be continuously recorded if an investigative CCTV system is provided.

2 Employee parking areas must be monitored by no more than (2) fixed cameras for each separate employee parking area. Coordinate camera locations with local inspectors.

Additional cameras must not be provided unless a deviation has been approved by Program Manager BDS.

3 Vehicle gates not equipped with access control must be monitored by (1) fixed camera.

4 In applications where multiple fixed cameras are mounted in the same location and are positioned to view different areas, gates or doors, a multi-directional or multi-sensor camera with individual camera lenses may be utilized as a design alternative.

Security CCTV wiring must be run in cable loop assemblies or cable tray with a spacing that will not compromise transmission. Use of bridle rings or tie-wrapping cables to beams is not acceptable.

Interior cable runs from cameras to node cabinets or to the CCTV headend that do not exceed 300 feet (total horizontal and vertical cable length) shall be CAT-6; utilize plenum rated where required. All exterior security cameras must be connected using fiber optic cable for video and data signals unless the cameras are building wall mounted or protected by a canopy or other adjacent architectural element.

5-7.2.1 Camera Mounting Provisions

The mounting applications shown within exhibit 5-7.2.1a shall be utilized as a guideline for the positioning of the security and ePACS CCTV cameras: Note that site conditions may dictate slight mounting height adjustments. Refer to MPF standard details P5-7-2a thru P5-7-2b5 for camera mounting applications.

Exhibit 5-7.2.1a
Security and ePACS CCTV Camera Mounting Provisions

CAMERA	LOCATION	MOUNTING REQUIREMENTS (TYPICALLY)[1]
Interior	Accessible dropped ceiling areas less than 14 feet AFF	Utilize flush, recessed ceiling mounts or surface ceiling mounts
	Non-accessible dropped ceiling areas	Utilize surface ceiling mounts or wall mounts, maximum 12 feet AFF
	Exposed ceiling areas[2]	Pendant mounted below the HVAC ductwork and lighting luminaires; preferably 14 to 18 feet AFG
Exterior	Building entry/egress doors	Wall mounted approx. 9 feet AFF
	Employee parking entry/exit gates[3]	Stanchion mounted or strap mounted to site lighting pole at 11 to 20 feet AFG. Refer to details P5-7-4a, 4b and 4f.

CAMERA	LOCATION	MOUNTING REQUIREMENTS (TYPICALLY)[1]
	Truck entry/exit gates[3]	Stanchion mounted or strap mounted to site lighting pole at approx. 20 feet AFG (to be mounted above the top of the truck). Refer to details P5-7-4c thru 4e1.
	Truck entry gate (view of driver)[3]	Stanchion mounted or strap mounted to site lighting pole at approx. 11 to 20 feet AFG. Refer to details P5-7-4c, P5-7-4e and 4e1
	Employee parking areas[3]	Wall mounted 12 to 25 feet AFF and/or stanchion/pole mounted approx. 20 feet AFG

Keyed Notes:

1 Cameras shall be mounted to provide a minimum 84 inch headroom below the camera.

2 Mount camera junction boxes on a rigid member, as high as practical where located in exposed ceiling areas.

3 Stanchion mounted cameras shall be mounted to round tapered steel poles equipped with electrostatically applied, powder coat finish. Refer to MPF standard details P5-7-2a, 2a2, 2a4, 2a5 and 2a8.

5-7.2.2 CCTV Terminal Cabinets

CCTV terminal cabinets are typically used to house the fiber media converters and injectors serving more than (3) exterior pole mounted cameras. CCTV terminal cabinets shall be utilized to serve pole mounted cameras located no more than 50 ft. (horizontally) from the cabinet. Underground runs of CAT-6/OSP/Wet cables serving pole mounted cameras located more than 50 ft. from the terminal cabinets are not permitted and must utilize fiber cabling and pole mounted, NEMA 4SS enclosures to avoid the increased risk of lightning inducted transients; refer to standard details P5-7-0e and P5-7-0f.

CCTV terminal cabinets shall not contain ePACS components. The CCTV system shall utilize independent wiring, raceways and cabinets.

Terminal cabinets shall be provided to house multiple media converters, fiber patch boxes, mid-spans, power supplies, SPD's and other CCTV system components. Enclosures shall be hinged and lockable with panelboard construction and plywood backboards. Refer to details P5-7-2c and P5-7-2c1 for rack details and interior component layout. CCTV terminal cabinets shall be provided by the General Contractor.

Terminal cabinets shall be wall or pedestal mounted with bottom of the cabinet at no less than 12 inches A.F.F. or A.F.G. Provide NEMA type 1 enclosures within interior locations and NEMA type 4X stainless steel type for exterior locations.

Terminal cabinets shall be amply sized to accommodate all components without overheating and forced air exhaust fans shall be provided. Cabinets requiring 120 Volt power shall be provided with appropriate number of 20 Amp, 125 Volt receptacles complete with surge protection.

Exterior terminal cabinets mounted near or adjacent to vehicular traffic shall be protected using 6 inch dia. X 4 ft. high concrete bollards. Exterior terminal cabinets shall be located within the secured area of the facility.

Exterior terminal cabinets shall be equipped with a copper ground bus bonded to a driven ground rod using #2/AWG copper grounding electrode conductor.

5-7.3 Intrusion Detection System (IDS)

In facilities with an Enterprise Physical Access Control System (ePACS), co-locate IDS control panel with ePACS server.

The CIO, "CIO" breakout doors and Secondary Covert Entry areas must be separately zoned, monitored and controlled by the IDS panel and must not be integrated with the ePACS.

Criminal Investigative Office (CIO) IDS system shall be designed so that the alarm panel records, but does not display, the status of the IDS components associated with the CIO. The system will be designed by the A/E and provided by the General Contractor. There must be no deviations from the manufacturers and products listed in the Specification Section 281600.

5-7.4 Enterprise Physical Access Control System (ePACS)

All Mail Processing Facilities typically over 60,000 square feet require an Enterprise Physical Access Control System.

Provide Enterprise Physical access control system (ePACS) in accordance with Specification Section 281304. Refer to "ePACS Standard System Configuration" and "Access Control (ePACS) SOP" for configuration and local facility responsibilities. These documents are contained in the Building Design Standards, Folder F – Other Requirements and Info., CCTV and ePACS Documents.

The Enterprise Physical Access Control System (ePACS) monitors the movement of people in and out of a facility, as well as movement of USPS vehicles in and out of the parking areas. The system also monitors the movement of employees within certain areas of the facility.

The system must be Windows WAN/LAN capable. The database of the access control system must be an open architecture that allows use of a standard relational database, which is updated periodically. ePACS software will reside on a main administrative/operator PC server to be integrated into the security CCTV system, or as directed by the Project Manager.

The ePACS controllers shall communicate with the "enterprise" host servers located at the Eagan, Minnesota Facility. A Communication Interface Module (CIM) application is responsible for handling all communications between the security management software host server and the controllers. The "CIM" is responsible for controlling all database changes and updates downloaded to the controllers and for gathering transactional information from the controllers. Typically, a CIM application can communicate and interface with (64) ePACS controllers.

The A/E shall contact “pacs-support@usps.gov” during the design phase to confirm the need of an additional “CIM” application to be added as part of the server farm hosted at the Eagan Facility.

The employee entrance requires full height metal turnstiles and a USPS RE-4 compliant handicap entrance. Turnstiles and RE-4 door must be monitored and controlled by enterprise physical access control system with card readers on both entry and exit sides. The employee entrance must be in plain view of the Security CCTV system.

The ePACS must interface with the USPS structured cabling system to attain the IP address communication lines required for the ePACS controllers.

The entire ePACS shall utilize an independent wiring system not shared with any other building system. The structured cabling system racks, the TE’s, the fiber backbone, cable trays, etc. cannot be utilized for any ePACS purpose. Cable trays installed for ePACS cabling may be utilized to contain CCTV wiring.

At the entrance to the administrative offices there is one set of doors which are always closed and locked. Entrance requires in/out card readers. Door must be equipped with electro-magnetic locks if double leaf style and electric strike if a single leaf door. Provide code compliant panic hardware for egress. Door design must comply with applicable codes.

The ePACS must utilize 125 kHz proximity cards and compatible card readers. Cards must allow direct photo-ID printing of images on the card via a factory applied PVC overlay or PVC laminate card construction. Cards will be provided by USPS based on full employee compliment as identified in the USPS Form 929 plus 50 percent. The Solicitation A/E must coordinate control access requirements for sensitive areas as defined by the plant manager and local Inspector. Equip access control doors with proximity type card readers, electric strikes or electro-magnetic locks and alarm devices.

The vehicle entries and high speed roll-up doors (HSRDs) must utilize 125 kHz proximity cards with compatible long range proximity card readers. Provide 120 Volt power for local power supplies and batteries.

Interface the ePACS with the Fire Alarm System to release controlled egress door locks. The ePACS within multi-story buildings shall be interfaced to release only the egress doors on the first floor, the “fire floor” and the intermediate floors above and below the fire floor.

The majority of egress doors shall be equipped for “free exit”. The egress shall not be card reader controlled. Provide exit door alarms as required.

The exterior side of all exterior doors must be secured from unauthorized entry by either using a card reader or by removal of the exterior door hardware.

The interior side of all exterior doors must be secured from unauthorized exit by either an emergency exit alarm or by using a card reader.

Equip the following locations with cameras and access control devices as prescribed in Exhibit 5-7.4a and MPF standard details P5-7-4a thru P5-7-4v1. Refer to Module 4D, exhibit 3-6.3a for camera and access control device locations for Vehicle Maintenance Facilities.

Exhibit 5-7.4a
Enterprise Physical Access Control Locations

LOCATION	EQUIPMENT REQUIRED	REFERENCE DETAIL
Inbound employee parking gates (each lane) [1,6]	LRCR, IC, 2 or 3 VSL, 2 FC	P5-7-4a, 4f
Outbound employee parking gate (each lane) [2]	FC, 2 or 3 VSL	P5-7-4b, 4f
Pedestrian gate to employee parking [6,12]	CR, RX, ML, DC, DR, IC, FC	—
Inbound truck maneuvering area gate [3,6]	2 LRCR, 2 IC, 3 VSL, 3 FC	P5-7-4c, 4e, 4e1
Outbound trucks [4]	3 VSL, 2 FC	P5-7-4d, 4e, 4e1
Employee Entrance [5,7]	2 FC per every 2 Doors/turnstiles; 2 CR (in & out). PB with FC.	P5-7-4p
RE-4 Employee Entrance [5,6,8]	2 CR (in & out), ES, DC, EX, REX, IC, 2 FC	P5-7-4p
Gate to recycling area	DC, FC	—
Fire lane access gate	No access control required	—
Main entrance from public lobby to administrative area [6,8,9]	2 CR, 2 ML, 2 DC, EX, REX, FC, IC	P5-7-4g
Interior doors from workroom side of building to admin [9]	CR, RX, 2 ML, 2 DC, DR	P5-7-4l
Interior doors from employee services side of building to Workroom floor	No access control required.	—
Interior doors from workroom or employee service area to maintenance / support area [9]	CR, RX, 2 ML, 2 DC, DR	P5-7-4j
Interior doors to equipment rooms containing ePACS control equipment [9,11]	CR, RX, ES, DC	P5-7-4t, 4t1
Exterior doors to equipment rooms containing ePACS [9]	CR, RX, ES, DC, FC	P5-7-4u, 4u1
Exterior doors to mechanical rooms containing HVAC or fire sprinkler equipment [9]	CR, RX, ES, DC, FC	P5-7-4t, 4t1
Interior doors to main mechanical rooms containing major HVAC or fire sprinkler equipment [9,12]	CR, RX, 2 ML, 2 DC, DR	P5-7-4t, 4t1

LOCATION	EQUIPMENT REQUIRED	REFERENCE DETAIL
Interior doors to maintenance shops containing valuable tools or storage items [9]	CR, RX, 2 ML, 2 DC, DR	P5-7-4j
Exterior doors to maintenance shops containing valuable tools or storage items [9]	CR, RX, 2 ML, 2 DC, FC, DR	P5-7-4u, 4u1
Interior doors to main electrical rooms [9, 12]	CR, RX, ES, DC	P5-7-4t, 4t1
Exterior doors to main electrical rooms [9]	CR, RX, ES, DC, FC	P5-7-4t, 4t1
Doors to elevator equipment room	No access control required	—
Exterior doors leading to/from maintenance / support area [8,9]	2 CR, 2 ML, 2 DC, EX, REX, FC	P5-7-4i
Exterior doors leading to/from administrative area [8,9]	2 CR, 2 ML, 2 DC EX, REX, FC	P5-7-4i
Exterior doors leading to/from workroom [8,9]	2 CR, 2 ML, 2 DC, EX, REX, FC	P5-7-4i
Exterior door for contract driver entry [6,8]	2 CR (in & out), ES, DC, EX, REX, IC, FC	P5-7-4v, 4v1
Exterior workroom re-entry door from outside assembly area [8,9]	2 CR (in & out), 2 ML, 2 DC, EX, REX, FC	P5-7-4i
Exterior door from lunchroom to exterior break area [8]	2 CR (in & out), ES, DC, EX, REX, FC	P5-7-4h, 4h1
HSRDs at mail vestibule to/from workroom to/from mail platform [13]	2 CR (in & out), 2 LRCR (in & out)	P5-7-4s, 4s1, 4s2
Personnel entry door at mail vestibule [8]	2 CR (in & out), ES, DC, EX, REX, FC	P5-7-4s1, 4s2
Emergency exit only doors to exterior	DC, EX, REX, FC	P5-7-4h, 4h1
CCR or Computer Room doors [9]	CR, RX, 2 ML, 2 DC, DR, FC	P5-7-4k
Tool and parts / Stock room or Computer Storage Room [9]	CR, RX, 2 ML, 2 DC, DR	P5-7-4t, 4t1
Exit doors off the Platform [8]	2 CR, ES, DC, EX, REX, FC	P5-7-4u, 4u1
Hazardous Materials Room	CR, RX, ES, DC, FC	—
Accountable Paper Depository (APD) [9]	CR, 2 ML, RX, 2 DC, DR	P5-7-4k
Registry Cage personnel door/gate [8,10]	2 CR (in & out), DC, ML, EX, “REX or DR”, FC	P5-7-4n
Registry Cage sliding service gate[14]	CR, ML, DC, FC	P5-7-4n

LOCATION	EQUIPMENT REQUIRED	REFERENCE DETAIL
Registry Cage service window	DC, FC	P5-7-4n
Roof access door	2 CR, ES, DC	—
Roof hatch	DC	—
Exterior doors leading to storage rooms	DC (on each door leaf)	—
Other site specific doors as required by AS-805.	As required for proper function. Deviation required.	—

Electric strikes (ES) are the preferred method for controlling new single leaf doors. Electro-magnetic (ML) style locks shall be utilized on all double leaf doors (new or existing).

New single leaf doors equipped with single card reader for entry shall have door hardware suited for “free exit”. Door shall also be equipped with a motion sensor (RX) to disable the door contact during “free” egress. Provide panic pushbars (REX) and exit door alarms (EX) where required.

Existing single leaf door frames not presently equipped with electric strikes shall utilize electro-magnetic (ML) style locks. Existing interior doors equipped with single card reader for entry and ML style locks shall be provided with motion sensor (RX) control and door release pushbutton on the egress side of the door. Existing exterior egress doors equipped with in & out card readers shall be provided with panic pushbars (REX) on the egress side of the door. Provide exit door alarm (EX) where required.

- All interior and exterior doors equipped with ePACS devices shall be programmed as “fail safe” to allow egress upon an ePACS failure. The only exceptions to this rule are the doors to rooms with increased security (e.g. records rooms, accountable, paper, etc.) and the registry cage door/gate, which shall “fail secure” upon an ePACS failure.

Magnetic style door switch contacts are the preferred method for supervising the door position (open or closed). Hinge transfer devices shall not be utilized. All ePACS components to include door contacts and electric strikes shall be provided by the low voltage subcontractor. Request to exit pushbar shall be provided by the door hardware supplier.

Equipment Key:

CR Card Reader
LRCR Long Range Card Reader
DC Door Contact
DR Door Release Pushbutton with adjustable time delay
ES Electric Strike
EX Exit Door Alarm
FC Fixed CCTV Camera
IC Video/Intercom Call Station
ML Electro-Magnetic Lock
PB Emergency Evacuation Pushbutton
RX Request to Exit (motion sensor)
REX Request to Exit device (panic hardware)
VSL Vehicle Sensor Loop

Keyed Notes:

1 Inbound Employee Parking Entrance Gate(s):

Entrances to employee parking lots at baseline security facilities must have both a motorized barrier arm gate and manual sliding or swing gate. High risk locations require motorized sliding or swing gates. Refer to Standard Detail P5-7-4a and P5-7-4f.

Security CCTV and Access Control at inbound employee entrance gates (each lane) shall include but not be limited to the following:

a. Dedicated CCTV and ePACS alarm monitoring and video/intercom gate release controls shall be from two (2) locations in the building.

b. Video/Intercom station connected to master video/ intercoms at various locations in building. (See Footnote 6)

c. Employee parking entrances equipped with a motorized barrier arm lift gate and manual sliding/swing gate shall be provided with two (2) vehicle sensor loops located and wired to operate as follows:

- The 1st VSL (in direction of traffic flow) will identify the presence of the vehicle and will open the barrier arm gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the barrier arm gate(s) until the vehicle has passed. Purpose is to stop gate(s) from closing on a tailgating vehicle following the first vehicle.
- Locate the first entry vehicle sensor loop a sufficient distance in front of the entrance gate and synchronize gate speed to allow vehicles to proceed continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by vehicles attempting to enter while the gate is closing.

d. Two (2) fixed cameras to view front and rear of vehicle.

e. Long range card reader.

f. The long range card reader and video/intercom station shall be pedestal mounted as shown on standard detail P5-7-4a1.

g. Employee parking entrances at high risk facilities equipped with a motorized sliding/swing gate shall be provided with three (3) or more vehicle sensing loops located and wired to operate as follows.

- The 1st VSL (in direction of traffic flow) will identify the presence of the vehicle and will open the motorized slide gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the vehicle has completely passed. Purpose is to stop gate(s) from closing on a tailgating vehicle following the first vehicle.
- The 3rd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the vehicle has passed. There may be occasions where the entering vehicle stops and does not immediately pass the VSL.
- Locate the first entry vehicle sensor loop a sufficient distance in front of the entrance gate and synchronize gate speed to allow vehicles to proceed continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by vehicles attempting to enter while the gate is closing. Use additional exit sensor loops as may be necessary.

h. High risk employee entrances equipped with motorized sliding or swing gates shall not be equipped with barrier arm gates.

2 Outbound Employee Parking Gate(s):

Exits from employee parking lots at baseline security facilities must have both a motorized barrier arm gate and manual sliding or swing gate. High risk locations require motorized sliding or swing gates. Refer to Standard Detail P5-7-4b and P5-7-4f.

Security CCTV and Access Control at outbound employee exit gates (each lane) shall include but not be limited to the following:

a. Dedicated CCTV ePACS alarm monitoring and video/intercom gate release controls shall be from two (2) locations in the building. Note that a video/intercom station is not provided for the outbound gate but gate release functions tied to the video/intercom masters are required.

b. Outbound employee parking exits equipped with a motorized barrier arm lift gate and manual sliding/swing gate shall be provided with two (2) vehicle sensor loops located and wired to operate as follows:

- The 1st VSL (in direction of traffic flow) will identify the presence of the vehicle and will open the barrier arm gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the barrier arm gate(s) until the vehicle has passed. Purpose is to stop gate(s) from closing on a tailgating vehicle following the first vehicle.
- Locate the first exit vehicle sensor loop a sufficient distance in front of the exit gate and synchronize gate speed to allow vehicles to proceed continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by vehicles attempting to exit while the gate is closing.

c. Fixed camera to view front of vehicle.

d. Outbound employee parking exits at high risk facilities equipped with a motorized sliding/swing gate shall be provided with three (3) or more vehicle sensing loops located and wired to operate as follows.

- The 1st VSL (in direction of traffic flow) will identify the presence of the vehicle and will open the motorized slide gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the vehicle has completely passed. Purpose is to stop gate(s) from closing on a tailgating vehicle following the first vehicle.
- The 3rd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the vehicle has passed. There may be occasions where the entering vehicle stops and does not immediately pass the VSL.
- Locate the first exit vehicle sensor loop a sufficient distance in front of the exit gate and synchronize gate speed to allow vehicles to proceed continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by vehicles attempting to exit while the gate is closing. Use additional exit sensor loops as may be necessary.

e. High risk employee exits equipped with motorized sliding or swing gates shall not be equipped with barrier arm gates.

3 Inbound Truck Entrance Gate(s):

Inbound truck entrance gate(s) must be equipped with motorized sliding gates. Refer to Standard Details P5-7-4c, P5-74e and P5-7-4e1.

Security CCTV and Access Control at inbound Truck Maneuvering area gates (each lane) shall include but not be limited to the following:

a. Dedicated CCTV and ePACS alarm monitoring, and video/intercom gate release controls shall be from two (2) locations in the building (location may be different from those indicated in 1.b. and 2.a. above for employee parking entrance and exit gates; coordinate with Plant staff). See footnote 6.

b. Two (2) video/intercom stations: left side high & low, connected to master video/-intercoms at various locations in the building.

c. The long range card readers and video/intercom stations shall be pedestal mounted as shown on standard detail P5-7-4a2.

d. Three (3) vehicle sensor loops shall be located and wired to operate as follows:

- The 1st VSL (in direction of traffic flow) will identify the presence of the truck and will open the motorized slide gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the truck has completely passed. Purpose is to stop gate(s) from closing on a tailgating truck following the first truck.
- The 3rd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the truck has passed. There may be occasions where the entering truck stops and does not immediately pass the VSL.
- Locate the first entry vehicle sensor loop a sufficient distance in front of the entrance gate and synchronize gate speed to allow trucks to proceed

continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by trucks attempting to enter while the gate is closing. Use speed bumps and/or additional exit sensor loops as may be necessary.

e. One (1) fixed camera to view the driver of the truck, one (1) fixed camera to view the vehicle's front license plate and one (1) fixed camera to view the rear license plate

f. Two (2) long range card readers: left side high & low.

g. For facilities that operate LLVs: In addition to the equipment described in 3-b for the left side of the gate, provide at the right side of the gate one (1) long range card reader and one (1) video/intercom station

(Select and locate the cameras described in 3e., so as to address the objects at both the left and the right sides of the gate, if feasible.)

4 Outbound Truck Gate(s):

Outbound truck exit gate(s) must be equipped with motorized sliding gates. Refer to Standard Detail P5-7-4d, P5-74e and P5-7-4e1.

Security CCTV and Access Control at outbound truck gates shall include but not be limited to the following:

a. Dedicated CCTV, ePACS alarm monitoring and video/intercom gate release controls from two (2) locations in the building. Note that a video/intercom station is not provided for the outbound gate, but gate release functions tied to the video/intercom masters are required.

b. Three (3) or more vehicle sensor loop detectors shall be located and wired to operate as follows:

- The 1st VSL (in direction of traffic flow) will identify the presence of the truck and will open motorized slide gate(s).
- The 2nd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the truck has completely passed. Purpose is to stop gate(s) from closing on a tailgating truck following the first truck.
- The 3rd VSL (in direction of traffic flow) will prevent closing of the motorized slide gate(s) until the truck has passed. There may be occasions where the entering truck stops and does not immediately pass the VSL.
- Locate the first exit vehicle sensor loop a sufficient distance in front of the exit gate and synchronize gate speed to allow trucks to proceed continuously through gate without having to stop to wait for gate to fully open. Provide particular attention to the reversing action (closing or opening) to prevent damage to the gate by trucks attempting to exit while the gate is closing. Use speed bumps and/or additional exit sensor loops as may be necessary.

c. Fixed camera to observe departing vehicles from the front and fixed camera to observe the departing vehicles from the rear.

5 Employee Entrance:

Security CCTV and Enterprise Physical Access Control at employee entrances shall include but not be limited to the following: Refer to standard detail P5-7-4p.

a. Turnstiles (Quantity of turnstiles to be provided is to be based on accommodating the number of employees on duty at peak occupancy, as called for on 929, within fifteen (15) minutes). There shall be a minimum of two (2) turnstiles).

b. RE-4 compliant full-height gate.

c. In-Out Card Reader at each turnstile and In-Out Reader at RE-4 gate. Interface emergency egress with F/A system and emergency evacuation pushbutton.

- Pushbutton shall be wall mounted at the secured side of the turnstiles, in the security lobby within 5 feet of the nearest turnstile or RE-4 access gate, as shown on standard detail P5-7-4p. Evacuation pushbutton requires CCTV monitoring.

d. Dedicated CCTV and ePACS alarm monitoring, and video/intercom door release controls shall be from two (2) locations in the building.

e. Video/Intercom door stations at the turnstiles and employee entrance(s) connected to master video/intercoms at various locations in the building (same locations as 1b. and 2a. above – for employee parking entrance and exit gates) (see Footnote 6).

f. One (1) fixed camera per every (2) turnstiles/doors located to view entry. One (1) fixed camera per every (2) turnstiles/doors located at exit. Total of (2) cameras per every (2) turnstiles/doors.

g. One (1) Fixed camera to view the entry and one (1) fixed camera to view the exit of the RE-4 personnel gate/door.

h. One (1) fixed camera to view operation of the emergency evacuation pushbutton. No additional camera is needed, unless the cameras monitoring the turnstiles/doors do not view operation of this pushbutton. Provide signage above pushbutton indicating "Emergency Evacuation Pushbutton below (monitored by CCTV)". Signage to be ordered through the National Signage Direct Vendor.

6 The intended function of the video/intercom control system is to allow a visitor, who does not have a valid entry badge, to communicate with either of two supervisory locations in the facility in order to gain access.

Supervisory locations are to be coordinated with the facility. Video/Intercom master displays will generally be located near the supervisory locations. Note that the two supervisory locations controlling visitor access may not be the same as the two locations that control truck access.

7 The following requirements are applicable for full-height revolving door type turnstiles:

a. Signal delay from card reader to database query at PC and return output signal to door controller must be as close to instantaneous as feasible.

b. Security camera system must automatically record any turnstile fault condition or operation of the emergency evacuation pushbutton immediately – without time delay.

c. Turnstile controls shall include an automatic reset, adjustable, time delayed "general alert" remote (audible and visual) alarm at the various security monitoring locations within the facility indicating turnstile fault condition. The turnstiles shall operate as follows:

- Upon activation of a fire alarm emergency, the power supplies and micro-switches serving the egress electric locks at the turnstiles and RE-4 personnel door shall release. The turnstiles shall immediately operate in the "free spin" mode (egress direction only). Inbound entry direction shall remain secure.
- Upon loss of power to the electric lock power supplies serving the turnstiles, the locks shall failsafe and release. Note that power supplies and controllers are equipped with (4) hour battery reserve for operation during a power outage.
- Upon manual activation of the "emergency evacuation pushbutton" power supplies and micro-switches serving the egress electric locks at the turnstiles and RE-4 personnel door shall release. The turnstiles shall immediately operate in the "free spin" mode (egress direction only). Inbound entry direction shall remain secure. Normal exit operation of the turnstiles and RE-4 access gate will be disabled until the manual reset of the pushbutton; minimum reset time shall be set at 30 seconds, per NFPA 101.

d. Manufacturer to provide detailed written training literature on the complete operation and explanation of all the features of the turnstile system and the various components.

8 Where a CR and EX are installed on the same door, provide a sign with the follow text: "Card reader must be used other than emergency evacuation."

9 Provide electric strike and (1) door contact for new single leaf doors.

10 The registry cage personnel door shall be equipped with a panic pushbar or door release pushbutton (for override of the egress card reader and tied to a local alarm) to be utilized in emergency situations or when the exit card reader malfunctions.

11 A card reader is not required to control access into the room housing the badge making printer and camera equipment.

12 Coordinate requirements with Inspection Services.

13 Locate card reader at 44 inches AFF for foot traffic and long range card reader hung 7 ft. – 6 in. AFF for tow motor traffic at each high speed rollup door (HSRD). Interface with door controls.

14 If sliding gate is used for both personnel and MTE access, provide ePACS components listed for the personnel door/gate.

5-7.4.1 Video Intercom and Exterior Gate Control System

Provide an integrated IP video intercom system complete with door and gate controls for the exterior motorized gates, vehicle and employee entrances and the turnstiles. The basis of design shall be Aiphone "IX" series. System must be provided with 18 minute "UPS" backup sized at 450 Watts. Refer to MPFS section 275117 and MPF standard detail P5-7-4q4.

Coordinate locations of the master stations with the Plant. Typically, CAT-6 wiring is utilized for interfacing of the call-in stations and multiple master stations to the network node cabinet. CAT-6 interface wiring is limited to a maximum length of 330 ft. The network node cabinet shall therefore be centrally located between the door and master stations to avoid excessively long cable runs. Door call-in and master stations located more than 330 feet from the network node cabinet shall utilize fiber cabling, fiber patch panels and fiber transmitters/receiver. Applications requiring a large quantity of fiber cables may require additional, strategically located, network node cabinets to permit the use of CAT-6 cabling and avoid the excessive fiber cabling.

Install individual surge protective devices (power and low voltage) at both ends of all exterior intercom wiring exiting the building. Surge suppression shall be provided for the power and control wiring associated with the barrier arm and sliding gates, exterior call stations and magnetic locks. This is a mandatory requirement for all intercom wiring installed exterior of any Mail Processing Facility.

During construction, the A/E must provide high-definition photographs of the required surge protection devices at both ends of all exterior power and low voltage conductors. Photographs shall be transmitted to the USPS Project Manager.

Provide independent wiring for the gate and door release functions. Each gate and door release shall be connected to the network node cabinet utilizing (2) conductor #18 (CMP or OSP) low voltage cable. This wiring shall be separate from the ePACS wiring. Loss or interruption of the ePACS shall not affect the operation of the gate or door release functions.

5-7.4.2 Photo ID System

Provide a photo identification system as an integrated part of the Enterprise Physical Access Control System (ePACS). The system must be able to work on a LAN/WAN network and support integrated remote access. Direction to provide a complete system including PC software, digital camera, card printer ("direct to PVC" type which prints the picture directly to a plastic card) and cards compatible with the ePACS. System features must include a watermarking or computer generated hologram to prevent duplication of the photograph printed on the card. System must support standard digital graphical file formats (.gif, .bmp, .jpg, etc.) and be able to share the same database or communicate with the access control system and the Postal Service personnel records database.

5-7.4.3 ePACS Surge Protection

Install individual surge protective devices (power and low voltage) at both ends of all exterior ePACS wiring exiting the building. Surge suppression shall be provided for the power and control wiring associated with the exterior card readers, exterior reader interface modules, power supplies, door contacts and magnetic locks. This is a mandatory requirement for all ePACS wiring installed exterior of any Mail Processing Facility.

During construction, the A/E must provide high-definition photographs of the required surge protection devices at both ends of all exterior power and low voltage conductors. Photographs shall be transmitted to the USPS Project Manager.

5-7.4.4 ePACS Terminal Cabinets

Terminal cabinets shall be provided to house long range reader power supplies, interface modules, SPD's and other ePACS system components. Enclosures shall be hinged and lockable with panelboard construction and plywood backboards.

ePACS terminal cabinets shall not contain CCTV components. The ePACS shall utilize independent wiring, raceways and cabinets.

Terminal cabinets shall be wall or pedestal mounted with the bottom of the cabinet at no less than 12 inches A.F.F. or A.F.G. Provide NEMA type 1 enclosures within interior locations and NEMA type 4X stainless steel type for exterior locations.

Terminal cabinets shall be amply sized to accommodate all components without overheating and forced air exhaust fans shall be provided. Cabinets requiring 120 Volt power shall be provided with appropriate number of 20 Amp, 125 Volt receptacles complete with surge protection.

Exterior terminal cabinets mounted near or adjacent to vehicular traffic shall be protected using 6 inch dia. X 4 ft. high concrete bollards. Exterior terminal cabinets shall be located within the secured area of the facility. Refer to standard details P5-7-4a3 and P5-7-4a4 for rack details and interior component layout.

Exterior terminal cabinets shall be equipped with a copper ground bus bonded to a driven ground rod using #2/AWG copper grounding electrode conductor.

5-7.4.5 ePACS Controllers

The ePACS controllers shall support a minimum of (16) card reader interface modules and shall be wired for a maximum of (13) reader interface modules, leaving (3) spare positions for future use. Cabinet shall be hinged and lockable.

The door lock power supplies shall be 12 VDC with (8) circuit minimum capacity. The power supply shall be wired for a maximum combination of (6) magnetic locks, exit door alarms or electric strikes, leaving (2) spare circuits for future use. Cabinet shall be hinged and lockable.

The controllers shall be wall mounted in a secure location with the lock power supplies mounted adjacent to the controllers. In those rare occasions where the controller must be mounted within the workroom, the controller shall be wall or column mounted with the bottom of the cabinet no less than 9 ft. AFF and no more than 14 ft. AFF.

The General Contractor shall provide 120 Volt power to the door lock and card reader power supply cabinets; maximum of (3) controllers/power supplies per 20 Amp, 120 Volt circuit.

5-7.5 Investigative Systems

Mail Processing Facilities with workrooms 60,000 square feet and larger shall include the Criminal Investigative Office with breakout door and a Criminal Investigative CCTV System.

The Criminal Investigative Systems (CIS) will consist of video surveillance cameras, CCTV components, and a Criminal Investigative Office (CIO).

Refer to Appendix M1-F: Building and Site Security Requirements by Type of Facility and Square Footage and Standard Design Criteria Module 1, Chapter 2, Section 2-9.

5-7.5.1 Investigative Office

The Criminal Investigative Office (CIO) is used by USPIS/OIG to conduct internal investigations. This room houses equipment for the control and observation of video surveillance cameras and is also used for viewing the workroom/platform floor. Refer to standard MPF detail P5-7-5a.

Lights in CIO must all be separately switch controlled.

Fire detection appropriate for rooms containing electronic equipment and fire alarm signaling device(s) are required.

Provide secondary bonding busbar (SBB) behind the headend rack(s) as specified in MPFS section 282305, paragraph 2.14.

5-7.5.2 Investigative CCTV System

A/E must determine the location of the cameras, headend equipment and CCTV components. Refer to the Building Design Standards, Folder F – Other Requirements & Info, CCTV and ePACS for “USPS CCTV Security Design Requirements”.

All equipment including the servers, monitors, network switch, etc. must be procured by the General Contractor from the Direct Vendor utilizing the pass through pricing process. Refer to the Building Design Standards, Folder F - Other Requirements & Info, CCTV and ePACS for “Securitas” design and construction guidelines. “Securitas”, the Direct Vendor, must install the cameras, servers, monitors and associated equipment. The general contractor must install/terminate the necessary CAT-6 and fiber cabling to the patch panels.

Install investigative CCTV wiring in cable tray or cable support system with a spacing that will not compromise transmission. Use of bridle rings or tie-wrapping cables to beams is not acceptable. Install exterior wiring in conduit raceway system that is suitable for wet locations. Cable tray for camera wiring must not include any low Voltage AC wiring.

A final inspection and test report demonstrating functionality of the Investigative CCTV system is required prior to acceptance of the system.

5-7.5.3 Cameras and Junction Boxes

Equip environmental enclosures for exterior cameras with individual 120 VAC / 12 VDC power supplies when required.

There are two options for providing power to Investigative CCTV cameras:

a. Provide dedicated 120VAC lockable panelboards as required, located in the Criminal Investigative Office (CIO) to serve all Investigative CCTV cameras. Comply with National Electric Code clearance requirements.

b. Provide circuit breakers equipped with padlockable, handle attachments in the panelboards that contain surge protection and do not supply motor loads. These handle attachments must be capable of padlocking in the "on" or "off" position. Circuit breaker trip function must remain operational when locked in the ON position.

Enclosures housing camera power supplies, media converters, fiber patch box (interconnect center) and 120 Volt receptacles shall contain interior backboards for mounting of all components and shall be provided by the General Contractor. NEMA type 4X, stainless steel, hinged and lockable enclosures shall be provided for exterior application serving 3 or less pole mounted cameras as shown on standard details P5-7-0e and P5-7-0f. CCTV terminal cabinets are typically used to house the CCTV components serving more than (3) cameras. Refer to section 5-7.2.2.

During construction, the A/E shall provide high definition photographs showing the interior components of all equipment enclosures, terminal cabinets, remote node cabinets and the headend rack(s). Photographs shall show wiring and placement of fiber media converters, surge protectors, fiber patch boxes and interconnect centers, power supplies, power strips and receptacles. Photographs shall be transmitted to the USPS Project Manager.

Mount camera junction boxes on a rigid structural member, as high as practical where exposed. Place junction boxes as indicated in Exhibit 5-7.5.3a:

Exhibit 5-7.5.3a
Investigative Cameras and Junction Boxes

SPACE	CCTV CAMERA TYPE
BMEU - Dock area, positioned to allow viewing into the truck bed	1 PTZ for every 3dock positions
BMEU - Scales	1 Fixed at each floor scale or MERLIN
BMEU[3]	1PTZ located in the center of the space
On the dock area, positioned to allow viewing into the truck bed.	1PTZ per 3 dock positions
Employee Lunchrooms	1 PTZ Every 50', 25' from walls
Interior Break Areas	To be covered by WR PTZ cameras
Exterior Break Areas	1 Fixed
Breakroom	1 Fixed
Entrance to Accountable Paper Depository (APD)	1 Fixed
Entrance to the Stamp Distribution Office (SDO)	1 Fixed
Hazardous Materials Area	To be covered by WR PTZ cameras
Trash/Recycling Room	1 Fixed

SPACE	CCTV CAMERA TYPE
Hazardous Materials Room	1 Fixed
Mail Vestibule	1 Fixed
Satellite Vending Room	1 Fixed
In Stockrooms that store such items as parts and Tools	1 PTZ
On the Workroom (WR) floor, the final camera types and placements shall be confirmed by PSS, USPIS and OIG[3]	1 PTZ, every 40 ft; 20 ft from walls
Outside of the CCR or Computer Room entrance doors[1]	1 Fixed, viewing each entrance door.
Freight Elevators[2,3]	1 PTZ located at each door opening on each floor

Equipment Key:

PTZ – Pan/Tilt/Zoom cameras

Multi-D/S – Multi-Directional or Multi-Sensor camera

Keyed Notes:

1 The entry doors to the CCR and all computer rooms containing "MPE" server equipment must be monitored by investigative fixed cameras.

2 Conditional: Upon approval from the OIG and USPIS.

3 In certain applications, a multi-directional or multi-sensor camera with individual camera lenses may be utilized as an alternative to a PTZ camera. Attain approval from the PSS, the OIG and USPIS.

Workroom cameras that are in close proximity may be used to view open room/areas located in the Workroom or directly adjacent to the Workroom, such as Rewrap, therefore separate cameras are not required.

5-7.5.4 Camera Mounting Provisions

The mounting applications shown within exhibit 5-7.5.4a shall be utilized as a guideline for the positioning of the investigative CCTV cameras: Note that site conditions may dictate slight mounting height adjustments. Refer to MPF standard details P5-7-2a thru P5-7-2b5 for camera mounting applications.

Exhibit 5-7.5.4a
Investigative CCTV Camera Mounting Provisions

CAMERA	LOCATION	MOUNTING REQUIREMENTS (TYPICALLY)[1]
Interior	Accessible dropped ceiling areas less than 14 feet AFF	Utilize flush, recessed ceiling mounts or surface ceiling mounts
	Non-accessible dropped ceiling areas	Utilize surface ceiling mounts or wall mounts, maximum 12 feet AFF

CAMERA	LOCATION	MOUNTING REQUIREMENTS (TYPICALLY)[1]
	Exposed ceiling areas[2]	Pendant mounted below the HVAC ductwork and lighting luminaires; preferably 14 to 18 feet AFG
	Dock area (enclosed platform)	Pendant mounted bottom at 10 feet AFF and 25 feet from dock door.
Exterior	Recycling areas Break areas	Wall mounted approx. 9 to 12 feet AFF
	Dock area (enclosed or open platform)	Pendant mounted bottom at 10 feet AFF and 25 feet from dock door.

Keyed Notes:

1 Cameras shall be mounted to provide a minimum 84 inch headroom below the camera.

2 Mount camera junction boxes on a rigid member, as high as practical, where located in exposed ceiling areas.

5-7.5.5 Video and Control Wiring

Interior cable runs from cameras to node cabinets or to the CCTV headend that do not exceed 300 feet (total horizontal and vertical cable length) shall be category 6; utilize plenum rated where required.

Final CAT-6 cabling routed from the pole mounted NEMA 4SS enclosures and the terminal cabinets, serving the “blue sky” cameras and the patch cords utilized within the exterior enclosures and cabinets, shall be “outside plant (OSO)” rated, gel-filled, direct burial type.

Interior cable runs exceeding 300 feet from cameras to node cabinets or to the CCTV headend shall be (2) count 62.5/125, OM1, multi-mode, indoor rated fiber cable contained within innerduct.

Exterior cable runs, contained in conduit and routed to remotely located “blue sky” cameras shall be (2) count, 62.5/125, OM1, multi-mode, indoor/outdoor rated fiber cable. Where multiple fiber cables are routed within a common conduit provide innerduct separation of each cable.

Interior cable runs from remote node cabinets to the CCTV headend rack(s) shall be (6) count, 62.5/125, OM1, multi-mode, indoor rated fiber cable contained within innerduct.

Provide category 6 or fiber cabling for camera video wiring. Video wiring must be routed to the equipment rack in the Investigative Office with 20 ft. of pigtail at final point of demarcation in room. All video signal runs must be continuous (not spliced) from camera to demarcation point.

Power interior cameras by “PoE” (power over ethernet) from the network switch for cable runs up to 300 ft (total horizontal and vertical cable length). Provide fiber optic cabling for cable runs exceeding 300 ft.

The entire CCTV system shall utilize an independent wiring system not shared with any other building system. The structured cabling system racks, the TE's, the fiber backbone, cable trays, etc. cannot be utilized for any CCTV system purpose. Cable trays installed for CCTV cabling may be utilized to contain ePACS wiring.

5-7.5.6 Camera Systems

When a facility has an investigative CCTV system AND a robbery countermeasure/retail system, cameras for both systems are required at the full service and BMEU counters. Mount one fixed Investigative CCTV camera, above a mirrored ceiling panel, over each cash drawer at the service counter. Mount one fixed robbery countermeasure/retail CCTV camera for every two full service and BMEU workstations, on side or rear walls.

All non-investigative cameras (security and robbery countermeasure/retail systems must be individually homerun to the CIO for viewing by Inspection Service personnel.

Provide and install cameras for all junction box locations. All workroom/platform cameras must be pan-tilt-zoom (PTZ) or multi-directional/multi-sensor (Multi-D/S) units. Camera heights and locations must be coordinated with **the local Inspector and the OIG**. Place cameras at least six inches below lighting luminaires. Place cameras to avoid HVAC ducts, diffusers and other obstructions. Camera height must be between 14 and 18 feet AFF. If cameras are required to be outside this height range additional camera junction boxes/cameras will be required. The A/E must coordinate site specific requirements with the **local Inspection Service and the OIG**.

Direct Vendor shall provide arm brackets, recessed housings, surface mounts, grid mounts, pendant kits, and surface conduit back boxes for all camera types.

Camera mounts must be bolted or clamped, not welded, to allow simple relocation. If mounting height requires stems of 4 ft. or more, then additional bracing will be required to prevent camera movement.

Camera systems shall be supplied by the approved USPS CCTV Direct Vendor, in accordance with MPF Specification Section 282305.

5-7.5.7 CCTV Remote Node Cabinets

Remote Node Cabinet shall be lockable and will house an IP video system network switch, patch panel, UPS and camera power supply.

a. The GC shall install the remote node cabinet and terminate fiber optic and CAT-6 cables.

b. Direct Vendor will supply line-interactive, rack mounted UPS with battery reserve rated to supply continuous load for18 minutes.

c. The GC shall provide a dedicated 20 Amp, 120 Volt circuit for each remote node cabinet.

Remote node cabinets shall be mounted high enough to deter unauthorized tampering, but low enough to avoid the use of motorized lifts for future repair or warranty work.

a. Node cabinets mounted within ePACS secured rooms shall typically be wall mounted top at 6 feet AFF.

b. Node cabinets mounted within the workroom and platform areas must be wall or column mounted bottom at no less than 9 feet AFF and no more than 14 feet AFF.

All cameras will reside on separate Securitas provided ISIP switches within the headend and/or node(s). No camera utilizing UTP cable can exceed 294 feet.

a. Intermediate node locations can be well over 300 feet from the head end. Nodes serve as a local termination/communication point for remote cameras in a work space. A node collects cameras within an area that exceeds 300 feet from the head end. Nodes must communicate over fiber to the head end. Two or more node cabinets can be aggregated at a given node location in a facility. Node cabinets require wall space and electrical power on appropriate circuits. Placement effects cable termination locations and cable type.

b. The number of cameras that can be supported by a single node cabinet is dependent upon the equipment manufacturer, the number of fixed, PTZ or multi-directional cameras, the number of surge protection modules and the quantity of fiber connections. Refer to paragraph 9.b. of the "USPS CCTV Security Design Requirements" document contained within BDS, Folder F – CCTV and ePACS documents for applicable node cabinet formulas.

5-7.5.9 Registry Cage/Registry Room Surveillance

Provide fixed cameras for all registry cages as efficiently as possible to provide surveillance of the registry service windows and door of the registry cage. Refer to MPF standard detail P5-7-4n.

Prior to submission of 30% construction documents, the Solicitation A/E shall obtain a written determination from the USPIS as to whether or not the facility under consideration is deemed a Banking Consolidation Point, that is, a facility which receives bank remittances and/or armored car service. A copy of this letter shall be provided by the designer concurrent with the 30% submission.

In all major facilities that are deemed Banking Consolidation Points, provide a total of four investigative cameras at locations as indicated in Exhibit 5-7.5.8a.

Exhibit 5-7.5.8a
Investigative Camera Types for banking Consolidation Points

SPACE	CCTV CAMERA TYPE
Registry Cage entry/egress door	One Fixed viewing exterior side of door
Registry Cage sliding service gate	One Fixed viewing exterior side of gate
Registry Cage service window	One Fixed viewing exterior side of window
Registry Cage Interior at opposite corners for total interior viewing coverage.	Two Fixed at opposite interior cage corners.
Armored car parking area at the back loading	One Fixed at exterior

SPACE	CCTV CAMERA TYPE
dock viewing doors leading into the building.	entry.

5-7.5.10 Remotely Located Cameras

Cameras located remote from the main building, where the cost to trench is significant or where the area to be trenched spans a canal, body of water, tunnel or contaminated brownfield can be equipped for wireless transmission when justified and approved by deviation. Refer to SDC Modules 2A and 3, 5-4.3.12 and MPFS 272134.

5-7.6 Exit Door Alarm

In MPF's equipped with an Enterprise Physical Access Control System (ePACS), the exit door alarm is to be provided by the ePACS integrator. The horn/strobe exit alarm shall be 12 VDC powered from the lock power supply and batteries located at the controller.

- Due to the capacity of the lock power supply, alarm and visual indications shall operate continuously for no more than (45) seconds. The visual/audible alarm shall be field adjusted to operate (30) seconds, if not reset.
- Refer to MPF specification section 281304.

The following equipment must be installed at the Exit Alarm doors:

- Fixed exterior security cameras shall be installed at each door for facial recognition and to view the door opening and the surrounding area.

5-9 Special Occupancies

5-9.1 Battery Charging Areas

Battery charging areas are used for charging and maintaining the batteries used in mail-handling mobile equipment (or PITs, Powered Industrial Trucks).

The USPS is currently moving toward the use of Thin Plate Pure Lead (TPPL) advanced lead acid batteries and hydrogen fuel cell technology. However, sealed gel cell and lead acid batteries are still used. The Solicitation A/E shall verify with the USPS Project Manager which battery technology will be used by the facility as part of the solicitation development, and design battery charging areas accordingly.

Battery charging areas must be protected from weather and/or outside environmental conditions. If necessary to ensure adequate environmental control, a battery charging area may be placed in a separately enclosed room. However, within a larger environmentally controlled space (e.g.: workroom, enclosed platform, etc.) the charging area should be open to the larger space.

Provide power for battery chargers. Also provide shut off switches. Shut off switches are to be located together at the end of the battery charging area. Protect the charging apparatus from damage by powered industrial trucks. The Solicitation A/E must determine if provisions of NFPA 70E, such as sail switches and shut off switches are applicable based on maximum capacity of the battery charging area.

5-9.2 Evidence Rooms

Larger USPIS office suites must contain an Evidence Room. The Evidence Room must be constructed with security walls and security doors and shall contain a lockable cage within the secure area with key control for pharmaceutical evidence. The following electrical provisions shall be provided for Evidence Rooms:

- Provide illumination of 50 footcandles, average maintained.
- Provide convenience receptacle(s) for general cleaning of the room(s). Receptacle(s) must be located to avoid shelving on open wall space(s), preferably near the door.
- Provide power for HVAC and exhaust systems.
- Provide power for special appliances such as coolers or freezers containing pharmaceutical evidence.
- The room must include a motion sensor and keypad interfaced and separately zoned with the building intrusion detection system if the facility is so equipped.
- Provide access control for daytime access consisting of a card reader camera at the entry door. Interface these components to the Plant ePACS and criminal investigative CCTV system.

5-9.5 General Shop

Provide a 120/208Y Volt, 3-phase, 100A main breaker surface mounted panelboard with 12 poles in the general shop and satellite maintenance areas. Provide one 277/480Y Volt, 30A, 4-wire circuit with disconnect at these designated locations.

5-10 Construction Closeout

5-10.4 Testing

The A/E shall ensure that the contractor has provided infrared thermal imaging of all low voltage and medium voltage switchgear and switchboards and of the main feeder terminations (under load).

The A/E shall ensure the Contractor has submitted the results of the direct voltage, acceptance testing for the medium voltage cable to the USPS Facilities Representative.

The contractor shall submit documentation of the infrared test results to the USPS Facilities representative.

The A/E shall ensure that the CAT-6 and fiber camera cabling test results, prepared by the Contractor, have been submitted to the USPS prior to operational testing of the CCTV system.

Module 2B - Customer Service Facilities

Chapter 2 - Architectural

2-1 Introduction
2-1.2 Codes and Standards

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Chapter 2 - Architectural

2-1 Introduction

2-1.2 Codes and Standards

Refer to Introduction 0.2 Codes and Standards.

2-2 Workrooms

2-2.1 Floors

Workroom floor finish for all new construction is sealed concrete, using a clear penetrating sealer. Asphalt plank is no longer manufactured and is only repaired or replaced in existing workrooms as called for in Module 3, 2-2.1 Floors

Module 3

2-3 Platforms

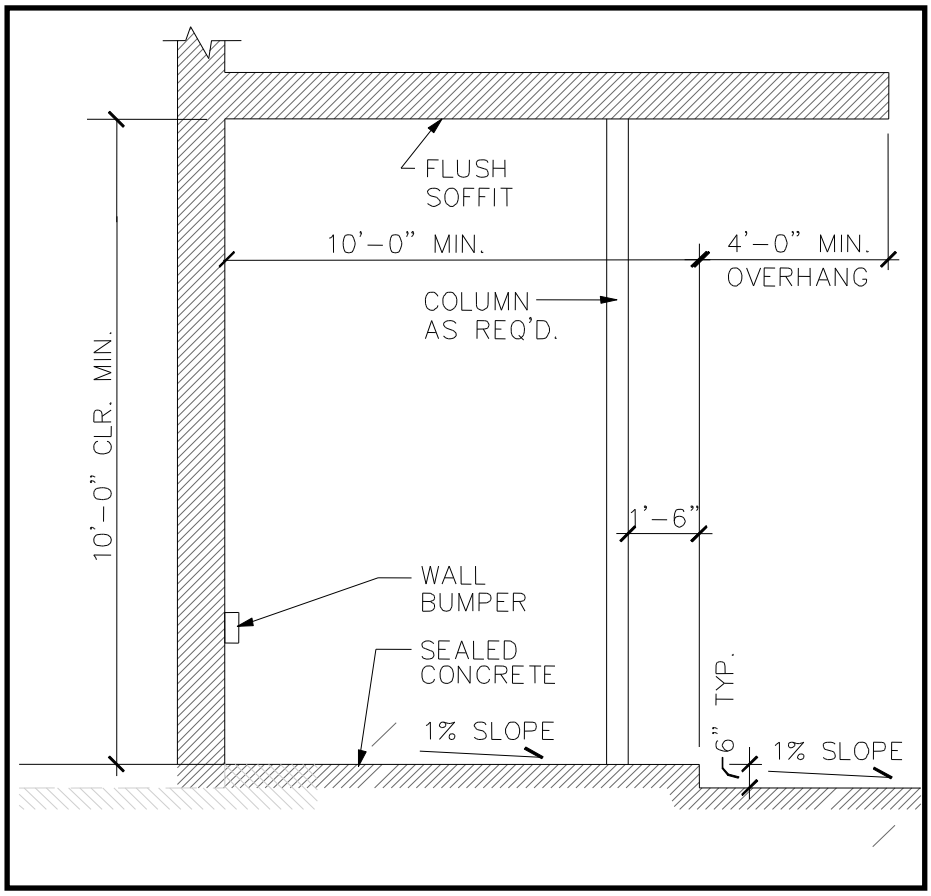
2-3.3 Carrier Platforms

Carrier platforms (see Exhibit 2-3.3a) may extend beyond the building face into a “Finger Dock” but the platform canopy may not extend past the face of the building. A finger dock may be accessible to USPS vehicles from both sides.

Coordinate platform height with USPS requirements (typically 6 inches). If adjacent to a building wall, the carrier platform must be 10 feet wide. Provide a 4-foot overhanging canopy with a 10-foot vertical clearance between underside of canopy soffit and the platform below. Provide curb ramp(s) as required by code, and USPS use requirements. At carrier slabs, use a rolled curb, a curb and gutter, or a straight curb; any other curb requires an approved deviation from USPS HQ.

As indicated in the Customer Service Facilities project Manager’s Manual, if there are 15 or more carriers in a CSF Small facility, or in an AQ facility that is based on a CSF Small plan, a separate Carrier Vestibule may be provided. If a separate Carrier Vestibule is provided, include a carrier platform adjacent to the building, with a canopy per standard detail S2-6-1a2, if the exterior building wall is tall enough to accommodate it. Of the CSF Small plans, only the 100 Plans has a high enough wall.

Exhibit 2-3.3a
Carrier Platform Diagram



2-3.4 Trash and Recycling

If the subject CSF is designated as a National Recycling Operation (NRO) hub site, standard design criteria for Trash and Recycling operations apply. Refer to Module 2A, Section 2-3.4, Trash and Recycling, for additional information. Final design criteria for Trash and Recycling operations at all NRO hub sites must be completed in coordination with HQ's Office of Sustainability, Corporate Sustainability Initiatives Office.

The space requirements for recycling are a function of the volume of undeliverable standard mail, discarded plastic, and cardboard generated by Customer Service Facilities. Basic equipment and space requirements are determined by recycling space criteria developed by the Office of Sustainability, based on standard waste generation rates for mixed paper, cardboard and plastic. For the purposes of trash and recycling requirements, a Large CSF is one with 25 or more carrier routes. A Small CSF has fewer than 25 carrier routes. The requirements differ for each.

2-3.4.1 Required Equipment

There are currently no requirements for recycling equipment in Customer Service Facilities, but that could change in the future. Solid waste containers will be USPS furnished.

a. Large CSF:

(1) Recycle Equipment:

None

(2) Solid Waste Equipment:

Space for a solid waste dumpster. The dumpster is to be supplied by solid waste contractor. Container size will depend on the number of carrier routes located at the Post Office. Approximately two cubic yards per 25 carrier routes disposed once per week is required. Post Offices with more than 100 carrier routes should go to multiple pick-ups rather than a container larger than eight cubic yards.

b. Small CSF:

(1) Recycle Equipment:

None.

(2) Solid Waste Equipment:

Space for a solid waste dumpster. The dumpster is to be supplied by solid waste contractor. Container size will depend on the number of carrier routes located at the Post Office. Approximately two (2) cubic yards per 25 carrier routes disposed once per week is required. Post Offices with more than 100 carrier routes should go to multiple pick-ups rather than a container larger than eight (8) cubic yards.

2-3.4.2 Dock and Work Space

Provide indoor and outdoor space as indicated below.

a. Large CSF:

- A minimum of 5 feet x 20 feet (i.e. 100 square feet) near the carrier vestibule for larger Post Offices for staging mixed paper, cardboard, clean shrink/stretch wrap, and mixed plastic.
- An area adjacent to the dock for locating the trash dumpster is preferable, but an area away from the dock is also acceptable.

b. Small CSF:

- A minimum of a 5-foot x 5-foot area (i.e. 25 square feet) near the carrier vestibule for staging of a container (gaylord or wire container) for depositing excess advertising mail (i.e. “Every Door Direct” Mailings labeled for “current household”) as carriers return to the Post Office. An area adjacent to the dock for locating the trash dumpster is preferable, but an area away from the dock is also acceptable.

2-3.5 Columns

On open mail and carrier platforms locate columns with a setback of 1 foot 6 inches between the dock face and the closest face of the column. On enclosed mail platforms, the exterior face of walls between overhead doors shall be flush with the outside face of the platform and columns shall be located within or contiguous to platform walls. Columns shall be located between dock positions and coordinated with dock opening locations.

2-3.6 Ramps *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

G2-3-6a→a1

Ramps are required at platforms to facilitate the movement of cart and other traffic into carrier and other areas. The minimum clear width of ramps shall be 4 feet at CSF Small platforms and 5 feet 6 inches at CSF Medium platforms, with a maximum allowable slope of 1:12. (Local code requirements shall govern if more stringent. In particular, some codes limit the slope of handicapped accessible ramps to1:20.) Where these ramps are the only accessible means of egress from the platform, and are therefore, required units of egress from the building, they shall be in compliance with RE-4 and local codes.

2-3.7 Stairs

G2-3-7a→c

At open and enclosed mail platforms, provide stairs down to the pavement. The stairs should be located opposite the personnel doors and between the scissors lifts and the dock levelers, as shown in the CSF Medium Platform drawings. Overhead signs shall be installed on the interior of the platform area indicating all stair locations.

2-3.8 Dock Equipment

The Solicitation A/E shall determine this information and incorporate into the Solicitation.

2-3.8.1 Flip Ramps

Provide electro-hydraulic, front mounted adjustable flip ramps (also known as edge-of-dock levelers), including maintenance struts, at all 30-inch docks.

2-3.8.2 Dock Levelers

Provide Air-Bag type dock levelers at all 47-inch high docks.

Levelers shall be 6 feet wide x 10 feet long and recessed into the concrete mail platforms in a 2-foot deep pit.

2-3.8.5 Dock Restraints

Provide automatic truck restraints at all CSF Medium facilities if it is anticipated that powered industrial vehicles will be used on the platform. If it is anticipated that no powered industrial vehicles are to be used then wheel chocks with automatic communication are to be used.

Provide manual chocks at all small customer services facilities.

2-3.8.6 Back-Up Signal Lights

Provide LED back-up (Stop/Go) lights at each dock position serving tractor trailers. Lights are to be located on interior and exterior sides of each adjacent wall. Sequence of operation to be:

When a truck is backed into a dock stall and dock restraint bar is engaged the inside light shall turn green and exterior light shall turn red. This signal will signify that it is safe to open the overhead door.

When the door is opened it will activate a limit switch allowing the dock leveler to function and causing the dock light to be activated.

The outside light should say red until door is closed and restraint/chocks are released.

Inside and outside lights should always be opposite colors unless both are flashing red indicative of a trouble in the system.

2-3.9 Vestibules

Vestibules are used at facilities with open mail and carrier platforms to minimize the heat gained or lost due to intermittent high volume cart traffic passing from the workroom to mail and carrier platforms. Utilize entry vestibules in accordance with the current version of ASHRAE 90.1 based upon climate zone requirements. G2-3-9a

Each vestibule has either four (4) sets or two (2) sets of impact doors, half of the sets should be designated for ingress and half for egress, to help control the circulation route for heavy push cart traffic. Pedestrian traffic accesses the platform through a set of two personnel doors that are physically separated from the impact doors by a pipe guardrail.

2-4 Support Areas

2-4.23 Telecommunications Equipment Room (ER)

The Telecommunication Equipment Room (ER) for CSFs less than 10,000 square-feet is a room shared with other functions; CSFs in excess of 10,000 square-feet must have a dedicated ER. Minimum size shall be 8 feet x 9 feet.

Floor surfaces shall receive resilient flooring; sealed concrete is not acceptable. Ceiling height shall be a minimum of 10 feet.

Provide 24-hour supplemental HVAC system.

The room should have provisions for physical access control with restricted access.

Provide halocarbon clean agent fire extinguishers.

2-4.28 Carrier Annex - Mail Pickup Lobby

M2-4-28a

If approved by Facilities Planning and Headquarters Retail, and prescribed in the project FPC, a Mail Pickup Lobby may be included in Carrier Annex designs. The room shall be designed to be 10 feet wide x 12 feet long, per Standard Detail M2-4-28a. Additional features that are not shown in the Standard Detail, such as automatic entrance doors and SSK, would have to be specifically approved by Facilities Planning and Headquarters Retail, and indicated in the FPC. The entrance and customer parking must be outside the Postal secured area. Coordinate accessible route and signage requirements with the RE-4.

2-5 Retail Design Standards *(Also refer to USPS Handbook RE-5)*

USPS Handbook RE-5

The design and configuration of the Retail Design Standards allow the USPS to better serve its customers and improve the financial performance of its retail facilities. The Retail Design Standards arrange spaces to present a hierarchy of service options to the customer that will speed transactions and lower overall labor costs while improving the image and profitability of the USPS.

G2-5-1a→e3

G2-5-1f4→f7

The basic components of the Retail Design Standards are: Customer Entrance, Self Service, P.O. Box and Full-Service Counters. Refer to Module 4A, Retail Design Standards, for more detailed design criteria.

Module 4A

2-5.1 Customer Entrance

It is essential that customers arrive at a site and be able to easily identify/ access the point of entry.

2-5.2 Self Service

G2-5-2a→g

The Self Service area is the first area customers see as they enter a retail facility. This area provides the mechanical equivalents of personal service with current vending capabilities to allow a customer a quick and easy way to conduct normal mailing services. This area shall be designed to allow for the capability of 24 hour access.

2-5.4 P.O. Box

G2-5-4a→l

In this area, mail and parcels are available to customers for self service retrieval through secured post office boxes, called "P.O. Box". This area shall be designed to allow for the capability of 24 hour access. Parcel lockers in this area allow customers the ability to retrieve packages which are too large to fit into a P.O. Box.

2-5.5 Full Service Counters

G2-5-5a→g3

This is the traditional counter service where Sales Service Associates conduct complex transactions with a customer. It is important to maintain a clearly understood queuing system with clear lines of sight to all featured

retail areas. Coordinate layout with USPS supplied full service and accessible counter workstations in this area.

All casework required is to be provided under national contract by Carolina Cabinets (Direct Vendor). All cabinetry to be installed in accordance with Carolina Cabinets printed instructions.

For more information regarding bullet-resistant counterlines and other retail security requirements, see Module 4A, 6-1.

Module 4A

2-5.6 Passport Acceptance Counters

If a Passport acceptance counter is required the Project Manager must incorporate the space requirements indicated in Exhibit 2-5.6a for the specific Passport service designated. It is important to note that Passport services are affected by wait time in line (WTIL) service concerns. The counters are subject to RE–4 requirements. If volume justifies a separate Passport office then its location should be coordinated with local management to suit local operational needs such as extended hours or a dedicated exterior door.

In high volume Passport offices consider installing ganged seats in a waiting area.

USPS Handbook RE-4

Exhibit 2-5.6a
Passport Acceptance Counter Alternatives

DESCRIPTION	SPACE REQUIRED	SERVICES	CONSTRAINTS	SIGNAGE
Service Counter	None	Forms and mailing	Not to be employed when there are service concerns (WTIL)	None
Space in Lobby	5 ft by 5 ft – out of area of parcel slide and main traffic flow	Forms and mailing	Not to be employed when there are service concerns (WTIL)	Define area with services offered and hours of operation.
Single Counter Office off Lobby	Counter for one person, provide POS counter, type C739 / waiting area sized to expected business volume / table or wall mounted counters for forms completion.	Forms, mailing and photos	Not to be employed when there are service concerns (WTIL) unless Passport acceptance is staffed to accept payment for all services.	Define area with services offered and hours of operation. Directional signage to promote ease of customer use required.
Multiple Counter Office	Varies, depending on number of counters	Forms, mailing, and photos	Refer to Interim Guidance documents in the Passport Acceptance Centers folder, under BDS folder E4 Retail	Refer to the Interim Guidance documents for details

2-7.2 Doors and Hardware *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

See Appendix M2-B CSF Door Schedule for more information.

2-7.2.1 Doors

a. Lobby Entrance Doors
When possible, provide lobby entrance doors as two separate swinging doors separated by a mullion, one in-swinging for inbound traffic and one out-swinging for outbound traffic. Entrance doors are not required to have a door operator, unless the door cannot meet RE-4, 404.2.9 Door and Gate Opening Force, and be opened with a maximum of 5 pounds of force (for instance the area is very windy), then automatic door operators may be necessary. The same applies if the door cannot meet the approach or maneuvering clearances required by RE-4. (For BMEU Customer Service Entries refer to Module 4B, 3-3.2.)

b. Mail and Carrier Vestibule Doors (*Also refer to USPS Handbook RE-4)*

Mail and carrier vestibule doors are typically provided in sets, one for inbound traffic and one for outbound traffic. These doors accommodate mail cart movement, and are therefore double acting with impact-resistant bumpers and heavy-duty steel hinges and frames. They are additionally protected from damage by placing bollards or steel channels at both the head and base. For safety, employee circulation through vestibules is not permitted by use of the impact doors. A separate set of single acting personnel doors shall be provided. These personnel door(s) shall be a viable means of egress; impact doors do not constitute a means of egress.

2-7.2.2 Hardware

a. Keying *(Also refer to USPS Handbook RE-5)*

USPS Handbook RE-5

A lockable key cabinet shall be provided and sized to hold all keys for the facility. The key cabinet (Equipment Item E502) should be installed in the stamped envelope storage rooms in CSF Medium facilities. Note that this item is no longer available on-catalog through eBuy2 and must be ordered by the District off-catalog.

b. Security

For Customer Service Facilities over 60,000 square feet, provide security components at door openings as listed in Module 2A Exhibit 5-7.4a.

Module 2A

2-7.4 Protective Barriers

See Module 1 for the general requirements for protective barriers. For Customer Service Facilities that use fork-lifts, PITs, and AGVs, see Module 2A for protective barriers required for Mail Processing Facilities.

In retail facilities, plastic laminate wall protection is required in the Full Service area, at the bottom of the screenline wall that faces the customer, below the opening to the Workroom. MDF panels are installed over gypsum wallboard and fastened to steel studs at 16 inches on center horizontally and vertically, and the plastic laminate is applied to MDF with adhesive. See Module 4A – Retail Design Standards, Exhibit 5-2b - Section at Screenline Wall for more information.

2-7.7 Entry Feature

The entry feature is an optional element of CSF Medium retail facilities. The design may be modified to accommodate specific site issues.

The standard details show an illuminated covered structure designed to provide some shelter for customers approaching the building entrance. Gutters and downspouts may be revised, omitted, or used as shown. In addition, the downspouts may be connected to the underground storm water system, if available.

2-8 Fire Protection

2-8.2 Fire Extinguishers

When located in retail lobbies, fire extinguishers shall be located in lockable, break-glass cabinets. G2-8-2a

2-9 Criminal Investigative Systems

The following CSF facilities require a Criminal Investigative System:

- CSFs 6,500 square feet and smaller (including Carrier Annexes), when the 10-year projected complement exceeds 28 carrier routes.
- CSFs 6,501 to 60,000 square feet (including Carrier Annexes to 10,000 square feet), when the 10-year projected complement exceeds 28 carrier routes.
- CSFs larger than 60,000 square feet with over 200 full time employees.

2-9.1 Criminal Investigative Office (CIO)

When determined to be required in a CSF Small Facility, refer to CSF Small Plan 100C.

Module 2B – Customer Service Facilities

Chapter 4 - Mechanical

4-1 Introduction
4-1.1 Scope
4-1.3 Mechanical Commissioning
4-1.4 Mechanical Measurement and Verification (M&V)

4-2 HVAC
4-2.1 Energy Conservation
4-2.4 Inside Design
4-2.5 Space Specific Requirements
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4-2.15 Miscellaneous HVAC Requirements

4-3 Plumbing
4-3.1 Water Supply Systems
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4-4 Miscellaneous HVAC/Plumbing Components
4-4.1 Motors and Controllers

4-5 Fire Protection
4-5.1 Sprinkler Systems
4-5.2 Standpipe and Hose Systems
4-5.3 Duct Mounted Smoke Detectors

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope

The design criteria within this document specify mechanical requirements for design and construction of new CSF Small and CSF Medium facilities. The mechanical systems must meet year-round control of temperature, humidity, air circulation, ventilation, and air cleaning to the degree required to ensure the safe and efficient use of space by occupants and equipment.

4-1.3 Mechanical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services. The information below is specific to Customer Service Facilities for new construction, expansions, and alternate quarters projects.

4-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” must be utilized to develop the Commissioning Plan and associated Test Procedures. In addition, the appropriate USPS specifications sections, i.e. “220800 - Commissioning of Plumbing”, “230800 - Commissioning of HVAC”, and “250804 - Building Automation System (BAS) Commissioning”, must also be utilized.

Also, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

4-1.3.2 Commissioning Requirements

Formal commissioning of all systems is not required for facilities less than 20,000 square feet. However, all new HVAC systems and related controls must be inspected by the Energy Manager, Project Manager, and A/E to ensure proper installation and operation.

When commissioning systems or equipment for facilities over 20,000 square feet, it must be performed on a sampling basis. See Module 1, 5-1.3.1 Observation and Testing Requirements, for the sampling rates for each system.

The degree of commissioning that will be required for the project must be determined by the USPS Project Manager and the solicitation A/E, but for any type of CSF project over 20,000 square feet that includes the following systems, they must be commissioned:

- HVAC Systems, including associated Chillers, Cooling Towers, Heat Exchangers, Pumps, Air Handling Units, Variable Frequency Drives (VFD)

- Building Automation System (BAS)
- Enterprise Energy Management System (EEMS)
- ▪Compressed Air Systems

For any type of CSF project over 20,000 square feet, the Project Manager may also decide to require other mission critical systems and equipment to be commissioned, such as:

- Chillers
- Cooling Towers
- Heat Exchangers
- Sewage Ejector Pumps
- Water Pumps
- Air Handling Units
- Variable Frequency Drives (VFD)
- Fire Protection Systems
- Plumbing Piping Systems

4-1.4 Mechanical Measurement and Verification (M&V)

See Module 1, 4-1.4 Mechanical Measurement and Verification (M&V), for general information about Mechanical M&V.

In general, formal M&V is not required on Customer Service Facilities for new construction, expansions, and alternate quarters projects. However, special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generation, must be measured and verified.

When formal M&V is required, it must be performed after commissioning of the new system is complete. The estimated energy use projected during the design phase and the actual energy use measured after commissioning should be comparable. Also, the total energy consumption that results from the project are to be submitted to the Facilities Program Management, Energy/Standards Team Leader in an ECC-S package for review, acceptance, and inputted into eFMS.

4-2 HVAC

The Postal Service prohibits the use of any refrigerant that contains CFC (chlorofluorocarbon) or HCFC (hydrochlorofluorocarbon) that is on the EPA Regulatory Phase-out Schedule.

All packaged and split systems purchased for new construction or replacement must utilize SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends.

4-2.1 Energy Conservation

Refer to Standard Design Criteria, Introduction, Section 0-2.2 Energy Conservation, for detailed energy mandate statement.

4-2.1.2 Conservation/Environmental Measures

When applicable, the designers must adhere to the following measures when designing systems and selecting equipment:

- Cooling equipment, heating equipment, and domestic water heaters must carry the Energy Star label.
- Systems must not be oversized because such systems are not energy efficient or cost-effective.
- Part load performance must be analyzed and kept as high as practical. To keep part load efficiencies high, while providing redundancy, use multiple smaller systems. Provide analysis demonstrating this part load performance to the USPS.
- Block loads (building heating and cooling requirements) must reflect the basic building requirements without adding safety factors and must utilize peak coincident loads to take into account system diversity.
- Provide systems that avoid reheating and/or re-cooling for humidity control.
- Provide automatic controls to de-energize heating, cooling, and fan equipment when not needed.
- Provide heat pumps in lieu of resistance heat. Straight resistance heat may be used only if proven cost-effective.
- Provide the most efficient heating and cooling systems available considering the building operation and local weather conditions, e.g., evaporative cooling or precooling systems in dry weather conditions. Also, consider air-air heat exchangers or heat wheels for preheating or pre-cooling ventilation air requirements.
- Exterior snow melt systems for roofs and parking must not be used.
- Consider energy recovery ventilators to reduce the cost of outside air.
- Consider Demand Control Ventilation with CO_2 monitors, see Section 4-2.15.10.
- Consider geothermal heat pumps.
- Consider renewable energy systems.

When applicable and proven cost effective, consider the following additional energy conservation measures:

- In colder climates, consider heat exchangers, heat wheels, etc. to preheat makeup air.
- Provide automatic blowdown controls in the boiler plants to avoid continuous blowdown, which is very wasteful.
- Provide a boiler blow down, waste heat recovery heat exchanger system to preheat boiler feed water.
- Provide a variable frequency drive at one of the centrifugal chillers in the plant to improve the chiller part load efficiency.
- Limit the chiller pressure drop through condenser and evaporator bundles to no higher than 10 ft. of water column.

4-2.1.3 Equipment Performance

Select HVAC equipment efficiencies based on Exhibit 4-2.1.3a or the current edition of ASHRAE 90.1. When there is a conflict, use the stricter of the two.

Exhibit 4-2.1.3a
Equipment Performance

UNIT SIZE	SPLIT SYSTEM EFFICIENCY STD. (including heat pumps)	PACKAGED SYSTEM EFFICIENCY STD. (including heat pumps)
< 5 tons	15.00 SEER	14.00 SEER
≥ 5 Tons < 10 tons	11.00 EER	11.00 EER
≥ 10 Tons < 20 tons	11.00 EER	11.00 EER
≥ 20 Tons	10.00 EER	10.00 EER

4-2.4 Inside Design

Unless noted otherwise in Exhibit 4-2.4a below, if the indoor relative humidity within a facility generally cannot be maintained naturally at a minimum of 20% RH in the winter, provide humidification for the occupied spaces. In those cases, design humidification systems to maintain a 20% relative humidity. Include water filtration if required by the humidifier manufacturer when the local water source is considered too "hard" or the mineral content would cause system maintenance issues.

Design conditions for spaces must be in accordance with Exhibit 4-2.4a, where applicable.

Exhibit 4-2.4a
Inside Design Space and Temperature Conditions

SPACE[3]	SUMMER[1]	WINTER[1]
Enclosed Mail Platforms with Sorting Operations[2]	78°F DB (See note 6)	65°F DB (See notes 4 & 5)
Enclosed Mail Platforms[7]	Ventilation	45°F DB (See notes 4 & 5)
Full Service and P.O. Box Lobbies[2]	78°F DB (See note 6)	65°F DB
Money/Stamp Vaults	Ventilation (Gravity Type)	No Heating (See note 8)
Workroom[9]	78°F DB and 50% RH	65°F DB

Keyed Notes:

1. DB = Dry Bulb temperature, RH = Relative Humidity; RH values shown in table are intended to be design values, not maximums or minimums.
2. When unoccupied, setback inside design conditions to heating of 55°F and cooling to 85°F and with no humidity control.
3. The operating hours, conditions, and population at various times of the Facility used for analysis must be developed in conjunction with Facility personnel. State the assumptions used in reports to USPS.
4. Per Handbook MS-49, *Energy Conservation and Maintenance Contingency Planning,* TL-3.
5. Platform must meet all applicable ASHRAE ventilation and outside air standards and must be designed to meet all OSHA standards including but not limited to Wet Bulb globe temperature. Give special consideration to use of economizer cycles in appropriate climates.

6. The design of the HVAC system must provide a Leaving Air Temperature (LAT) to maintain the stated design temperature and a maximum 50% Relative Humidity.
7. Provide heating in Enclosed Mail Platforms only if there is plumbing needing protection from freezing.
8. Provide winter humidification to maintain interior conditions of 55% RH at 71-75ºF.
9. In Workrooms that do not operate 24/7, when unoccupied, setback inside design conditions for heating to 55oF and cooling to 85oF.

4-2.5 Space Specific Requirements

4-2.5.1 Non-Heated Spaces

Prevent freezing of piping located in non-heated spaces by providing minimum heating or heat trace.

4-2.5.4 Postal Retail Lobbies

To the extent possible, self-service and P.O. Box areas that will be open after business hours must have their own HVAC zone.

4-2.8 Computations

Provide the following computations as well as any other applicable computations as required for proper sizing of the systems to USPS for review:

a. Heating Capacity Sizing: Base the heating capacity on maximum instantaneous overall building envelope (block) heating load.
b. Cooling Capacity Sizing: Base the cooling capacity on maximum instantaneous overall building envelope (block) cooling load.
d. Individual Zone Heating and Cooling Loads: Base the individual zone loads on the time of day which its individual peak occurs.
e. Ventilation: Provide minimum and maximum ventilation requirements for the total building. Provide a slightly positive building pressurization for administration and office spaces during all operational conditions to prevent excess intrusion of unconditioned air. Design workrooms for a neutral pressurization. Assume fully closed doors when calculating for pressurization requirements.
f. Static Pressure Drop: Provide static pressure drop calculations for fans and air handling units.
g. Expansion Tank Sizing
h. Psychrometric Analysis: Prepare a psychrometric chart study for each type of air handling unit. Include the following in the study, if applicable:
    - Outside and inside design temperatures.
    - Temperature rise caused by return-air.
    - Temperature rise caused by fans.
    - Return and outside air mixture conditions.
    - Coil exiting conditions.
    - Bypass and exiting air mixture conditions.
    - Space sensible heat factor lines.
    - Air volumes (supply, return, exhaust, etc.)
i. Completion of ECC-S form.

4-2.10 HVAC Controls

4-2.10.1 General Requirements

The control systems must be the simplest that will serve the purpose with due consideration for controlling space conditions, monitoring (if applicable) and maintaining heating, ventilation and air-conditioning systems, conserving energy, and affecting operating economies. Prepare and place control diagrams with sequence of operation for all systems on contract drawings. Workrooms, large multiple support areas, and public spaces (lobbies) with tamper-proof controls or remote sensors which are not readily susceptible to damage.

4-2.10.2 Facilities Smaller than 15,000 SF

CSF facilities smaller than 15,000 SF must utilize low voltage digital electronic wall mounted thermostats for space temperature control of all packaged heating and cooling equipment. Refer to HVAC Instrumentation and Controls Specifications 230905.

4-2.10.3 Facilities 15,000 SF and Larger - Enterprise Energy Management System

CSF facilities 15,000 SF and larger must utilize remote communicating thermostats for space temperature control of all packaged heating and cooling equipment. The system must provide temperature control, the ability to adjust parameters remotely, remote access for monitoring, alarming, trending of data, and to provide integration with the EEMS. Control systems must utilize the BACnet IP communication requirements for all data communication to the EEMS. Internal communication protocols may be BACnet, MODbus, or LonWorks. Additional monitoring and control points may be warranted including control of fans and terminal equipment, if deemed appropriate and cost effective.

The standard installation of HVAC controls at the CSF Medium level must include the following:

- Monitoring of heating/cooling voltage/amperage/kW/kWh on all roof top units individually.
- Installation of revenue grade advanced metering for main utilities servicing the building (electric, gas, water, fuel oil). Gas and water advanced metering must consist of pulse initiator/pulse contacts installed by the local utility.
- Installation of supply duct temperature sensors for all roof top units.
- Installation of two-way communicating space thermostats for each RTU.
- Installation of humidity sensor(s) in ASHRAE zones 1A, 2A, 3A, 4A, and 4C.
- Installation of a microprocessor-based, centralized controller that collects the metering, sensor, and thermostat data and makes it viewable graphically via a phone line and future LAN connection
- System level reporting of temperature, humidity, and electrical load, trend analysis and performs load shedding on HVAC units

The following specifications apply:

- 230904 Instrumentation and Control for HVAC (CSF Medium).
- 251204 Integrated Network Gateways For Enterprise Energy Management Systems (EEMS).

4-2.11 Central Heating Systems

4.2.11.4 Unit Heaters

Use thermostatically controlled propeller-fan-type unit heaters or radiant heaters for the heating of areas that are listed to be heated but not air conditioned, or where quick response is required to compensate for the opening and closing of doors in cold climate areas. Select the heater type (i.e., electric, gas fired, or hot water) for each application based a Life Cycle Cost Analysis that consider such factors as on the initial cost and the annual energy consumption.

Provide gas-fired unit or radiant heaters in mechanical rooms, loading docks, Carrier Platforms, and similar areas. Provide cabinet type electric heaters for entryways and vestibules.

4-2.12 Air Handling Systems

G4-2-12b→d

4-2.12.3 Air Distribution System

Design all ductwork in accordance with the latest ASHRAE and SMACNA criteria. The design analysis submitted must include complete calculations for all duct runs, pressure losses, volume control devices, and air diffusers.

Insulate ductwork only as necessary to avoid condensation. Install insulation on the exterior of the ductwork.

Design all Low-Pressure ductwork using the “equal friction” method with friction loss rate of .08 in. water column per 100 ft. of duct

Ductwork in workroom areas may be exposed, but must be installed as high as is practical. It must be run above the ceiling whenever suspended ceilings are used.

To minimize the installation of return ductwork, use corridors or common spaces to the maximum extent for transmitting return air where permitted by code.

When return air path is obstructed by physical barriers, extend return air ducting around such obstructions a minimum of 2'-0", so as to minimize their effect on air circulation.

Coordinate ceiling diffusers with light fixtures and consider a modular arrangement in administrative areas. Mount diffusers adjacent to pendant-mounted lamp fixtures at the same height as the lights. Light troffers for supply air distribution are not acceptable, however, they may be used for return air.

Size ductwork at the fan outlet to the fan outlet area for at least one duct diameter. Duct transitions between fan outlet and the duct distribution system must be a maximum of 15^{o}. Do not use elbows within 3 wheel diameters of the fan outlet.

Flex duct must only be used for the final connection of branch to diffuser and must not exceed five (5) feet in length.

4-2.15 Miscellaneous HVAC Requirements

4-2.15.8 Control

Provide a motorized outside air damper to close when the building is not occupied.

4-2.15.9 Intake Location

Install outside air intakes away from pollutant exhaust sources (boiler stacks, toilet room exhaust, vehicle exhausts, etc.).

Secure outside air intakes from potential tampering. Locate intakes as high as feasible; air intakes located less than 15 feet above grade must be fenced off from public access.

Do not locate return air grilles in publicly accessible areas in walls, so as to reduce the potential for tampering.

4-2.15.10 Demand Control Ventilation and Economizers

Demand Control Ventilation (DCV) regulates fresh air for occupants in a building by measuring the CO_2 levels inside the space then adjusting the amount of fresh air that gets delivered to the space. The advantage that DCV controls offer is that many times the fresh air requirement is adequately met by normal daily building activity such as dock doors opening and closing, air infiltration thru cracks and seals, etc. Under those conditions, unconditioned outside fresh air is not needed, which reduces energy costs if the DCV damper is closed.

If DCV is recommended, the A/E must demonstrate the benefits when applied to the typical USPS mail carrier environment.

Whether or not DCV is utilized, outside air brought in by the HVAC system on to the workroom floor/dock areas must take into account all sources of natural air infiltration when determining OA damper settings.

If justifiable, through life-cycle cost analysis, apply Demand Control Ventilation to a facility based on the current version of ASHRAE 62.1 “Ventilation for Acceptable Indoor Air Quality”.

An economizer is a controls logic that opens outside air dampers to allow a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather, usually in the spring and fall. Economizers must be evaluated and utilized whenever cost effective.

Specify economizers in an HVAC design in accordance with the current version of ASHRAE 90.1 geographic zones.

4-2.15.12 Personnel Cooling Fans

Ceiling, wall-mounted, and column-mounted fans may be used in delivery units, manual distribution operations, docks, trailers, elevated keying areas, workrooms, and administrative offices. Ceiling fans may be used in workrooms only if concurrence is received by local operations.

4-3 Plumbing

4-3.1 Water Supply Systems

4-3.1.1 General Requirements

Confirm availability of adequate municipal water service pressure. If water pressure is not sufficient to meet the water supply system requirements, provide a triplex booster pump package with each pump sized for 50 percent of calculated peak demand.

Plumbing design engineer shall obtain chemical analysis of water supply from utility or other source prior to designing the domestic water system so that any necessary water treatment components are properly provided in the design to ensure compliance with all applicable codes.

Provide the potable water distribution system with backflow preventers as required by codes and local authorities to protect against the back flow of water or other liquids from all sources.

4-3.2 Sanitary Drainage Systems

4-3.2.1 General Requirements

Configure and size sanitary sewer piping to accommodate initial building needs.

Sanitary sewer piping must not be combined with storm sewer piping within the site boundary, even if the local jurisdiction will allow them to be combined. Provide adequate venting and cleanouts.

Floor cleanouts must be strong enough to safely carry the loads of anticipated traffic and be of adjustable type to insure flush installation with finished floor. For foot and light vehicular traffic, use heavy duty nickel bronze tops. For heavy vehicular traffic (including all areas subject to forklift traffic), use round, heavy duty cast iron tops with non-tilt tractor-type covers.

Where possible, drain the sanitary system to the public sewer or private sewage disposal system by gravity. Where gravity drainage is not possible, provide duplex sewage ejectors with each pump sized for 100% of system requirements. Pump control must provide for single and two pump operation.

Horizontal drainage piping must be run at a uniform pitch of not less than ¼ in. per ft. Where it is impractical to obtain a ¼ in. per ft. slope due to elevation of street sewer, or structural features, piping 4 in. and larger may be uniformly pitched at not less than 1/8 in. per ft.

Provide cellular foam insulation for any horizontal run or offset of sanitary drainage originating from a mechanical equipment room that passes over a finished ceiling, workroom area, or dock platform.

4-3.3 Plumbing Fixtures

4-3.3.1 General Requirements

Provide the minimum number of toilet plumbing fixtures of each type as indicated in Module 1, Chapter 2, Architectural, Section 2-4.2 Toilet Facilities.

4-3.3.2 Fixture Types

Water Closets: White vitreous china office and industrial type with elongated bowl, exposed large diaphragm top supply flush-o-meter with side oscillating handle, siphon jet wall outlet, wall hung on heavy-duty chair carrier, and white open front molded plastic seat. Provide floor-mounted tank type water closets for CSF Small facilities.

4-4 Miscellaneous HVAC/Plumbing Components

4-4.1 Motors and Controllers

Motors must be of sufficient capacity to operate the driven equipment through its total range without exceeding the motor capacity. Motors 1 hp or greater in continuous service must be premium efficiency type as listed in NEMA MG-1 Standards. Care must be taken to prevent over sizing of motors.

Use sealed ball bearings to reduce maintenance frequency and discourage over-greasing.

Building equipment motors must be controlled and protected by combination fused circuit breaker switch type motor starters installed in motor control centers, except when design and economic considerations dictate the use of individual motor starters. Control voltages must not exceed 120 volt to ground. Three-phase running overcurrent protection must be provided and each starter must be supplied with a hands-off-automatic (HOA) switch.

Generally, design larger motors above 1/2 HP for 208 Volt or 480 Volt, single phase or 3-phase power, unless otherwise noted for specific equipment. Motors 1/2 HP and smaller must operate on 120 Volt, single-phase circuits.

Motors sized 1/2 HP and above must be fed from dedicated branch/feeder circuit breakers. Multi-motor branch circuits, limited to a maximum of (2) motors, may be utilized for fractional horsepower motors.

For individual three phase motors not furnished as part of package with motor starter, provide individually mounted magnetic, 3-phase, across-the-line combination type motor controller with fusible switch protector and phase loss/phase reversal protection, individual 120 Volt control power transformer, control devices HOA selector switch, push buttons, pilot light as required to suit intended motor control operation as required.

Provide manual, single-phase, 120 Volt, toggle type motor rated switches with thermal overload element for fractional horsepower equipment not requiring automatic control interfaces.

See Module 2B, Chapter 5, Electrical, for additional criteria.

4-5 Fire Protection

4-5.1 Sprinkler Systems

Provide sprinkler systems where required by local code and as directed by USPS. Design sprinkler systems in accordance with NFPA 13, Installation of Sprinkler Systems, using the hydraulic method for pipe sizing. Install backflow prevention devices as required by local codes.

Use dry systems for any area where freezing temperatures could occur.

Equip all flow switches with a retard device to prevent false alarms due to pressure surges.

Sprinkler piping is deemed foreign to electric service equipment by NFPA code. As such, sprinkler piping must not be routed directly above electrical switchgear or transformers.

Provide a sprinkler head with inline manual shut-off approximately 30 ft. from the sprinkler head at workroom side of Self-Service area drop boxes.

Refer to Chapter 2, Architectural, Section 2-8, Fire Protection, for additional criteria.

4-5.2 Standpipe and Hose Systems

In facilities where standpipes are required by code, provide Class III systems for use by either fire departments and those trained in handling heavy hose streams (2 ½ in. hose) or by the building occupants (1 ½ in. hose) as required. Provide adapters for fire department use on site.

Design standpipe systems to meet local code requirements and NFPA 14 (Standards for the Installation of Standpipe and Hose Systems).

The number of hose stations for Class III services in each building and in each section of a building divided by fire walls must be such that all portions of each story of the building are within 30 ft. of a nozzle attached to not more than 100 ft. of hose.

4-5.3 Duct-Mounted Smoke Detectors

Install smoke detectors in air handling systems, in accordance with NFPA 90A, and local codes, Installation of Air Conditioning and Ventilating Systems, to automatically shut down the fan for that system and to indicate an alarm at the facility fire alarm panel.

For air handling systems not specifically included under NFPA 90A, provide smoke detectors as required by the local code.

Module 2B - Customer Service Facilities

Chapter 5 – Electrical

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Chapter 5 - Electrical

5-1 Introduction

5-1.1 Scope

The design criteria within this document specify electrical requirements for design and construction of new Customer Service Facilities (CSFs).

Refer to Standard Design Criteria Module 1, Chapter 5 for general electrical requirements.

5-1.3 Electrical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services. The information below is specific to Customer Service Facilities for new construction, expansions, and alternate quarters projects.

5-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” and “260800 - Commissioning of Electrical Systems” must be utilized to develop the Commissioning Plan and associated Test Procedures.

In addition, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

5-1.3.2 Commissioning Requirements

Formal commissioning of systems and equipment, excluding lighting controls, is not required for facilities less than 20,000 square feet.

When commissioning systems or equipment for facilities over 20,000 square feet, it must be performed on a sampling basis, excluding lighting controls. See Module 1, 5-1.3.1 Observation and Testing Requirements, for the sampling rates for each system.

The functional testing of the lighting control system is mandatory for all facilities, regardless of size, and must be tested in accordance with the current version of ASHRAE 90.1, 9.4.3.

The degree of commissioning that will be required for the project must be determined by the USPS Project Manager and the A/E. For Customer Service Projects consideration should be given to commissioning mission critical systems, such as:

- Generators and Emergency Power Distribution System.
- Enterprise Physical Access Control System.
- Fire Alarm System.

- Security/Enterprise Physical Access Control CCTV System.
- Electrical Advanced Metering.
- Electrical Distribution System Wiring.

5-1.4 Electrical Measurement and Verification (M&V)

See Module 1, 5-1.4 Electrical Measurement and Verification (M&V), for general information about Electrical M&V.

In general, formal M&V is not required on Customer Service Facilities for new construction, expansions, and alternate quarters projects. However, special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generation, must be measured and verified.

When formal M&V is required, it must be performed after commissioning of the new system is complete. The estimated energy use projected during the design phase and the actual energy use measured after commissioning should be comparable. Also, the total energy consumption that results from the project are to be submitted to the Facilities Program Management, Energy/Standards Team Leader in an ECC-S package for review, acceptance, and inputted into eFMS.

5-1.5 Electrical Computations

Refer to Standard Design Criteria, Module 1, Section 5-1.5 for general information about Electrical Computations.

5-2 Power Distribution

5-2.1 Incoming Electrical Service

During preparation of the Design, the A/E must determine the reliability of the commercial utility's incoming power service over a five year period. The Solicitation A/E must make recommendation for electric service connection. Based on this assessment and recommendation, the USPS Project Manager must determine if any of the following options should be implemented:

a. Emergency generator hook up.

b. Permanent on-site emergency generator. Incorporation of permanent on site emergency generator(s) requires review and approval of the Vice President, Facilities. *(Also refer to Module 4E for requirements for storage tanks associated with on-site emergency generators.)*

5-2.1.5 Advanced Metering

Knowing and understanding how energy is consumed in a building is necessary to manage and control energy costs. Advanced electric meters are those that have the capability to measure and record interval data and communicate that data to a remote location on at least a daily basis. These meters are separable from the standard electromechanical or solid state meters provided by the utility for billing purposes and are Contractor installed. Whole building (utility level) metering of electricity is required in all CSFs equal to or larger than 15,000 SF.

There is no requirement for submetering of the electrical system other than advanced metering of the incoming service.

The building contractor is responsible for ensuring that the information collected by the electric meter tie into the EEMS system through a field panel communicating in BACnet IP and that EEMS connectivity is achieved. The metering data must be collected by the monitoring and control system addressed in Section 4-2.9.2 and 4-2.9.3. See CSF Specifications 230904 and 251104 for technical requirements.

a. Electric Metering

   Provide advanced electric meters as an integral part of building switchgear, as required by ASHRAE 90.1, 8.4.3. Advanced electric meters must be programmable and capable of measuring kWh and other power characteristics (kw, amperage, power factor, etc.) on 5 – 60 minute intervals with built-in data storage. A fifteen (15) minute interval measurement must be programmed at installation. Make the data accessible on a real-time basis and downloadable to the Building Automation System for management of data.

5-2.4 Switchboards and Panelboards

5-2.4.1 Switchboards

Service entrance style main switchboard must be of the dead front, free standing type, designed in accordance with UL Standard 891. Provide at least two spaces for future feeder positions. Provide full size equipment grounding bus and neutral bus. Provide secondary lightning arresters and MOV type Surge Suppressers for the main incoming service. Provide surge suppression with integral disconnect switch. Provide surge suppression protection only for main service entrance equipment and other mission critical pieces of equipment, unless required otherwise.

All circuit breakers must be molded case, bolt-on type as required for proper coordination of loads served. Coordinate protective elements to provide a fully selective system.

All bussing must be copper.

Equip facilities equal to or larger than 15,000 SF with an advanced power meter on the main service entrance feeder to the building. The meter must be integrated and mounted within the main switchboard. Power meter as a minimum must measure electrical parameters for each feeder phase as well as system total. Parameters should include as a minimum, amperage, volts, kW, power factor, VA, VAR, kWh, THD. Power meter must include a communication port to the Building Automation System through a Modbus RTU or TCP/IP connection. Coordinate the power monitoring with the BAS design.

5-4.3 Telecommunications - Structured Cabling System

5-4.3.8 Telecommunications Room (TR)

The Telecommunications Room (TR) is the room that houses the horizontal cross-connect (HC) that serves as a transition point between the backbone and horizontal cable systems. The TR provides a controlled environment to house voice, data equipment, and connecting hardware.

Certain projects may require separate Telecommunications Rooms and "HC's" for the horizontal cabling needs of the OIG and USPIS. Separate HC's shall be provided in those instances and shall be interfaced with the "MC" utilizing (25) pair CAT-3/5e copper and (24) strand fiber backbones. Design A/E shall coordinate these provisions with the local OIG special agent, local Postal Inspector or PSS.

CSF's do not usually require a TR in addition to the Telecommunication Equipment Room (ER). A TR is only required when the total cable distribution lengths (horizontal and vertical distances) exceed 295 feet. All TRs must be a minimum of 9 ft. x 8ft. clear interior space with ventilation, sufficient lighting, lockable doors and minimum ceiling height of 10 ft. A.F.F.

One armored fiber optic cable will be required from each HC to the MC. TIA-569-*X* specifies additional general requirements for the TR. USPS AS 504, Space Requirements Handbook, identifies space requirements.

a. TR Specification List

The TR must adhere to the following specification list:

- Floor mounted equipment rack spacing formula: One rack mount unit (RU) equals 1.75 in. All high-density 48 port patch panels require 2 RU's. All horizontal wire managers equal 2 RU's. One horizontal wire manager is required between each patch panel. Place one horizontal wire manager at the top of each equipment rack, if more than (1) rack is required.
- One 7ft.H x 19 in. W x 3ft.D floor mounted equipment rack will support up to 40 RU's. If more than 40 RU's are required, add additional 7 ft. H x 19 in. W, 3 ft. D floor mounted equipment racks. The TR for CSF's shall be sized to accommodate a minimum of (2) floor mounted equipment racks.
- Equip each rack with a Tripp-Lite #RS-1215RA rack mounted power strip equipped with twelve power outlets and plastic cover over the power button to prevent accidental outages. Mount each rack mounted power strip in the middle of each equipment rack.
- All floor-mounted equipment racks must have 36 inches of free and clear space from the front of any installed equipment racks as well as 36 inches free and clear from the furthest rearward mounted piece of equipment installed in any rack.
- Allocate a minimum of 16 RU's within the floor-mounted equipment rack for LAN and WAN electronic components to be supplied and installed by the USPS.
- Complete grounding and bonding of all provided hardware and cabling must be completed in accordance with the TIA-607-*X* specifications as well as the NFPA-70 NEC and any applicable

codes. Provide Secondary Bonding Busbar (SBB) within the TR. The SBB shall be bonded to the PBB at the TEF using a minimum #1/0/AWG/CU bond conductor. The SBB shall be utilized for all bonding needs within the TR. Refer to CSF Specification Section 271100.

- Provide an overhead cable or basket tray system, suspended from exposed structure above. Installation guidelines are covered in USPS CSF 260533, CSF 270500 documents and related sections.
- Maximum horizontal cabling distances must not exceed 295 ft. for a standard telecommunications outlet. This horizontal distance is to include all vertical distances plus required service loops.
- Provide a minimum 3 KVA at 120 Volt input/output of uninterruptible power with 30-minute backup rack mounted in the bottom of the right hand side HC equipment rack in each TR room.
- Terminate armored fiber optic cables connecting this room to the ER in a rack mounted interconnect center.
- Continuous temperature and humidity controls may be required to maintain telecommunications equipment within manufacturer's recommendations.
- Provide one (1) 30 Amp, 120 Volt single receptacle wall mounted directly behind the UPS and (2) dedicated, 120V nominal, non-switched, AC, duplex, 20 Amp outlets in each TR.
- Each rack shall be provided with an installation kit and isolation pads for securing and isolating the rack to and from the floor.

5-5 Fire Protection

5-5.1 Fire Alarm System

Alarm systems for Customer Service Facilities over 60,000 square feet with more than 200 employees shall be equipped with supervised speakers, in lieu of horns, for generation of live and pre-recorded voice messages. Install Fire Emergency Voice/Alarm Communication System (EVACS) as outlined within Module 2A, 5-5.1 and 283100 of the USPS MPF specifications.

5-5.1.2 Remote Monitoring

Customer Service Facilities equipped with a fire protection sprinkler system and not occupied 24/7 must be monitored by a central station remote monitoring company.

A digital cellular connection must be provided, as a sole means, to retransmit all "Contact ID-Point Address" alarm signals to the central station monitoring company. Note that a digital alarm communicator transmitter (mounted integral within the FACP), a third party, cellular communicator and a remote antenna are required for the cellular off-premise connection.

Remote monitoring is required as part of the construction contract, the contractor will select a central station remote monitoring company that is UL listed and approved, and approved by the AHJ. The contractor shall pay for the first year of monitoring service and the cost of service after the first year will be borne by the USPS. Additionally, the contractor must furnish documentation of the company's qualifications to the USPS Project Manager.

5-6 Lightning Protection

The A/E must perform risk assessment calculation per NFPA 780 - 2011 to determine lightning protection requirement for specific site location. Coordinate the design and installation of such systems with the bird deterrent system, if present.

5-6.1 Building Lightning Protection System

Provide a building lightning protection system if the “expected lightning stroke frequency” (Nd) exceeds the “tolerable lightning frequency” (Nc) to the structure.

Unless otherwise directed by the USPS, use the following values:

- C_3 Structure Contents Coefficient =3.0 (Exceptional Value).
- C_4 Structural Occupancy Coefficient =1.0 (Normally Occupied).
- C_5 Lightning Consequence Factor = 5.0 (Continuity of Service Required).

Other factors and coefficients used in the Lightning Risk Assessment are site specific or construction dependent.

Coordinate details of attachment of roof mounted lighting air terminals and conductors with roof design. Attach roof mounted equipment using methods approved by roof manufacturer. Conceal all lightning protection down leads within new construction.

The resistance of the lightning protection system shall not exceed 5 ohms. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening ground rods or installing ground enhancement materials; then retest to demonstrate compliance. Install rods at least 8 feet apart. Furnish written report of all tests.

5-6.1.1 Underground Counterpoise

Customer Service Facilities over 60,000 square feet with more than 200 employees and Carrier Annexes over 10,000 square feet require an underground counterpoise. The requirements for the underground counterpoise are outlined within the Standard Design Criteria, Module 2A, 5-2.7.5 and specified within section 264101 of the USPS MPF specifications.

5-7 Integrated Security and Investigative Platform (ISIP)

5-7.1 Robbery Countermeasure/Retail CCTV Cameras

Robbery countermeasure/Retail CCTV cameras are required in the full service area if the retail facility is located in a high crime area, as indicated by a recently completed risk analysis:

a. If the VRAT (Vulnerability and Risk Assessment Tool) CAP score is greater than 500 in the overall, crimes against persons or crimes against property categories, countermeasure/retail cameras are required.

b. If the CAP score is greater than 400 in the overall, crimes against persons or crimes against property categories AND any TWO of the following statements apply, countermeasure/retail cameras are required:

- A security incident has occurred within the past 12 months (vandalism, robbery, or burglary).
- The walk-in cash revenue is greater than $1 million year.
- The retail facility is easily accessed from a major highway.
- The retail facility is near a bar, liquor store, or adult oriented store.

Where required, mount one fixed camera for every two counters, on side or rear walls, to view the customer. If Open Merchandising is provided, robbery countermeasure/retail CCTV cameras are required. CCTV cameras for Open Merchandise areas consist of fixed cameras viewing the stamp merchandise displayed in the Open Merchandise space.

The Robbery Countermeasure/Retail CCTV System shall include (1) fixed camera to view the rear door of the facility and (1) fixed camera viewing truck unloading. Provide only (1) fixed type in applications where the dock camera can also monitor the rear door. Also provide (1) interior fixed camera at each customer entrance, for the purpose of catching face shots of customers as they enter. Positioning of this camera, relative to lighting, is critical and so must be coordinated with USPIS.

Cameras are not permitted to monitor the post office box alcove areas. Deviation requests to add cameras in the post office box lobby will not be approved unless the risk analysis demonstrates a threat to postal employees or postal property. If deviation approval is granted, a Sign 151 must be posted to notify the public that “Activity in this lobby may be monitored or recorded for operational or security purposes.”

Cameras located on the dock or in areas accessible 24 hours a day to the public must be secured in vandal-resistant housings and all wiring must be in a flexible armored conduit entering the housing. Secure the mounts for these cameras to prevent easy removal. Dock or canopy cameras monitoring doors must view the door opening (i.e.; the non-hinged side of the doors).

5-7.2 Security and Enterprise Physical Access Control CCTV Cameras

Customer Service Facilities over 60,000SF with more than 200 employees require Security and Enterprise Physical Access Control CCTV cameras.

The Security and Enterprise Physical Access Control CCTV system requirements are outlined within the Standard Design Criteria, Module 2A, Mail Processing Facilities and specified within section 282305 of the USPS CSF specifications.

5-7.4 Enterprise Physical Access Control System (ePACS)

Customer Service facilities over 60,000 square feet with more than 200 employees and Carrier Annexes over 10,000 square feet require an enterprise physical access control system (ePACS), only if both of the following conditions are satisfied:

a. In high crime area with a VRAT (Vulnerability and Risk Assessment Tool) CAP score of 500 or more.

b. Risk Assessment performed by local Inspector(s) recommends ePACS.

All access control projects must utilize the Enterprise Physical Access Control System (ePACS) specification section 281304 included in the USPS

MPF specifications unless an approved deviation request has been issued. The ePACS requirements are outlined within the Standard Design Criteria, Module 2A, MPF. The decision to proceed with an access control project needs to be judicious and approved when security is compromised due to broken or failed system components. Upgrades to functional access control systems are not authorized. Legacy Access Control Systems must submit an Enterprise Physical Access Control survey through the local IT Department for evaluation and approval to replace the system. Additionally, when it is determined that an access control project must proceed, the computer hardware must be procured by USPS. To enable a certified solution, the software and computer hardware acquisition must be managed and approved by the Headquarters IT Portfolio and must meet a strict set of requirements.

5-7.5 Investigative Systems

The following Customer Service Facilities require a Criminal Investigative CCTV System (CIS):

a. Facilities of 6,500 square feet or less (CSF Small including Carrier Annexes) require a Criminal Investigative Office and a Criminal Investigative CCTV System to be installed when the 10-year full time employment complement will equal or exceed 29 Carriers.

b. Facilities larger than 6,500 square feet (CSF Medium less than 60,000 square feet or Carrier Annexes less than 10,000 square feet) require a CIS to be installed when the 10-year full time employment complement will equal or exceed 29 Carriers. The CIS consists of an Investigative CCTV system in the Investigative Office.

c. Carrier Annexes over 10,000 square feet and CSF's larger than 60,000 square feet with over 200 full time employees shall include the Investigative Office with Breakout door and the Criminal Investigative CCTV System.

The Criminal Investigative Systems (CIS) will consist of video surveillance cameras, CCTV components, and a Criminal Investigative Office (CIO).

Refer to Appendix M1-F: Building and Site Security Requirements by Type of Facility and Square Footage and Standard Design Criteria Module 1, Chapter 2, Section 2-9.

5-7.5.1 Investigative Office

The Criminal Investigative Office (CIO) is used by USPIS/OIG to conduct internal investigations. This room houses equipment for the control and observation of video surveillance cameras and is also used for viewing the workroom/platform floor.

Lights in CIO must all be separately switch controlled.

Fire detection appropriate for rooms containing electronic equipment and fire alarm signaling device(s) are required.

Provide secondary bonding busbar (SBB) behind the headend rack(s) as specified in MPFS section 282305, paragraph 2.14.

5-7.5.2 Investigative CCTV System

A/E must determine the location of the cameras, headend equipment and CCTV components. The A/E shall also produce to the direct vendor,

AutoCAD electronic copies of the camera placement drawings and camera schedules for preparation of the preliminary and final cost estimates.

All equipment including the servers, monitors, network switch, etc. must be procured by the General Contractor from the Direct Vendor utilizing the pass through pricing process. Refer to the Building Design Standards, Folder F - Other Requirements & Info, CCTV and ePACS. “Securitas”, the direct vendor, must install the cameras, servers, monitors and associated equipment. The general contractor must install/terminate the necessary CAT-6 and fiber cabling to the patch panels.

Install investigative CCTV wiring in cable tray or cable support system with a spacing that will not compromise transmission. Use of bridle rings or tie-wrapping cables to beams is not acceptable. Install exterior wiring in conduit raceway system that is suitable for wet locations. Cable tray for camera wiring must not include any low Voltage AC wiring.

A final inspection and test report demonstrating functionality of the Investigative CCTV system is required prior to acceptance of the system.

5-7.5.3 Cameras and Junction Boxes

Equip environmental enclosures for exterior cameras with individual 120 VAC / 12 VDC power supplies when required.

Power camera power supplies, when required, from 20 Amp breakers on a panel in the Investigative Office.

Enclosures housing camera power supplies, media converters, fiber patch box (interconnect center) and 120 Volt receptacles shall contain interior back planes for mounting of all components and shall be provided by the General Contractor. NEMA type 4X, stainless steel, hinged and lockable enclosures shall be provided for all exterior applications.

During construction, the A/E shall provide high definition photographs showing the interior components of all equipment enclosures, terminal cabinets, remote node cabinets and the headend rack(s). Photographs shall show wiring and placement of fiber media converters, surge protectors, fiber patch boxes and interconnect centers, power supplies, power strips and receptacles. Photographs shall be transmitted to the USPS Project Manager.

Mount camera junction boxes on rigid structural member, as high as practical where exposed. Junction boxes for CSF Medium and Carrier Annexes less than 10,000 sq. ft. shall be placed as indicated in Exhibit 5-7.5.3a.

Exhibit 5-7.5.3a
Investigative Cameras and Junction Boxes

SPACE	CCTV CAMERA TYPE
BMEU - Dock area, positioned to allow viewing into the truck bed	1 PTZ for every 3 dock positions
BMEU[6]	1 PTZ located in the center of the space
BMEU - Scale	If floor scale 1 fixed; if table scale 1 fixed at discretion of PSS with OIG concurrence.

SPACE	CCTV CAMERA TYPE
On the Workroom (WR) floor. The final camera placements shall be confirmed by PSS, Inspection Service and the OIG on a case-by-case basis.[2,3,6]	1 PTZ, located on 40 foot centers and 20 ft from walls[1,4]
On the dock area, positioned to allow viewing into the truck bed.	1 PTZ per 3 dock positions
Full Service Counter (mounted above mirrored panel)	1 Fixed over each counter position
Carrier Loading Slab	1 PTZ every 60 ft.
Carrier and Mail Vestibules	1 Fixed to view personnel doors
Employee Lunch/Break rooms	1 PTZ
Trash/Recycling Area, if area cannot be viewed by adjacent carrier loading area cameras	1 Fixed
Rear Entrance, if door cannot be viewed by the dock area camera	1 Fixed
Freight Elevators [5,6]	1 PTZ located at each door opening on each floor

Keyed Notes:

1 Provide additional PTZ's to view all areas of irregular shaped workrooms where necessary.

2 Workroom PTZ must provide visual access to registry cage and vault doors.

3 Workroom PTZ must provide visual access of the workroom side of the PO boxes.

4 Workroom PTZ's on 40 ft. centers and 20 ft. from walls applies only to medium CSF's. Camera junction box locations for small CSF's shall depend on the Carrier case layout and must be coordinated with the PSS.

5 Conditional: Upon approval from the OIG and USPIS.

6 In certain applications, a multi-directional or multi-sensor camera with individual camera lenses may be utilized as an alternative to PTZ camera. Attain approval from the PSS, the OIG and USPIS.

Workroom cameras that are in close proximity may be used to view open room/areas located in the Workroom or directly adjacent to the Workroom, such as Rewrap, therefore separate cameras are not required.

Investigative CCTV system for Carrier Annexes over 10,000 square feet and CSF's larger than 60,000 square feet with over 200 full time employees shall be provided in accordance with Module 2A, 5-7.5.

5-7.5.4 Camera Mounting Provisions

The mounting applications shown within exhibit 5-7.5.4a shall be utilized as a guideline for the positioning of the investigative CCTV cameras: Note that site conditions may dictate slight mounting height adjustments. Refer to CSF standard details G5-7-2a thru G5-7-2b5 for camera mounting applications.

Exhibit 5-7.5.4a

Investigative CCTV Camera Mounting Provisions

CAMERA	LOCATION	MOUNTING REQUIREMENTS (TYPICALLY)[1]
Interior	Accessible dropped ceiling areas less than 14 feet AFF	Utilize flush, recessed ceiling mounts or surface ceiling mounts
	Non-accessible dropped ceiling areas	Utilize surface ceiling mounts or wall mounts, maximum 12 feet AFF
	Exposed ceiling areas[2]	Pendant mounted below the HVAC ductwork and lighting luminaires; preferably 14 to 18 feet AFG
	Dock area (enclosed platform)	Pendant mounted bottom at 10 feet AFF and 25 feet from dock door.
Exterior	Recycling areas Break areas	Wall mounted approx. 9 to 12 feet AFF
	Dock area (enclosed or open platform)	Pendant mounted bottom at 10 feet AFF and 25 feet from dock door.

Keyed Notes:

1 Cameras shall be mounted to provide a minimum 84 inch headroom below the camera.

2 Mount camera junction boxes on a rigid member, as high as practical, where located in exposed ceiling areas.

5-7.5.5 Video and Control Wiring

Interior cable runs from cameras to the CCTV headend or node cabinets (if used) that do not exceed 800 feet (total horizontal and vertical distance) shall be category 6, plenum rated.

Interior cable runs exceeding 800 feet (total horizontal and vertical distance) from cameras to the CCTV headend or node cabinets (if used) shall be (2) count 62.5/125, OM1, multi-mode, indoor/outdoor, aluminum interlocked armor, plenum rated fiber cable.

Exterior cable runs, contained in conduit and routed to remotely located “blue sky” cameras shall be (2) count, 62.5/125, OM1, multi-mode, indoor/outdoor rated fiber cable. Where multiple fiber cables are routed within a common conduit provide innerduct separation of each cable.

Where remote node cabinets are utilized, interior cable runs from remote node cabinets to the CCTV headend rack(s) shall be (6) count, 62.5/125, OM1, multi-mode, indoor rated fiber cable; utilize plenum type where required.

Provide category 6 or fiber cabling for camera video wiring. Video wiring must be routed to the equipment rack in the Investigative Office with 20 ft. of

pigtail at final point of demarcation in room. All video signal runs must be continuous (not spliced) from camera to demarcation point.

Power interior cameras by “PoE” (power over ethernet) from the network switch for cable lengths up to 300 feet (total horizontal and vertical distance). Provide Ethernet cable extenders for camera runs in excess of 300 feet but no more than 800 feet. Provide fiber optic cabling for cable runs exceeding 800 feet.

5-7.5.6 Camera Systems

When a facility has an investigative CCTV system AND a robbery countermeasure/retail system, cameras for both systems are required at the full service and BMEU counters. Mount one fixed Investigative CCTV camera over each drawer at the service counter. Mount one fixed robbery countermeasure/retail CCTV camera for every two full service and BMEU workstations, on side or rear walls.

All non-investigative cameras (security and robbery countermeasure/retail systems) must be individually homerun to the CIO for viewing by Inspection Service personnel.

Provide and install cameras for all junction box locations. All workroom/platform cameras must be pan-tilt-zoom (PTZ) or multi-directional/multi-sensor (Multi-D/S) units. Camera heights and locations must be coordinated with the **local Postal Inspector and the OIG**. Place cameras at least six inches below lighting luminaires. Place cameras to avoid HVAC ducts, diffusers and other obstructions.

Direct Vendor shall provide arm brackets, recessed housings, surface mounts, grid mounts, pendant kits, and surface conduit back boxes for all camera types.

Camera height must be between 14 and 18 feet AFF. If cameras are required to be outside this height range additional camera junction boxes/cameras will be required. The A/E must coordinate site specific requirements with the **local Postal Inspector and the OIG**.

Camera mounts must be bolted or clamped, not welded, to allow simple relocation. If mounting height requires stems of 4 ft. or more, then additional bracing will be required to prevent camera movement.

Supply camera systems by the approved USPS CCTV Direct Vendor, in accordance with CSF Specification Section 282305 or CSF Section 282304 if applicable.

5-7.5.7 CCTV Remote Node Cabinets

Remote Node Cabinet shall be lockable and will house an IP video system network switch, patch panel, UPS and camera power supply.

a. The GC shall install the remote node cabinet and terminate fiber optic and CAT-6 cables.

b. Direct Vendor will supply line-interactive, rack mounted UPS with battery reserve to supply continuous load for 18 minutes.

c. The GC shall provide a dedicated 20 Amp, 120 Volt circuit for each remote node cabinet.

Remote node cabinets shall be mounted high enough to deter unauthorized tampering, but low enough to avoid the use of motorized lifts for future repair or warranty work.

a. Node cabinets mounted within ePACS secured rooms shall typically be wall mounted top at 6 feet AFF.

b. Node cabinets mounted within the workroom and platform areas must be wall or column mounted bottom at no less than 9 feet AFF and no more than 14 feet AFF.

All cameras will reside on separate Securitas provided ISIP switches within the headend and/or node(s). No camera utilizing UTP cable can exceed 294 feet.

a. Intermediate node locations can be well over 300 feet from the head end. Nodes serve as a local termination/communication point for remote cameras in a work space. A node collects cameras within an area that exceeds 300 feet from the head end. Nodes must communicate over fiber to the head end. Two or more node cabinets can be aggregated at a given node location in a facility. Node cabinets require wall space and electrical power on appropriate circuits. Placement effects cable termination locations and cable type.

b. The number of cameras that can be supported by a single node cabinet is dependent upon the equipment manufacturer, the number of fixed, PTZ or multi-directional cameras, the number of surge protection modules and the quantity of fiber connections. Refer to paragraph 9.b. of the “USPS CCTV Security Design Requirements” document contained within BDS, Folder F – CCTV and ePACS documents for applicable node cabinet formulas.

5-7.5.9 Registry Cage/Registry Room Surveillance

The Registry Cage/Registry Room Surveillance requirements are outlined within Standard Design Criteria Module 2A, MPF.

5-7.6 Exit Door Alarm

Install the following equipment at Exit Alarm doors:

- In facilities requiring a security and enterprise physical access control CCTV system, install fixed cameras at each door for facial recognition and to view the door opening and the surrounding area.

At locations with a CCTV security system, the door alarms must be tied into the matrix switcher or digital video recorder through the ePACS.

In facilities equipped with an Enterprise Physical Access Control System (ePACS), the exit door alarm is to be rated at 12 VDC and provided by the ePACS integrator. Refer to Module 2A, 5-7.6 for further details.

Appendix M2-A

Mail Processing Facility Door Schedule

MPF DOOR SCHEDULE

		SIZE (W x H)									LEAF			ACTION		MATERIAL/TYPE				FRAME				
	LOCATION	3'-0" x 7'-0"	3'-6" x 7'-0"	4'-0" x 7'-0"	6'-0" x 7'-0"	8'-0" x 8'-0"	1'-2" x 9'-0"	10'-0" x 10'-0"	12'-0" x 10'-0"	8'-0 x 10'-0"	SINGLE	DOUBLE	SPECIAL	SINGLE ACTING	SPECIAL	HM	Alum. (Special)	Stl. (Special)	Alum/Glass	Steel Tube/Channel	Hollow metal	Aluminum	DOOR ELEV (See Note 1)	KEYED NOTES
	Administrative/Office Areas	●									●			●		●					●		A	
	Conference Room	●									●			●		●					●		C	
	Toilet Rooms	●									●			●		●					●		A	
	Hallways				●							●		●		●					●		C	
	Lobby												●		●									2
	Lobby Interior	●																	●				B	
	Lobby Exterior				●														●				B	
	Employee Lunchroom interior (to Kitchen Area)	●									●			●		●					●		H	
	Employee Lunchroom exterior (to Break Area)	●									●			●		●					●		C	
	Employee Lunchroom Emergency Exit	●									●			●		●					●		A	
	Employee Lunchroom				●							●				●					●		B	
	Food Service Entry				●							●		●		●					●		A	
	Storage	●									●			●							●		A	
	Toilet Rooms	●									●			●		●					●		A	
	General Supplies				●							●		●		●					●		S	
	Miscellaneous	●									●			●		●					●		A	
	CIO interior/Remote Breakout	●									●			●		●					●		H	9
	CIO exterior/Remote Breakout	●									●			●		●					●		G	9
	BMEU Entry (Customer Service)												●						●			●		8, 4
	BMEU interior	●									●			●		●					●		C	
	BMEU Entry to Platform					●							●										E	
	Stockroom				●							●		●		●					●		A	
	Stockroom		●								●			●		●							A	
	Custodial Storage		●								●			●		●					●		A	
	Custodial Closet	●									●			●		●					●		A	
	Buildings and Grounds Storage	●									●			●		●					●		A	
	Buildings and Grounds Storage							●															O	5
	General Shop				●							●		●		●					●		S	
	Machine Shop				●							●				●					●		S	
	Shower Rooms	●									●			●		●					●		A	
	Workroom egress	●									●			●		●					●		A	
	Wire mesh/day gates										●			●				●		●			N	3
	Registry Cage - Entry/Egress			●							●			●				●		●				
	Registry Cage				●								●		●			●		●				4, 9
	Mechanical Room				●							●		●		●					●		A	
	Platform Supervisors Office	●									●			●		●					●		R	
	Platform Egress Doors	●									●			●		●					●		S	
	Platform Overhead (TKO)									●			●		●								P	
	Platform Overhead (TKO)							●					●		●								P	6
	Workroom to Platform					●							●										Q	
	Workroom to Platform							●					●										Q	6
	Workroom to Platform		●										●										R	
	Platform Ramp Overhead (TKO)								●				●		●								P	
	Trash and Recycling Area					●						●		●				●		●			N	10
	Trash and Recycling Area					●							●		●			●		●			O	7
	Trash and Recycling Area	●									●			●						●			A	

DOOR SCHEDULE GENERAL NOTES:

1 All interior doors within the Administrative Area/Hallway, Workroom, Workroom Hallway, Employee Hallway and Support Area are painted hollow metal doors (P-111), with hollow metal door frames (P-105) unless indicated otherwise are to be stained grade wood.

2 All exterior door/frame finishes shall be proposed by DBE and approved by contracting officer.

3 For required hardware sets, see Hardware Schedule in Specification Section 087100 MPF.

DOOR SCHEDULE KEYED NOTES:

1 For door elevations, see Standard Detail P2-7-2a.

2 Special door required per specifications.

3 Dutch door optional.

4 Sliding door.

5 One 10'-0" x 10'-0" overhead sectional door at Buildings and Grounds Storage.

6 One 10'-0" x 10'-0" overhead sectional door and one 10'-0" x 10'-0" rapid roll up door to be located in Platform and Workroom to Platform as appropriate.

7 One 8'-0" x 8'-0" overgead sectional door at Trash and Recycling Area.

8 See standard BMEU plans for locations and BMEU Manual for additional information.

9 Hardware to be furnished by Inspection Service, installed by Contractor.

10 Wire mesh door in fence surrounding recycling dock.

Appendix M2-B

Customer Service Facility Door Schedule

CSF DOOR SCHEDULE

		SIZE (W x H)						LEAF			ACTION			MATERIAL/TYPE								FRAME					
	LOCATION (AS APPLICABLE)	3'-0" x 7'-0"	4'-0" x 7'-0"	6'-0" x 7'-0"	1'-2" x 9'-0"	varies x 9'-0"	7'-0" x 8'-0"	SINGLE	DOUBLE	SPECIAL	SINGLE ACTING	DOUBLE ACTING	SPECIAL	HM	SCW	Wd. (special)	Alum. (special)	Stl. (special)	Wood/Glass	Alum/Glass	Alum/Polycarbonate	Polyethylene	Steel tube/channel	Hollow metal	Aluminum	Wood	DOOR ELEV (See Note 1)	NOTE
	Workroom egress	●						●			●			●										●			A	
	Wire mesh/day gates							●			●							●					●				N	7
	Criminal Investigative Office Exterior	●						●			●			●	●								●				G	
	Criminal Investigative Office Interior	●						●			●			●	●								●				H	
	Carrier vestibule exterior impact			●					●			●										●	●				E	
	Carrier vestibule interior impact			●					●			●										●	●				E	
	Carrier vestibule exterior personnel	●						●			●			●										●			A	
	Carrier vestibule interior personnel	●						●			●			●										●			A	
	Mail vestibule exterior impact			●					●			●										●	●				E	2
	Mail vestibule interior impact			●					●			●										●	●				E	2
	Mail vestibule exterior personnel	●						●			●			●										●			A	
	Mail vestibule interior personnel	●						●			●			●										●			A	
	Mail vestibule combo personnel		●					●			●			●										●			A	
	Enclosed platform overhead						●			●			●					●					●				L	8
	Administration/Office Areas	●						●			●				●									●			A	
	Administrative to Work Room	●						●			●				●									●			G	
	Building and Grounds			●					●		●			●										●			A	
	Conference Room	●						●			●								●					●				6
	Custodial Supplies	●						●			●				●									●			A	
	Electrical Room	●						●			●				●									●			A	
	General Storage	●						●			●				●									●			A	
	Janitor's Closet	●						●			●				●									●			A	
	Mechanical Room	●						●			●			●										●			A	
	Postal Equipment Storage			●					●		●				●									●				
	Records	●						●			●				●									●			A	
	Stamp Storage	●						●			●				●									●			A	
	Stockroom			●					●		●				●									●				
	Toilet Room	○						●			●			●									●				A	1
	Vault		●					●			●							●					●				M	
	Folding grille, Full Service					●				●			●								●				●		J	5
	Full Service to Work Room	●						●			●				●									●			A	
	Grille closet, Full Service				●			●			●					●										●	I	4
	Customer storefront vestibule	●						●			●									●					●		B	9
	Folding grille					●				●			●								●				●		J	5
	Grille closet				●			●			●					●										●	I	4
	Lobby to Workroom	●						●			●				●									●			G	
	R-box alcove (egress only)	●						●			●									●					●		G	
	Wicket	3'-6" wide								●	●					●								●			F	3
	Wicket	3'-0" wide								●	●					●								●			F	3
	BMEU exterior			●					●		●			●										●			A	
	BMEU interior	●						●			●			●										●			D	

● TYPICAL ○ OPTIONAL, REQUIRES USPS APPROVAL

DOOR SCHEDULE GENERAL NOTES:

1 For door elevations, see USPS Standard Detail G2-7-2a.
2 For required hardware sets, see hardware schedule in Specification Section 087100 CSF or Section 087100 Compact Build

DOOR SCHEDULE KEYED NOTES:

1 Door may not be required if adequate screening is provided.
2 An 8'-0" set of doors may be required to ease future equipment installation.
3 Door has hinged panel and shelf in top half (not a Dutch door).
4 Wood door is laminated with masonite both sides.
5 Special door required per specifications.
6 Door may have sidelight.
7 Wicket or sliding door are optional.
8 CSF Small platform doors are 7'-0" x 10'-0"
9 Bi-parting automatic sliding doors are optional

Module 3 – Repair & Alteration Criteria

R&A Introduction

Chapter 1 Civil

Chapter 2 Architectural

Chapter 3 Structural

Chapter 4 Mechanical

Chapter 5 Electrical

Appendices

Appendix M3-A Boiler Replacement Reference Guide
Appendix M3-B Abatement Project Design Guide
Appendix M3-C Elevator Replacement & Upgrade Design Guide

Module 3 - Repair & Alteration Criteria

R&A Introduction

0-1 R&A Policy Statement

Repair and alterations (R&A) projects are to be treated as part of an integrated effort to maintain, expand, renovate, or alter existing facilities while meeting the changing needs and standards of the Postal Service. All repair and alterations projects must meet the intent of the USPS Building Design Standards (BDS), including the Standard Design Criteria, Standard Designs, the Standard Detail Library, and the USPS Specification.

Each Project Manager on an R&A or Hub Team is accountable to make the best decisions for the Postal Service. Facilities Headquarters will be conducting audits to review compliance with current Postal policies, design standards, and economic factors. The decision to repair, replace with same as existing, or replace with new standards should be evaluated based on cost, performance, operational, safety, environmental, and other factors. If a cost analysis is performed, it shall be on a life-cycle cost (LCC) basis, including impact on future expenses. For example, R&A work related to HVAC equipment will typically require an LCC analysis to determine if future energy savings will offset any additional first costs for more efficient equipment.

One of the most common questions regarding repair and alterations projects is how much of an existing building must be upgraded to meet the current codes. The requirements to upgrade existing facilities vary by state, county, and local jurisdictions. Typically, the likelihood that a building, or portion of a building, must be upgraded increases as the scope and extent of the repair and alterations work grows. How this is applied in each specific case will need to be reviewed and possibly discussed with the authority having jurisdiction.

Alterations in owned or leased facilities where the Postal Service is awarding construction contract, where the building structural integrity or main services to the building are impacted, or where detailed drawings are required to accomplish the work, are required to comply with the USPS model codes. Various editions of the International Building Code (IBC) have been adopted by all 50 states within the United States. For this reason, the IBC shall be deemed as the model building code for the USPS. Where, state or local Governments have adopted and amended version of the IBC and/or other ICC codes, the current adopted version of state and local amendments shall apply to USPS projects within that jurisdiction. All local codes in force at the time of solicitation shall apply.

For other code requirements, such as electrical, fire, and life safety, A/E design solutions are required to be compliant with the more stringent applicable requirements of current national, state and local building codes and standards, including but not limited to: the International Building Code, NFPA 101 Life Safety Code; OSHA General Industry Standards; and USPS Handbook RE-4 “Standards for Facility Accessibility”. For repair projects, accessible products and materials should be used whenever possible. For

projects that alter, change, or improve a facility, the products and construction included in the project must comply with all applicable RE-4 standards. The requirements contained in USPS Handbook RE-5 “Building and Site Security Requirements” have now been incorporated into this edition of the Standard Design Criteria.

Another topic that may have a big impact on an R&A project is whether or not the building is considered "historically significant". Usually, "historic" buildings are older structures, but there are some newer buildings that are classified as "historically significant" for other reasons. Existing buildings are constantly being added to "historic registers". It is possible for this to occur at any point during the design of a project. The A/E shall be responsible for keeping up to date on local historic registers. If there is any question about the status of a building or if it has been determined that a building is "historic" then the state historic preservation officer (SHPO) must be contacted. In addition, the USPS Federal Preservation Officer must be contacted.

There are many federal, state, and local environmental laws and regulations that affect repair and alterations projects of all sizes and complexity. USPS Handbook RE-6, *Facilities Environmental Guide*, serves as a tool for identifying and managing environmental impacts associated with such projects. The RE-6 Document can be accessed through the following link:

http://blue.usps.gov/cpim/ftp/hand/re6/re6fm/re6toc.pdf

The use of National Asbestos Flooring Encasement System (NAFES) is allowed in the abatement of ACM in floors by the approved blanket deviation (although, the use of NAFES in high traffic areas or motorized traffic aisles in not recommended).

The USPS standards now require a comprehensive look by the A/E to identify energy savings opportunities in a building. Those with the largest impact will involve lighting and HVAC upgrades. Additional factors that need to be considered include the building envelope (roof, walls, windows, openings) and lighting/HVAC equipment nearing the end of its life cycle. All solutions should strive to beat the the current version of ASHRAE 90.1 Compliant Base Case by 30% or the greatest amount practicable. The expectation for any project is that the A/E would evaluate alternatives against an ASHRAE Base Case for the building/equipment and provide a Life Cycle Cost Analysis (LCCA) for each one, allowing the USPS Project Manager to make the decision that is in the best interest of the USPS.

0-2 Overview

This R&A Module is not meant to provide comprehensive direction on all aspects of design and construction for repair and alteration of USPS facilities. The objective of this module is to provide guidance on specific Postal Service requirements, issues, and conditions. Current industry practice and professional judgment should be used for items not covered.

Module 3 has been formatted to match the chapter numbering of Module 1 General Criteria and Module 2 Specific Criteria with the intention of simplifying the cross-referencing topics between Module 3 and the current design criteria.

The USPS specifications provide a set of Division 1 documents for use on Repair and Alterations projects. These documents include items unique to R&A work requiring coordination with the local facility and possibly with utility companies, such as minimizing construction noise and dust, and how to deal with interruptions of electricity, water, and other utilities. Also, any USPS

specifications sections that are designated as "mandatory" cannot be revised without an approved deviation.

Postal Accountability and Enhancement Act of 2006 may apply to some R&A Projects. If so, all communication with local officials associated with PAEA shall be sent via Certified Mail and the receipts are to be placed in the project files.

0-3 Facility Types and Programs

Repairs and alterations to all facility types must follow the design criteria and standards in the USPS Building Design Standards (BDS) as appropriate for the facility type:

- Mail Processing Facilities must use the Criteria, details, and outline specifications that are designated for Mail Processing Facilities (MPF). *(Also refer to Module 1 and Module 2A)*

Module 1, Module 2A

- Customer Service Facilities must use the Criteria, details, and specifications that are designated for Customer Service Facilities (CSF) Designs. *(Also refer to Module 1 and Module 2B)*

Module 1, Module 2B

When renovating a space for Alternate Quarters (AQ) space, the BDS must be employed to the fullest extent possible, including accessibility and security requirements.

If an R&A topic is not found in the current SDC Module 3, the A/E or USPS Project Manager should submit a Feedback form asking that it be added in the next update. In the meantime, contact Facilities Program Management for assistance.

Module 3 - Repair & Alteration Criteria

Chapter 1 - Civil

1-1 Site Information
1-1.3 Environmental Assessment

1-2 Site Design
1-2.4 Parking and Drives
1-2.10 Safety
1-2.12 Guardhouses

Chapter 1 - Civil

1-1 Site Information

1-1.3 Environmental Assessment *(Also refer to USPS Handbook RE-6)*

USPS Handbook RE-6

For guidance in dealing with existing underground storage tanks, consult with the USPS Office of Sustainability. Refer to Module 4E, Storage Tank Standards, for additional information.

Module 4E

1-2 Site Design

1-2.4 Parking and Drives

1-2.4.1 Pavement Resurfacing *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Pavement surfaces are to be carefully evaluated for best type of repair or resurfacing. Methods acceptable include:

- Seal Coating: Seal coating is recommended where minor cracks and raveling is observed.
- Infrared Spot Repair: Infrared spot repair is recommended for pot hole patching, drainage area corrections or deep patches need around drainage structures.
- Joint Sealing: Joint sealing (hot mixture) is recommended for larger pavement crack repair to prevent water migration.
- Resurfacing/Repaving: Resurfacing/repaving is to be used where large scale pavement failure has occurred and surfaces are no longer usable or able to be repaired.

1-2.4.2 Curbs and Curb Cuts

G1-2-4e

Current criteria mandate the use of straight curbs only. If expanding a paved area with curbs other than straight curbs, the existing curb type can be used for the expanded area without obtaining a deviation.

Install landscape bollards at existing buildings/sites that have been subject to vehicle collisions. If allowed by site, modify configuration of areas that may have contributed to those collisions.

1-2.10 Safety

1-2.10.2 Fire Lanes

Make sure to maintain required fire lanes when reconfiguring parking areas and driveways.

1-2.12 Guardhouses

1-2.12.1 Replacement of an existing guardhouse does not require a Deviation Request. Confirm with local PSS or Postal Inspector whether new guardhouse is to be in the same location as the existing, or in a different location. Typically they are to be located on the inbound side of the roadway where a single gate is used and between inbound and outbound traffic where double gates are used. Single gate installments are to be protected by six-inch diameter concrete-filled bollards at the two roadway side corners, and at all four corners at two-gate installations.

They may be site built or prefabricated but must incorporate materials that will withstand the local conditions with minimal upkeep and maintenance.

Refer to Handbook RE-5 Building and Site Security Requirements for additional criteria for location, architectural design, heating, ventilation, air conditioning, plumbing, and electrical.

Module 3 - Repair & Alteration Criteria

Chapter 2 - Architectural

2-1 Introduction
2-1.2 Codes and Standards

2-2 Workrooms
2-2.1 Floors
2-2.3 Ceiling and Height Requirements

2-3 Platforms
2-3.3 Carrier Platform
2-3.4 Trash and Recycling
2-3.8 Dock Equipment

2-4 Support Areas
2-4.2 Toilet Facilities
2-4.3 Locker Areas
2-4.14 Battery Charging Areas

2-5 Retail Design Standards
2-5.2 Self Service
2-5.3 Open Merchandise (aka Postal Store)
2-5.5 Full Service Counters
2-5.6 Passport Acceptance Counters

2-6 Exterior Envelope
2-6.1 Walls
2-6.2 Roof
2-6.3 Energy Conservation

2-7 Miscellaneous Building Components
2-7.2 Doors and Hardware
2-7.3 Vertical Circulation
2-7.4 Protective Barriers
2-7.6 Building Materials / Interior Finishes

2-8 Fire Protection

2-9 Criminal Investigative Systems
2-9-1 Criminal Investigative Office (CIO)

2-10 Safety
2-10.1 Egress

Chapter 2 - Architectural

2-1 Introduction

2-1.2 Codes and Standards

2-1.2.2 Accessibility Standards

Major renovation projects in lobby and/or workroom areas may require upgrades to the path of travel, the restrooms, telephones, and drinking fountains serving the altered area, to ensure these areas are usable by persons with disabilities. Refer to USPS Handbook RE-4 and Postal Bulletin 22153 (4-48-05).

USPS Handbook RE-4

Completing the Facility Accessibility Survey and Certificate of Accessibility (FAS/CoA) must be a contract deliverable for every design project that has the potential to affect RE-4 compliance. The Certificate of Accessibility is tied to the Facility Accessibility Survey and the CoA must be signed by the designer of record.

2-1.2.3 Environmental Safety Standards

Depending on the project requirements, the information found in these USPS publications is to be used as a guide:

1. Handbook AS-556: Asbestos Management Guide
2. Management Instruction EL-890-2007-4: Lead Hazard Management Program.
3. Management Instruction EL-890-2016-3: Managing Asbestos in Postal Service Facilities

The documents can be found in BDS Folder F11.

2-2 Workrooms

2-2.1 Floors

The current standard for workroom flooring is sealed concrete. For existing facilities with asphalt plank, taking into consideration that asphalt plank is no longer being manufactured, the ultimate goal is to duplicate the same floor surface as new facilities, which is a sealed concrete slab. This may be achieved in stages.

If the existing asphalt plank floor has minor damage and the facility has attic stock or reclaimed plank that is non-ACM or a comparable material is available, such as Jennison Wright Jura Tile, then the plank floor can continue to be repaired.

If the damage is too wide-spread and/or there is no suitable replacement plank material available, and the existing plank is non-ACM:

- Remove large areas of existing plank from a contiguous functional area of the Workroom (typically an area not occupied by mail processing equipment).
- Reuse the removed plank to repair other areas of the facility and keep the remaining plank as attic stock for future repairs.

- Where the existing plank was removed, repair and/or resurface the exposed concrete slab and apply sealer to create a new wearing surface.
- Use a portion of the reclaimed asphalt plank to create sloped transition areas to accommodate the 1/8-inch or 1/4-inch height difference between remaining asphalt plank and the newly exposed concrete slab.
- Warning: The use of cementitious or other type of topping to build up the height of the concrete to match the level of the asphalt plank has not shown to be a successful strategy. Prior projects have revealed that the thin topping material has not been able to withstand the abuse of MTE over the long term and will crack, delaminate, and require constant repair.

If the facility currently has ACM asphalt plank, the use of National Asbestos Flooring Encasement System (NAFES) can be used to encapsulate the plank with VCT, however, the use of NAFES in high traffic areas or motorized traffic aisles in not recommended. Whenever feasible, ACM asphalt plank should be removed, and the exposed concrete slab prepared as the new wearing surface.

If the Workroom has vinyl composition tile (VCT) that is damaged, follow the same set of options as asphalt plank, as stated above.

Whichever strategy is decided upon, keep in mind that the long-term goal is to have a uniformly level sealed concrete slab as the wearing surface for the entire workroom.

2-2.3 Ceiling and Height Requirements

Current Workroom ceiling standard for facilities less than 10,000 SF is 2’ x 4’ acoustical ceiling tile (ACT); for new facilities over 10,000 SF, no ceiling is required. Existing Facilities over 10,000 SF currently with ACT in the Workroom are not required to comply with the ”no ceiling” requirement. Damaged ceiling tiles in existing facilities may be replaced to match existing.

If a facility has existing 2'x2' ACT in the workroom that are damaged, then replace to match existing unless the majority need to be replaced, in which case the new 2’ x 4’ ACT standard must be used.

2-3 Platforms

2-3.3 Carrier Platforms

A Carrier Canopy, per standard detail S2-6-1a2, can be added to an existing facility, or to an AQ facility, only if there are 15 or more carriers, and it can only extend along the building. It can’t extend over finger docks, if any.

S2-6-1a2

G2-3-4a→a1

2-3.4 Trash and Recycling *(Refer to Modules 2A & 2B)*

Standard facility design criteria for Trash and Recycling operations is based on the premise that the subject facility is designated as a National Recycling Operation (NRO) hub site, to prepare and consolidate recyclables. To ensure that facility design and construction is consistent with USPS NRO standards, facility planning and design development of Trash and Recycling areas in existing facilities must be done in coordination with HQ's Office of Sustainability, Corporate Sustainability Initiatives Office. If the R&A project concerns a Trash and Recycling area that is not designated as an NRO hub site, the NRO standards do not apply.

2-3.8 Dock Equipment

In general, for most dock equipment, if a piece of equipment is damaged, then repair the existing equipment if it is cost effective. If not repairable, then replace with the new standards. If it is more cost effective to replace an existing dock leveler or scissors lift that is installed in a pit, with a new unit of the same size, than to switch to the current standard and make modifications to the pit, when the current standard is a different size, do what is more cost effective.

G2-3-8e→e5

Truck restraints are to be installed at all new dock positions in accordance with the following guidelines.

G2-3-8f→f4

1. At MPF Facilities

   All docks serving tractor trailers must have automatic truck restraints with indicating lights installed.

2. At CSF Medium Facilities – 47" High Loading Docks

   A. If it is anticipated that motorized equipment will be used on the platform then all docks must have automatic truck restraints with indicating lights installed.

   B. If no motorized equipment is to be used on the platform then all docks must be equipped with smart chocks with indicating lights.

3. At CSF Small Facilities – All Loading Dock Positions

   Install manual chocks only. Provide exterior signage between each dock door stating "Trucks must be chocked."

Truck restraints may be installed at existing facilities on a case-by-case basis, if requested by Safety, to correct a particularly hazardous condition.

2-3.8.7 Dock Lights

G2-3-8a→c1

Replace all damaged or broken dock lights with the standard flexible pendent luminaire unless physical restrictions prohibit installation. If installation is restricted, replace in kind.

2-4 Support Areas *(Refer to USPS Handbook RE-4)*

USPS Handbook RE-4

2-4.2 Toilet Facilities

G2-4-2a→c1

Current USPS design standards do not provide toilet rooms for customers.

2-4.3 Locker Areas *(Also Refer to Module 1)*

Module 1

Current standards require half-size lockers for Climate Zones 1 through 5 and full-size lockers for Zones 6 and 7. If expanding a facility in Zone 1 through 5 with a significant increase in lockers and if the existing lockers are

G2-4-3a→a1

full-size, then perform a cost analysis to determine if replacing the existing lockers with the new standard mitigates the need to expand the existing locker room or area. If the locker area or room is being renovated and lockers are being replaced, check with local management and/or Labor Relations for any labor agreements preventing the replacement of existing locker room with an open locker area. If no prior agreements exist, then apply the new locker size and area requirements. Consider how to best utilize any excess space if occurred.

When adding lockers in Climate Zones 1 through 5, use half-size lockers regardless of current locker size.

2-4.14 Battery Charging Areas

Battery charging rooms are no longer used in new facilities. Battery charging areas are used instead. Depending on the scope of the R&A work, consider replacing lead-acid batteries with sealed gel batteries and provide a battery charging area instead of a room. This option may also require some minor modifications to the equipment that runs on the batteries. Additionally, if the PIT fleet is being retrofitted or replaced with hydrogen fuel cell technology, the need for traditional battery charging equipment (e.g., racks, cranes, etc.) will be eliminated; consult the USPS Office of Sustainability for more information.

When renovating existing battery charging rooms the following applies:

- Design the room for drive-through operation, wherever possible. Refer to standard details. Coordinate all requirements with USPS and develop in accordance with applicable standards and building codes.
- Design the room, including walls, doors, floors and ceilings to ensure that gases and vapors are released only through the exhaust system. Floors must be hardened concrete with a steel trowel finish.
- Provide tactile warnings on room entrance hardware in accordance with Handbook RE-4. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

- Provide modular battery charging racks, constructed with pressure-treated lumber or plastic decks and designed to support the weight of the batteries and chargers: see Major Facilities Outline Specification Section 111104. Provide a bridge crane for moving the batteries and other equipment.
- Provide floor drainage leading to acid neutralization pits for battery charging areas if required by local jurisdiction. If required, acid neutralization pits must be sized at the minimum size required to meet the regulatory standard. Verify with the Office of Sustainability regarding the required regulations and proper sizing of the unit. When acid neutralization pits are provided, the drainage and associated floor slopes are to accommodate the entire battery charging area.
- For Lead-Acid Batteries, locate battery-charging racks within curbed areas and provide tepid water safety eyewash/full body shower with containment curb within the room. Provide floor drains with proper drainage through an acid neutralization system.
- For Sealed Gel Batteries, provide portable safety eyewash within room. Curbed areas at battery-charging racks are not required.

2-5 Retail Design Standards

2-5.2 Self Service

The Self-Service areas in new facilities have been reconfigured and no longer include stamp vending machines. The vending machines in existing facilities are to be removed by USPS per the Material Logistic Bulletin dated June 21, 2006.

The need for floor area, electrical outlets and signage for copier must be reviewed with the Project Manager.

A Time Lock can be installed for the entrance of Self-Service lobby upon request by local management, ***and after concurrence with the local Postal Inspection Service***. Use product #USPSTL-FA-200 by Securitech Group at 800.622.5625, or equal.

2-5.3 Open Merchandise (aka Postal Store)

Open Merchandise Areas are no longer provided in new facilities. For existing facilities that already have open merchandise areas, the slat walls, gondolas, cash wrap, sliding grille and the counter can remain in place, but it is recommended that no accountable merchandise is displayed in this area. If this area is not used for display of non-accountable merchandise then consider other uses such as a passport acceptance counter and photograph back drop.

If the floor is carpeted and the carpet needs to be replaced, then replace it with the same flooring material as the adjacent area(s).

2-5.5 Full Service Counters

Menuboard requirements have been revised over the years. If a menuboard is damaged it must be replaced using the current standards.

All casework required must be provided under national contract by Carolina Cabinets (Direct Vendor, aka 3C Store Fixtures). All cabinetry must be installed in accordance with Carolina Cabinets printed instructions.

2-5.6 Passport Acceptance Counters *(Also refer to Module 2B and USPS Handbook RE-4)*

USPS Handbook RE-4

Passport Acceptance Counters must be in a publicly accessible area in or directly accessible from the Customer Lobby. If an unused Open Merchandise area is available then consider using it for the passport counter and photo area. The counters are subject to RE–4 requirements.

2-6 Exterior Envelope

2-6.1 Walls *(Refer to USPS Handbook RE-5)*

2-6.1.2 Windows

USPS Handbook RE-5

The security requirements for windows in new facilities have changed in recent years. If a facility needs to have windows replaced, then follow current standards for the facility type and coordinate with USPIS to determine the proper security measures. If the building has been determined to be “Historic” or “Historic Eligible” then the State Historic Preservation Officer (SHPO) must be contacted. The window replacement must be coordinated

with the SHPO and the USPS Federal Preservation Officer (FPO), per R&A Introduction, Section 0-1, R&A Policy Statement.

2-6.2 Roof

G2-6-2a→c

2-6.2.1 General

The United States Postal Service has an enormously diverse roofing portfolio spread across an even more diverse geographic area. USPS roofing systems experience literally every climate and are subject to a variety of regional building code requirements. Furthermore, USPS has numerous facilities which are either nearing their end of useful life or are being considered for disposal thus requiring due consideration when a roofing project is being considered. The portfolio types defined here are used throughout this document:

- Historic Roofs
- Low Slope Roofs – Critical Facilities (MPFs)
- Low Slope Roofs – Non-Critical Facilities (Main Post Offices, Stations, Branches, Retail Locations)
- Low Slope Roofs – Short-Term Facilities (USPS intends to vacate within 5 years)
- Steep Slope Roofs – Non-Critical Roofs (Main Post Offices, Stations, Branches, Retail Locations)
- Steep Slope Roofs – Short Term Facilities (USPS intends to vacate within 5 years)

For Postal Facilities, low slope roofs are defined as having slopes of less than 3:12. Steep slope roofs have slopes of 3:12 or greater.

Roofing Replacement projects with a total area of 5,000 sf or less do not need to comply with USPS SDC. Selection of roofing materials and methods should be based on the most cost effective solution that aligns with standard industry practice.

USPS has a Roof Asset Management Program that utilizes a Roof Asset Management Supplier (RAMS) for the management of its roofing portfolio. The RAMS is a private sector company specializing in roofing that is under contract to regularly inspect USPS roofs, provide detailed inspection reports, provide preventative maintenance and repairs to existing roof systems, and provide a prioritized list of roofs that are at the end of their useful life, so that replacement and repairs can be budgeted and completed. Roofs identified as requiring replacement go through a decision making process to determine the appropriate scope of work for the project. The Roof Asset Management Program is overseen on a national basis by a USPS Roofing Subject Matter Expert (SME), who is closely involved in all roof repair and replacement projects and must be consulted whenever questions arise about these roofing standards and their applicability to any specific project. The USPS Project Manager can provide contact information for the Roofing SME.

USPS utilizes an annual cost of ownership calculation to determine which scope of work represents the best value. Roof types and components utilized shall meet or exceed the requirements listed within the current version of ASHRAE 90.1. A/E shall verify compliance with the current version of ASHRAE 90.1.

Prior to starting a roof related project, perform an evaluation of the existing system and consider all of the feasible roof project types.

Include an appropriate amount of Construction Observation services in the Construction Administration portion of the project. Observation should be performed by an independent roof inspector who has no ties to the roofing contractor.

Recycling: some roofing components from a limited number of existing roof systems can be recycled. Roof systems such as ballasted or mechanically attached single ply roofs are potential candidates. Materials such as PVC, EPDM and certain insulations can be recycled. There are also many limitations to consider. If an existing roof system has materials that could possibly be recycled, include an alternate bid item in the specifications.

2-6.2.2 Roofing Project Types

a. Roof Replacement: New roofs can be installed on existing structures where the existing roofing system is completely removed to the roof deck. Installation of a complete replacement affords the best opportunity to begin from scratch and correct existing deficiencies.

   Minimum slope for roofs is ¼ inch per foot. If existing roof slope is 1/8 inch per foot or greater and drains adequately then Roofing SME may approve the reduced minimum slope.

   Replacement roofs shall meet or exceed the requirements listed within the current version of ASHRAE 90.1. A/E shall verify compliance with the current version of ASHRAE 90.1 for individual components and system when a complete roof replacement occurs.

   A complete tear-off would be required if:

   - The structural deck is unsound and needs to be repaired or replaced.
   - Insurance driven reattachments are required. (Metal or wood decks attachments may have failed over time due to moisture corrosion. Additionally, cadmium plated screws used with fire retarded wood decks suffer corrosion from the retardant chemicals. Total roof replacement may be needed to meet current local code requirements.)
   - There are existing deficiencies that can only be corrected by complete replacement.
   - The existing roof is inadequately secured to the deck.
   - If a large portion of the insulation system is deteriorated or saturated with water.
   - The desired warranty can only be obtained through complete replacement.
   - The existing roof system does not meet current USPS roofing standard for the facility.

b. Roof Re-Cover: A new membrane is placed over the existing membrane. This is allowed ONLY if the remaining portions of the roof system were built in general compliance with the USPS Design Standards. This process may or may not include adding insulation for additional thermal resistance and/or to provide better roof slope. This process is appropriate when the existing membrane shows signs of aging but there is no significant evidence of failure of the existing

roofing systems, whether caused by poor design or application methods. If the existing roof is in failure, re-cover is typically not an option. This procedure will yield the greatest success if used over a smooth membrane and insulation (recover board) is added. Take caution to ensure that a Class A fire rating and ASCE-7 wind uplift requirements can be maintained with the new roof assembly.

Reasons for considering a re-cover option:

- The need for constant protection of the building contents.
- Difficult removal of the old system due to building height, location, etc.
- Environmental regulations against disposal of old materials. (Asbestos containing transite board, for example).
- The cost of a new roof (complete replacement) is not economically sound due to:
  - Building life expectancy.
  - Lease agreement expiration date.
  - Deck and insulation systems are still sound.
  - The existing membrane is in good enough condition to serve as a base for a new roofing membrane.
  - The structure can support the additional weight of a new roofing system
  - The drainage is good or can be improved by including new tapered insulation or new drains.

Examples where re-cover would be appropriate:

- A new 4-ply BUR membrane over an existing smooth BUR.
- A new modified bitumen cap sheet over an existing modified bitumen roof.
- A new single-ply membrane over an existing BUR. EPDM cannot be installed over an asphaltic based roofing system, unless a separation layer is installed or the asphalt is weathered.
- New insulation system and a new fully adhered membrane over standing seam metal roof. This option requires evaluation of the roof structure to ensure that it can support the additional weight.

Examples where re-cover is not allowed on USPS properties:

- New single-ply membrane over an existing single-ply membrane. Fleece back membranes are used in this application (see Roof Membrane Replacement).
- New shingles over old shingles.

Assuming the existing deck already has insulation, a vapor barrier membrane must not be installed unless it can be clearly demonstrated that the dew point will not occur until after that point in the cross-section of the roof. If the dew point is below the vapor barrier, it will function as a trap for the condensation formed and failure will be inevitable.

c. Roof Membrane Replacement: Removal and replacement of the existing roof membrane only. Older roofing systems, using materials and methods other than those described in this guideline, are often not suitable for membrane replacement. New installations that include vapor barriers, wood fiber or perlite roof board over the insulation, and installed in accordance with NRCA's best practices (required by these

standards), will be good candidates for membrane replacement in the future.

Membrane replacement examples:

- Installation of a new mechanically attached single-ply membrane after the old membrane has been removed.
- Installation of a new metal roofing system after removal of the old metal roof.

d. Roof Refurbishment: Improvement of an existing roof system that is in fairly good condition overall, but has some weaknesses, by replacing or adding only select components.

- BUR/Modified Bitumen (MB) Refurbishment - membrane replacement at vertical connection, flashing points (field area surfaces remain), and spot field area surface patching, as needed, etc. Note that BUR field areas can be damaged by UV when the gravel topcoat has dislodged, exposing the asphalt flood coat and membranes. Field patching activities may include:
  - Adding asphalt top coat and gravel if BUR felt is not damaged. If the felt is damaged, partial replacement is required in those areas.
  - Replacing MB cap sheets, where damaged.
  - Coatings on BUR and MB: Reflective coatings of various compositions can be added to these roofs. Coatings are not considered additional water proofing.
- Single-ply membrane refurbishment includes replacement of flashing at vertical transition points (field area membrane and ballast remain), spot field membrane patching, etc. Field membrane patching activities may include:
  - Removing/patching blisters and splits.
  - Repairing or capping failed seams.
  - Coatings: Reflective coatings of various compositions can be added to these roofs. Coatings are not considered additional water proofing.

e. Partial Roof Refurbishment: If the detailed survey reveals that the majority of the roof is salvageable, replacement of only damaged portions of the roof could be a viable alternative at less cost than complete roof replacement. Cause for the failure in the damaged portions of the roof must be thoroughly understood to ensure that failure of the remainder of the roof is not imminent. Considerations include:

- Moisture or structural problems need to be evaluated to ensure that the remainder of the roof will not be subjected to similar conditions that caused the failure of the damaged portions of the roof.
- If moisture has damaged insulation due to lack of a vapor barrier rather than leaks through the membrane, a new roof system that includes a vapor barrier is warranted. Partial replacement, in this case, is not an option.
- If moisture damage to the insulation is caused by leakage through a leaking membrane, partial replacement could be considered. Moisture damaged insulation systems must be completely removed.

- BUR felt is damaged by UV because gravel coating has been displaced by wind or foot traffic.

Depending on the age, condition, and maintenance history of single ply membranes, re-cover of the salvaged portions of the roof system would typically be included (allowing reuse of insulation system). Salvage of the remaining membrane could be considered, if the membrane has 10 years or more normal life expectancy (allowed on EPDM and KEE roofs only). A new roof would then be anticipated (added to the Asset Repository) after the above-10-year period has expired, *if any* of the roof membrane is salvaged.

f. Skylights: Whenever possible, completely remove existing skylights and curbs and infill the opening with new deck, insulation, and roofing to match the existing adjacent roof.

Skylights should be removed when:

- They are leaking or otherwise failing.
- They are a part of a roof repair or replacement project.
- Not in compliance with fall protection requirements of OHSA Standard 1910.23.
- Not in compliance with Energy Requirements. Refer to Standard Design Criteria, Section 0-2.2 Compliance with Energy Requirements, for details.
- Not in compliance with Handbook RE-5, Building and Site Security Requirements, 3-3.4 Security of Roof.

2-6.2.3 Roof System Selection

a. General – An annual cost of ownership must be calculated for all feasible alternatives:

- As part of the roof system selection, replacement or addition of more roof insulation should be considered.
  In selection of insulation U-Factors must meet or exceed those required by the current version of ASHRAE 90.1 based on the geographic zone and construction method for roofs.
  The A/E shall provide a study to justify the actual U-Factors used in the design. Roofs should be designed to provide a maximum overall U-Factor. R value of insulation shall be based on diminished thermal performance as the insulation ages.
- Roof Refurbishment criteria are not specified in these Design Standards. The designer must be responsible for creating the appropriate Scope of Work that is required and for estimating the cost and additional life span that may be received if a roof refurbishment is feasible.
- Roof Re-cover and Membrane Replacement will require additional modifications to the USPS Specifications to accommodate existing conditions and construction techniques that are specific to this type of project. In addition, the requirement for roof slope and insulation R value may be adjusted to accommodate existing conditions.
- Low Slope Roof Replacement Alternatives have been listed in the ***Roofing System Facility Matrix***. This table provides a list of roof types that are recommended for various building types in addition to listing additional allowable roof types that can be considered when unusual challenges are encountered. It is important to note that the USPS Building Design Standards have been written primarily focused on standard roof replacement type projects.

Unusual geographic conditions, codes requirements, or existing building conditions may require modification to the specifications.

- Roof projects on historic facilities may require additional modifications to the USPS Specifications (or the creation of completely new specification sections) to accommodate the unique characteristics that are encountered in a historic project.
- Short-Term Roof Replacement Solutions (for buildings where USPS intends to vacate the building within 5 years) may also require modifications to the USPS Specifications. Short-Term Solution roof types are listed on the ***Roofing System Facility Matrix***. The project scope of work must be adjusted to minimize cost (reduce the insulation thickness; reduce tapered insulation; less expensive attachment methods, etc.) Short-Term Roof Replacement Solutions must still meet code requirements and if a warranty is purchased it must be transferable.

b. Roofing System Facility Matrix: The following ***Roofing System Facility Matrix*** is a quick reference guide that indicates which roof type is recommended, acceptable, or not acceptable for each USPS facility type. The first choice must always be the recommended type (i.e. R). Site conditions, life cycle cost, rooftop traffic, HVAC maintenance, and building occupancy, are among the criteria that must be weighed against each other to select the most appropriate roof.

Roofing System Matrix

BLDG Designation	Critical or Non-Critical	4-Ply BUR W/Gravel	3-Ply BUR W/Cap Sheet	2-ply Modified Bitumen	60 mil EPDM	90 mil EPDM	60 mil PVC/45 mil KEE	80 mil PVC/50 mil XT KEE	Metal 24 Ga. Min.	Fiberglass Asphalt or Concrete Shingle, Tile
P & DC	C	A	A	R	NA	R	NA	R	R	A
NDC	C	A	A	R	NA	R	NA	R	R	A
GMFs	C	A	A	R	NA	R	NA	R	R	A
Main Post Offices	NC	A	A	R	A	A	R	A	R	A
Carrier Annexes	NC	A	A	R	A	A	R	A	R	A
Stations & Branches	NC	A	A	R	A	A	R	A	R	A
Retail Location	NC	A	A	R	A	A	R	A	R	A
VMF	NC	A	A	R	A	A	R	A	R	A

Key	
C	Critical Facility
NC	Non Critical Facility
R	Recommended Roof System
A	Acceptable Roof System

NA	Not Acceptable

General Notes:

- Recommended roof preferences are based on complete replacement situations.
- Local Codes may cause certain roof types to not be acceptable on certain facilities.
- USPS does not accept TPO, PIB, CPE or White EPDM membranes.
- Projects in historic buildings must comply with USPS historic requirements. (Wood Shingles must be avoided regardless of historic requirements if possible. Utilize a substitute material that meets appearance requirements)
- For all roof system Types - Energy Star (or similar system as dictated by region) rated roof systems are required for ASHRAE zones 1, 2, 3 and 4. A white granule cap sheet with a reflectivity rating of .26 or greater may be utilized in lieu of an Energy Star roof system in ASHRAE zones 5, 6, and 7.
- Black EPDM roof membranes may only be used in ASHRAE zones 5, 6, and 7.
- Recommended membrane thicknesses are minimums - thicker membranes may be required, based on site specific conditions. (i.e. wind, hale, traffic)
- New roof system for Leased Facilities may vary from above standard due to USPS responsibility, term of lease, long-term strategy for building or requirement to replace with like kind system.
- Short-Term Roof Replacement Membrane Types include 36 mil KEE, 45 mil PVC, and 45 mil EPDM.
- Metal roofs w/concealed fasteners and tile roofs must have a secondary roof system self-adhering underlayment. Include a slip sheet over the self-adhering underlayment below metal roofs. Shingle roof must all have self-adhering underlayment at perimeter edges and valleys.

c. Roof Selection Considerations:

- Current and anticipated/potential future use of the space.
- Leased facilities may vary from the standards due to USPS responsibility, term of lease, long term strategy for building or requirement to replace with like kind system.
- Deck Type:
  - Poured-in-place (monolithic) concrete.
  - Pre-cast concrete.
  - Gypsum concrete.
  - Light weight insulating concrete over other substrate.
    - Perlite or vermiculite aggregate base.
    - Gypsum based.
  - Metal deck.
  - Wood deck.
  - Thermosetting insulating fill: Poured in place perlite aggregate in an asphalt binder. This material would not likely be used in construction today, but may be encountered in very old roofs to provide roof slope on flat substrates.
  - Cementitious wood fiber (Tectum): Used for acoustical control and wouldn't have an application in a typical USPS facility but may be encountered in older roofs.
- Wind Design
  - Roofing systems must be installed in a manner that has been successfully tested by a qualified testing and inspecting agency such as FM Global, Florida Building Code or Miami-

Dade County. Roof systems must resist uplift pressures calculated according to ASCE 7 for the field, perimeters and corners. The specified approval rating must incorporate a safety factor of 2 over the maximum calculated uplift pressure in inch-pound units.

- Fire Resistance
  - Re-cover applications must carefully consider fire resistance compliance. Addition of insulation on top of other roof systems may violate the UL Class A rating.
- Hail Resistance
  - Hail resistance requirements will vary with the geographic location. Hail can be encountered at most any location. East coast, west coast and mid-America states, and mountainous areas could experience smaller/softer (less damaging) hail. Larger, more damaging hail can be anticipated in a wide swath from Austin, Texas up through the western plains including Kansas, Oklahoma, Nebraska, eastern Colorado, and the Dakotas.
  - Roofing system tolerance to hail varies. If damaging hail is a common occurrence at the site in question, then a hail resistant roofing system must be considered. Warranty or approval from the manufacturer for hail may be desired for these sites.
  - Many roofing manufacturers specifically exclude hail damage in their warranties.
- Structural Load
  - Dead load: Dead loads are weights of material, equipment or components that are relatively constant throughout the structure's life
  - Live load: Probabilistic load include all the forces that are variable within the roof's normal operation cycle such as snow, rain, and wind.
  - Roofs are built for specific dead and live loads. Structural analysis is needed to determine the structure's capability.
- Expansion/Contraction
  - Expansion and contraction of roofing systems is expected with changes in ambient temperature. Roof system tolerance to expansion and contraction is a factor in determining the most appropriate roof selection.
  - Roofing membranes typically have reinforcement such as fiberglass or polyester to resist the forces of expansion and contraction as well as providing puncture resistance.
  - Roofing systems can include area dividers (control joints) to minimize the effect of expansion and contraction and to facilitate drainage management.
  - Roof deck types and change in direction have bearing on expansion and contraction considerations.
- Thermal Shock
  - Quick changes of atmospheric temperature can cause roofing system materials to crack. Some roofing systems are more resistant to thermal shock than others.
  - Periodic inspections are needed to find damage from thermal shock conditions.
- Slope/Drainage

- Minimum slope may be dictated by roofing type or manufacturer and by building code. USPS requires ¼" per foot slope minimum, unless site conditions require exceptions. Greater roof slopes ensure that water is more quickly removed from the roof, minimizing the opportunity for water to deteriorate the roofing system.
- Maximum slope options can be dictated by site conditions such as parapet heights, doors etc. Modifications to parapets, thresholds, etc. may be required to attain required sloping.
- Locate roof drains at the low point of the roof when maximum deflection from live load is anticipated (if any). Roofs near support columns won't deflect appreciably and are generally a poor location for roof drains.
- Locate roof drains in sumps. Insulation around the roof drain, in cold climates, must be thin enough to allow building heat to prevent freezing at the drain inlet.
- Special considerations may need to be given to address interim drainage patterns during the construction phase.
- If roof drainage is added or altered, consideration must be given to site drainage conditions to ensure that drainage is properly discharged away from the building and property.
- Additional overflow drains and scuppers are not required for existing USPS facilities. The USPS utilizes a roof maintenance program that monitors the existing drainage systems.
- Roof drains and horizontal drain leader piping must not be located over critical equipment. If unavoidable, drain pans under the piping is required. Drains from these pans must be installed and discharged to a safe location. (i.e. vertical downspout piping or floor drain.)

▪ R-value Requirement
  - Roof recover, membrane replacement, and short term roof replacement projects may reduce the amount of insulation if existing conditions or excessive cost cause less insulation to be a better business decision.

▪ Replacement or New Roof Hatches
  - Select roof hatches for weatherproofness, energy efficiency that meets or exceeds the current version of ASHRAE 90.1 security and applicable design to facilitate personnel and equipment to roof surface.
  - Provide a minimum of 12" vertical distance from top of hatch to roof surface. Locate hatches as close as possible to roof top equipment.

▪ Walk Pads/Pavers
  - Walk pads are required at entry points, at the base of downspouts and beneath equipment and equipment supports set on the roof membrane surface.
  - Medium traffic areas would include roofs with some serviceable equipment. Use of walk pads or heavy weight concrete pavers arranged in direct line to mechanical equipment from roof access doors/hatches, to minimize foot contact to roof surface, must be employed.
  - High traffic: Use walk pads or pavers arranged as described for medium traffic areas or completely covered with pavers.
  - Concrete roof pavers (heavy and light weight) are specifically manufactured to be freeze/thaw resistant. Lightweight pavers

are designed to be interlocked and can reduce the structural requirement of the building, where used as ballast.
    - Walkway pads must be adhered to the single-ply membrane or include a mopped-in granular pad on built-up and modified bitumen roof systems.
    - Also see Wind Design Criteria.
- Solar Reflectivity
    - USPS requires that all low sloped roofs in ASHRAE zones 1, 2, 3, and 4 comply with DOE Energy Star requirements. The initial Solar Reflectance must be greater than or equal to 0.65.
    - USPS requires that all steep sloped roofs in ASHRAE zones 1, 2, 3, and 4 comply with DOE Energy Star requirements. The initial Solar Reflectance must be greater than or equal to 0.25. A deviation letter may be issued to eliminate the use of the Energy Star rated shingle if a Hail impact shingle with a UL Class 4 rating is required.
    - DOE Energy Star requirements are not mandated on steep slope roofs located in ASHRAE zones 5, 6 and 7.
    - Modified Bitumen and BUR roofs in ASHRAE zones 5, 6, and 7 may utilize a white granule cap sheet with a reflectivity rating of .26 or greater in lieu of an Energy Star system. Use of reflective membranes may be mandated by local jurisdictions (example Chicago and California).
    - All requirements above should meet or exceed the requirements listed within the current version of ASHRAE 90.1 . A/E shall verify compliance with the current version of ASHRAE 90.1.
- Aesthetics (Color)
    - Coordinate with building finishes where appropriate and economical.
    - Comply with local/community ordinance where dictated.
- Chemical Contamination on Roof
    - General: Oil, grease, chemical potential contamination must be identified. Certain materials are susceptible to damage from these contaminates.
    - Oils and fats will weaken and swell EPDM membrane.
    - Asphalt based roofs are damaged by oil.
    - EPDM is damaged by asphalt.
    - KEE single ply membrane (Ketone Ethylene Ester) is the most resistant to petroleum products and chemicals.
- Owned vs. Leased Facilities
    - Length of lease agreement and likelihood of lease renewal could have bearing on the desired roof quality, cost, and warranty needs for new roofing.
    - Owned properties are candidates for higher quality roofs with lower total life cycle costs.
- Cost Factors
    - It is the general corporate goal to install an appropriate quality roof with the lowest life cycle cost. First cost is not to be used as sole criteria. It is difficult to identify exact market conditions that affect roofing system costs for several reasons including:
    - Oil prices affect the cost of all membranes, especially asphaltic based types such as BUR, and MB roofs and mopped two-ply vapor barriers. Wide swings can be expected.

- Certified vendors for specific roof types may be hard to find in certain geographic areas. Cost for travel, room and board for installers coming from outside the geographic area can make a particular roof type cost prohibitive.
- The Project Manager must explain what criteria were used to select a roofing system that is not the (R) recommended preference in the Roofing System Facility Matrix. Deviation from the preferred roof systems will require written authorization from the USPS roofing subject matter expert

d. Bidding Strategy

- The anticipated best value recommended roofing system (i.e., R) listed in the ***Roofing System Facility Matrix*** (after qualified vendor availability has been evaluated), must always be the "base bid" roofing system.
- After consideration of all roof selection criteria, go forward with the highest appropriate priority roofing system listed on the ***Roofing System Facility Matrix***, as the base bid for the project. Alternate pricing methods include:
  - Add Alternate – Use this method when the alternate roof system is suspected to be a higher initial cost alternate.
  - Deductive Alternate - Use this method when the alternate roof system is suspected to be a lower cost initial alternate.
  - Bid evaluation must consider total life cycle cost over initial cost.

2-6.2.4 Roof System Types

a. Modified Bitumen (MB)

- Description: MB roof is built in a similar fashion to BUR but uses asphalt bitumen that includes modifiers that give it rubber like properties. Sequenced Butadiene Styrene (SBS) is the generally preferred modifier because it is more flexible in lower temperatures than Amorphic Polypropylene (APP) modifiers. APP is preferred in warmer, sun-belt climates. MB sheets are much thicker than other membranes, by as much as 3 times. A typical MB roof system uses a single base sheet and a granular cap sheet over an insulation system.
- A vapor barrier (if required) will protect the insulation system from building moisture, as well as, adding a degree of additional leak protection. The vapor barrier is applied directly on concrete deck surfaces or over gypsum board on wood and metal deck roofing systems.
- Gypsum board is mechanically fastened to wood, metal, and lightweight concrete surfaces.
- A single base sheet is typically used. Although multiple base sheets can be applied, the added cost is not warranted and installation is slowed to allow curing time between layers. (Curing between layers is needed to prevent foot traffic damage during installation.)
- Base sheets, made with a variety of reinforcement and thicknesses, are impregnated/saturated with SBS modified bitumen. Torchable grades are thicker as they have an asphalt layer that is heated with a torch to provide adhesion between layers.

- Mopping Asphalt: Sequenced Ethylene-Butylene-Styrene (SEBS) mopping asphalt in colder climates or Type II or III asphalt in warmer climates.
- Membranes can be hot asphalt applied, torch applied, or cold process applied. Torch application is required with polyethylene backed APP bitumen. Sand and talc backed APP can be set in cold adhesive or torch applied.
- SBS membranes can be applied on slopes up to 3" per foot.
- The cap sheet (also called finish ply) can be made with a variety of reinforcement and thicknesses and is impregnated/saturated with SBS modified bitumen, then coated with mineral granules that both protect the sheet from ultra violet damage and provide a reflectance factor.
- Typical components for MB roofs and requirements include:
  - System compliance with ASTM 6164 Type II, 6162 Type III or 6222 Type II.
  - Vapor Barrier: (If Applicable) Two plies of type IV felt in type III mopped asphalt or self-adhering base sheet.
  - Insulation: Polyisocyanurate. Typically, two layers adhered with type III asphalt over concrete deck or underlayment. Low rise polyurethane adhesive may also be used to adhere insulation. Bottom layer in mechanically attached over steel and wood decks. (Tapered type is also used, if needed to provide minimum roof slope).
  - Roof board over insulation: ¼" minimum thick gypsum board or ½" thick wood fiber is allowed in this application. Securement can be achieved with hot asphalt or low rise polyurethane foam.
  - Base Sheet: 115 mil (ASTM 6164 Type II, 6162 Type III or 6222 Type II) thick, modified bitumen base sheet
  - Cap Sheet: 130 mil (ASTM 6164 Type II, 6162 Type III or 6222 Type II) thick, modified bitumen granular coated cap sheet
  - Interply Mopping's: mopping asphalt, Type II or III asphalt or cold adhesive meeting roofing systems manufacturer's published specifications.
  - Flashing sheets: Two-layer flashing system must be from the same material as the base ply and cap sheet.
  - Accessories to meet roof manufacturer's requirements.

b. Built-up Roof (BUR)

- Description: Consists of multiple plies of fiberglass asphalt saturated felts laminated together with interply asphalt bitumen. A gravel surface coat is then applied on a liquid asphalt flood coat. It is ideally applied over a two ply vapor barrier and closed cell foam insulation system with a roof board cover.
- A vapor barrier (if required) will protect the insulation system from building moisture, as well as, adding a degree of additional leak protection. The vapor barrier is applied directly on concrete deck surfaces or over gypsum board on wood and metal deck roofing systems.
- The glass fiber reinforcement of the felts provides strength to the roofing system. As described below, 4 plies are preferred on critical applications, but 3 plies could be used on non-critical facilities where cost containment is a primary concern.
- The interply mopping of asphalt between the felt provides the required adhesion, as well as the water proofing.

- Roof board is applied over wood and metal decks and over the insulation systems. The roof board over the insulation system allows future re-cover operations without damaging the insulation system which remains in place. See re-cover definitions for more information.
- The gravel surface coat protects the asphalt flood coat and membrane from UV damage.
- Typical components for a BUR include:
  - Vapor Barrier: Two plies of Type IV felt in Type III mopped asphalt or self-adhering base sheet.
  - Insulation: Polyisocyanurate. Typically, two layers mopped in place with Type III asphalt. (Tapered type if needed to provide minimum slope).
  - Roof board over insulation: ¼" minimum thick gypsum board or ½" thick wood fiber is allowed in this application. Securement can be achieved with hot asphalt or low rise polyurethane foam.
  - Flashing: Elastomeric granule surfaced modified bitumen flashing over 2 plies of type IV felt.
  - Membrane: 4 plies of Type VI asphalt impregnated glass felt or a high performance base sheet and 3 plies of type VI asphalt impregnated glass felt.
  - Interply Mopping: Type II, III, or IV asphalt meeting the roofing system manufacturer's published specifications for ambient condition at the site.
  - Sealer: Two part pourable sealer meeting roofing systems manufacturer's published specifications.
  - Surfacing: Mineral Aggregate-Gravel or slag over Type II or III asphalt or asphalt cut-back flood coat on cold applied systems. An SBS surfacing sheet may also be used as a cover ply.
  - Accessories to meet roof manufacturer's requirements.

c. Metal Roof

- Description: Preformed standing seam sheet metal roof panels with concealed fasteners for all enclosed structures. Metal roofing systems are available in a variety of colors and materials. They are installed over a wood and/or rigid insulation board that is typically fastened to a metal deck. Use stainless steel fasteners with wood decks that employ fire retardant wood sheets due to the accelerated corrosion of standard cadmium plated steel fasteners caused by the retardant. Metal roofs are available in 26 – 16 gauge, where 16 gauge is heavier (thicker) and more durable. The USPS preference is Kynar coated 24 gauge galvanized steel or .040 aluminum. Other materials including copper, zinc, or terne will stand-up to sea salt in coastal areas better than steel. Terne is carbon steel or stainless steel coated with a zinc/tin alloy and is corrosion resistant.
- Critical facility applications will require a substrate membrane of smooth surface adhering underlayment. A slip sheet is required between the metal and the adhering underlayment. Use high temperature adhering underlayment in hotter, Sunbelt climates. Non-critical applications can employ asphalt felt substrate or similar water proof substrate.
- Metal roofs are a good option for sloped roofs on critical facilities where multiple ply roofs are not an option and on non-critical

facilities that have an acceptable substrate. Metal roof installations include metal roofing accessories like soffits, ridge caps, vents, etc., which are typically provided by the same manufacturer.

d. Composite Shingle

- Description: Fiberglass mat based asphalt product with granular coating that is available in a large variety of shapes, sizes and colors. Shingles are nailed to a wood substrate on sloped roofs over an asphalt saturated felt membrane. Adhered ice and water shields are required in cold weather climates (non-slip surface).
- Shingle roofs can be used on adequately sloped roofs on non-critical facilities and critical facilities with wood fiber roof board decks where; multiple ply roofing systems cannot be applied, or where communities (architectural committees) may require a USPS facility to blend with the surrounding structures which employ shingled roofs.
- Dimensional shingles that meet the ASTM 3462 requirements are preferred and 3 Tab Shingles allowed on case by case basis. Six fasteners per shingle are required for all slopes.
- Insulation on sloped composite shingled roofs is typically installed within the attic space.
- Underlayment: self-adhering underlayment is typically applied on sloped shingled roofs at the eave, rake edges and valleys.
- Proper ventilation is required for a good performing shingle roof system.

e. Tile

- Description: Half-moon or S-shaped clay or reinforced concrete tiles provided in various sizes, colors, designs, and thicknesses.
- Tile roofs are not to be used on USPS facilities except certain circumstances. Some communities (architectural committees) may require a USPS facility to blend with the surrounding structures which employ tile roofs.
- Critical applications will require a substrate membrane of smooth surface ice and water shield. Non-critical applications can employ asphalt felt or similar water proof substrate.

f. Single-Ply Membrane Roof Types

- General:
  - Single-ply membranes can have high reflectivity values. This may be required for compliance with local energy codes where high reflectivity helps reduce the urban heat sink.
  - Where single ply membranes are employed in high traffic areas, use the thickest available membrane. It is acceptable to apply different thickness membranes to different areas of the roof to accommodate various conditions. For example 60 mil EPDM membrane may be used at flashing locations as the 90 mil is difficult to shape and form at these vertical transitions.
  - Attachment: Single-ply membranes can be fully adhered or mechanically fastened (in high wind areas) **fully adhered systems are preferred on single ply membranes on USPS properties.** Site conditions will dictate the design solution which may include one or a combination of systems. Single-ply membranes are installed quickly and minimize exposure to the facility.

- Solvent barriers may be required where the **insulation system in not compatible with solvent based adhesives.**
- Manufacturer requirements vary and must be complied with to obtain the desired warranty.

- Ethylene-Propylene-Diene-Monomer (EPDM)
  - Description: Single ply non-reflective membrane that comes in various thickness (45, 60 or 90 mil).
  - Membrane: 60 mil and 90 mil EPDM are standard thicknesses on USPS facilities. Use non-reinforced EPDM on fully adhered applications. Use of reinforced EPDM may be required by local codes that require mechanical fastening to provide additional wind lift resistance in locations that a subject to hurricanes.
  - Vapor barriers, insulation systems, and roof board requirements are the same as for asphalt roofing systems. An alternate vapor barrier is described within item 2-6.4.2.A.3 for use of EPDM on critical facilities where hot mopping a 2-ply vapor barrier is not practical.
  - Adhesives: Solvent based adhesive; water based adhesive, self-vulcanizing adhesive tape (EPDM), or combination of methods. A two-part adhesive is used to adhere the insulation system to the base layer (vapor barrier) because penetration of the vapor barrier with mechanical fasteners is not allowed
- Polyvinyl Chloride (PVC)
  - PVC Description: Single ply reflective membrane that comes in various colors and thicknesses.
  - 60 mil and 80 mil are the recommended thicknesses for reinforced PVC.
  - A fleece backed PVC sheet may be used for certain applications.
  - PVC membranes must meet requirements established by ASTM D 4434.
  - Thermoplastic vinyl quality is influenced greatly by the use of virgin plasticizers. Lower quality PVC products use recycled product that results in inconsistent, often inferior quality membranes.

2-6.2.5 Roofing Material Recycling

Contractors must contact Nation Wide Foam Recycling at (508)532-1840 or Kwardrop@NationWideFoamRecycling.com or other roofing recycling companies to get a free quote for roofing material recycling. Submit recycling quote or not-recyclable certification along with project cost proposal to justify the decision of taking the material to landfill in lieu of recycling.

2-6.3 Energy Conservation

The Energy Policy Act of 2005 (EPAct05), and the Energy Independence and Security Act of 2007 (EISA) mandate energy conservation measures that must be considered. These laws require the incorporation of energy efficiency and sustainability measures into federal agency facility operations. Facility energy intensity (British Thermal Units/gross square foot) must be reduced by 25 percent by 2025, compared to a 2015 baseline. The purchase of bio-based and recycled content based products is required (in place of conventional products) when they are available and cost effective. The laws further require the expanded use of products made of recyclable materials (those in the upper 20 percent of energy efficiency for all similar products, or

products that are at least 10 percent more efficient than the minimum level that meets Federal standards).

USPS organizational goals include reducing energy, water, and waste in our facilities and supporting the overall corporate mission and objectives with the lowest possible facility-related energy cost and impact to the environment. These objectives benefit the USPS by minimizing energy-related expenses, maximizing return on energy investments, and complying with federal energy mandates.

Specifically, energy impacting R&A projects are to be as energy efficient as life cycle cost effective, and improve upon the current version of ASHRAE 90.1 by at least 30%, or the largest amount practicable.

To meet the explicit requirements to maximize energy-efficiency and minimize life-cycle costs, multiple alternative designs **must** be considered in order to justify a 'best' final selection.

To meet the overall energy reduction goals, the design must incorporate the following:

- Standard BAS systems to allow remote management and control in MPF buildings.
- Detailing of building envelope must avoid thermal bridging, including window and door frames.
- Utilize entry vestibules in accordance with the current version of ASHRAE 90.1 based upon climate zone requirements.
- Low-infiltration windows and doors.
- Energy Star certification where possible.

The A/E must consider the following energy conservation measures:

- High mass for exterior wall systems.
- Textured exterior wall finishes to increase surface air film coefficient.
- Minimal paving adjacent to buildings in warm climates (to reduce reflected heat).
- Overhangs to increase wall surface shading in warm climates.
- Low absorption roof.
- Triple glazing in severe climates.

Repair and alternation projects must take advantage *of state and local government and* local utility incentive, grant, and rebate programs. The design/build entity and/or A/E must provide documentation to the USPS Project Manager that demonstrates a reasonable effort to research and use these programs.

U-factors must be taken from the current version of ASHRAE 90.1 based on geographic zone and building construction type.

The A/E must determine local utility and/or state and local government incentives, grants, and rebate programs to defray the cost of energy savings related projects and include this information in the solicitation.

2-7.2 Doors and Hardware

G2-7-2a

Sectional Overhead Doors: If replacing one or more sectional overhead door(s) they must be manually operated doors. Automatic door openers are NOT to be installed.

Impact Vestibule Doors: When replacing impact doors, both doors within a single frame must be replaced at the same time, as a set, and must be replaced using doors from the Direct Vendor. Verify existing conditions and accommodate them into the door order. Items could include jamb protection that encroaches into the door panel and non-standard hardware installations. When ordering a custom size door through Chase Doors, the Direct Vendor, it may be necessary to use the Durulite ME-200 door rather than the standard Durulite 200 door depending on the door size.

For existing buildings with ceiling height lower than 10'-6", Sectional Doors (specs 083613) can be used in lieu of TKO doors.

Customer entrance doors:

- For R&A projects if doors are being replaced, when possible, provide lobby entrance doors as two separate swinging doors separated by a mullion, one in-swinging for inbound traffic and one out-swinging for outbound traffic. Entrance doors are not required to have a door operator, unless the door cannot meet RE-4, 404.2.9 Door and Gate Opening Force, and be opened with a maximum of pounds of force (for instance the area is very windy), then automatic door operators may be necessary. The same applies if the door cannot meet the approach or maneuvering clearances required by RE-4.
- For BMEU projects, dedicated entry doors must be replaced with automatic doors from the current approved manufacturers. Note that for high energy automatic swinging doors, specific guide rails are required by code.
- All R&A project requiring changes to door hardware, (i.e. timelocks, post plan projects or similar) must maintain RE4 compliance and utilize accessibility checklist. At completion of project a C of A should be issued per USPS Policy.

Overhead Coiling Doors at Full Service Counters: The current standards do not use overhead coiling doors at the full service counters of facilities other than CSF Compact. If a facility has an existing overhead coiling door that is damaged, then repair if it is cost effective. If not repairable, then replace it with the current standard unless site conditions make this cost prohibitive, in which case replace it with the same as the existing. Exception: if remodeling existing space to comply with current Retail Design Standards, overhead coiling doors may be used to separate the Full Service Lobby from the Self Service Lobby, only if there is insufficient space for the storage closet required for folding closures.

Folding Closures (Grilles): The current standards use folding closures from Pre-Approved Vendors. If a facility has a folding closure that is damaged, then repair it when cost effective. If not repairable, then replace it with the new standards from one of the current Pre-Approved Vendors, unless site

constraints require changes to the support structure making it cost prohibitive.

Sectional Knock-out Doors: The current standards use a Selected Vendor for sectional knock-out doors. If a facility has a sectional knock-out door that is damaged, then repair it when cost effective. If not repairable, then replace it with the new standards, from the current Selected Vendor, unless site constraints require changes to the support structure making it cost prohibitive

2-7.3 Vertical Circulation

2-7.3.1 Elevators

R&A work on elevators and escalators requires Elevator Inspection Contractor's involvement during design and construction.

New elevators in building expansions, and R&A projects on existing elevators must comply as far as is applicable with the requirements in Appendix M3-C Elevator Replacement/Upgrade Design Guide.

2-7.4 Protective Barriers

G2-7-4a→e3

Whenever possible, the existing protective barriers in a facility should be upgraded to comply with the requirements indicated in Modules 1, 2A, and 2B, especially if the facility uses plywood for wall protection and/or dimensional lumber as bumpers, since these materials can splinter when impacted and create unsafe surfaces.

Areas where MTE, fork-lifts, PITs, and AGVs may be present, and do not meet the minimum requirements for protection in accordance with Module 2A, should considered for upgrading to improve safety.

Consideration should also be given to replacing gypsum wallboard that displays evidence of repeated damage from MTE with new wallboard with additional protection, such as plastic lumber bumpers and FRP or aluminum panels in accordance with the expected impact level as per Module 1.

2-7.6 Building Materials / Interior Finishes

2-7.6.1 Painting

For all R&A Projects the current SDC paint guidelines must be followed in areas that do not meet the standard. All areas to be painted are to be scraped to remove loose paint. Exceptions to scraping are exposed steel (where rust can occur), drywall, exposed decking, and maintenance of historical facilities. Lead paint encapsulation and abatement must follow the current MI (EL-890-2007-4).

2-7.6.2 Flooring in Workrooms, Offices, and Support Areas

Flooring in Workrooms:

- Refer to 2-2 Workrooms 2-2.1 Floors for Workroom floor requirements.

Flooring in Offices and Support Areas:

- Refer to Appendix M1-D, USPS Interior Finishes and Colors, for the current flooring standards for most spaces. If a particular space is not listed, use another space with a similar function. The current standard for the floor finish in some support areas is sealed concrete. If a room or area currently has a damaged floor finish that is different from what current standards would require, then evaluation must be made to determine whether it is more cost effective to remove and replace to match existing, or to totally remove and replace to comply with current standard.

- If the existing flooring is failing because of moisture in the subfloor and the current standard finish for the space would continue to have moisture problems, consider submitting a Deviation to use an alternative finish that would be more appropriate for the conditions encountered.

Exceptions:

- If existing carpet is damaged, replace as follows:
- In Administrative offices, such as those at Headquarters, District offices, Area offices, and Headquarters Field offices, replace with similar carpet.
- In Administrative offices at CSF and MPF facilities where carpet is damaged and cannot be repaired or patched then it should be replaced with resilient flooring per current standards.
- In Alaska where floor of Box Lobby and/or Customer Lobby are damaged and floor structure is on a raised wood structure/subfloor, aluminum diamond plate surface may be used for replacement.

2-7.8 Concrete Rehabilitation

For areas of deteriorated concrete an assessment should be made to determine if it is cosmetic or structural in nature. If it appears that a load bearing component is affected or compromised, then a licensed structural engineer should be engaged to make a further assessment and determine the proper repair. For non-structural and cosmetic deteriorations such as cracking or spalling, repairs may be made in conformance with the appropriate Division 3 Concrete Specification Section. A firm which specializes in concrete rehabilitation and repair should be engaged to make final recommendation as to the specific repair technique appropriate for a given type of deterioration and effect the repair.

2-8 Fire Protection

The use of halon or carbon dioxide extinguishing systems in repair and alteration projects is strictly prohibited. In lieu of halon or carbon dioxide, automatic sprinkler protection is recommended. Where the space contains a raised floor, provide smoke detection sensors with an alarm system.

Refer to Module 1, Chapter 2, Architectural, Section 2-8 Fire Protection for additional criteria.

2-9 Criminal Investigative Systems

Look out galleries (LOGs) are no longer used in new construction, however there are many existing facilities that still have them in operation. If a facility with an existing LOG is being expanded, a cost analysis must be performed to determine whether to expand the LOG system, or use a CCTV system only in the expansion Note that an approved deviation is required for the construction of new LOGs in building expansions.

When it is necessary to eliminate or relocate an existing LOG breakout in a Mail Processing Facility as the result of a mechanization project or mail processing equipment, and it results in a dead end corridor in the LOG, make sure the dead end corridor does not exceed 50 feet if sprinklered, or 20 feet if un-sprinklered. On the Workroom floor, verify that any point on the floor is within 100 feet of a breakout, taking new travel distances due to machine placement into account. Any changes must comply with code exiting

requirements and not obstruct access to an existing exit door. Changes must be approved in writing with OIG.

When any kind of project results in removing a section of existing LOG, CCTV cameras per current standards must be provided to cover areas that will no longer be observable by LOGs. Coordinate the camera locations with the OIG.

For any project involving demolition of an existing LOG, salvage unneeded Streich Observation Units that are in excellent condition and send them to the following address:

USPS MDC
7215 S Topeka Blvd
Building 7
Topeka KS 66618-3052

If the project includes demolition of breakouts, also salvage all Inspection Service locksets and turn them over to the local Inspector-In-Charge (INC).

If repairs or alterations will affect existing LOGs or if approval has been given to use LOGs in a building expansion, the previously established details in the Standard Detail Library must be used. The details are in the P2-9.2 series. Although these details were deleted from the BDS in 2007, they have been restored and updated, for use in existing facilities only.

If needed for LOG extensions, Streich Observation Units can be ordered from Topeka MDC, via eBuy2. If there are any problems, contact Clayton Turner, Topeka MDC, at 785-861-2829, or 785-554-7758.

2-9.1 Criminal Investigative Office (CIO) *(Also refer to USPS Handbook RE-5)*

USPS Handbook RE-5

G2-9-1a

Most current CSF Small standard plans do not include an CIO since they do not meet the threshold requirements. In CSF Small facilities where an CIO is no longer required, it must be abandoned and reconfigured to meet other space requirements if possible. Coordinate with the Inspection Service before any work begins and also to determine if USPIS/OIG will remove unused equipment.

2-10 Safety

2-10.1 Egress

Facility mailing vestibule doors, if applicable, are for transporting mail to and from the loading docks. These vestibule doors are not an approved means of egress and must be designated and/or identified with a 'NOT AN EMERGENCY EXIT' sign.

Provide means of egress from the building complying with the more stringent requirements of NFPA 101 or other applicable codes. Refer to Instruction Module, 0-2.1, Compliance with Building Codes and Standards.

All egress routes must lead to exits that discharge to open space that allows for safe access to a public way.

Review the final facility floor plan for renovations from the perspective of a visitor not familiar with the facility. Identify doors that might reasonably be construed by a stranger to be an exit and call for "Not an Emergency Exit" signage to be installed at that location.

Module 3 - Repair & Alteration Criteria

Chapter 3 - Structural

3-1 Introduction
3-1.1 Codes and Standards

3-2 Design
3-2.1 Geographic Considerations
3-2.2 Not Used
3-2.3 Design Loads
3-2.4 Not Used
3-2.5 Not Used
3-2.6 Rooftop Photovoltaic Panel Systems

3-3 Computations

Chapter 3 - Structural

3-1 Introduction

3-1.1 Codes and Standards

All repair and renovation must be designed in accordance with the requirements set forth by the applicable state and/or local codes and construction material codes in force at the time of design. Refer to the Introduction Module, Section 0-2, Codes and Standards, for more details. In addition, the following USPS minimum design criteria shall be followed for structural repairs and alterations. Where two or more codes, standards or USPS criteria are in conflict, the more stringent ones apply.

3-2 Design

3-2.1 Geographic Considerations

All appropriate building repair and renovation work shall be designed in accordance with site specific local requirements for snow, wind, frost depth and seismic zone. Follow the seismic provisions of the model code (i.e., IBC) commonly adopted in the area where the facility will be located or provisions of the local code, whichever is more stringent.

3-2.3 Design Loads

3-2.3.1 Minimum Design Loads

Calculate design dead loads based on minimum code requirements or actual weights of the material specified, whichever is greater. Include weight of snow (including drift), and other equipment, utilities and services in seismic calculations where required by applicable codes.

Design live loads, including wind and snow loads, must be in accordance with all applicable codes or with those shown in Exhibit 3-2a whichever is more stringent:

Exhibit 3-2a
Minimum Design Loads

LOCATION	MINIMUM DESIGN LIVE LOAD (PSF)
Workroom Floor	150[1]
Platform, Support Areas and Retail Store Floors	150[1]
Mechanical Room Floor	150[3]
Roof	20[4]
Building Utilities/Services (Hanging Load) above Mechanical Equipment Rooms	30[3]
Building Utilities/Services (Hanging Load) above all rooms other than Mechanical Equipment Rooms	5[2, 3]
Rooftop mounted photovoltaic panel systems, including rack support	6[5]

Keyed Notes:

1. Floors in workrooms, platforms, storage rooms and all other spaces accessible to forklift traffic shall be designed for the live load indicated or for the effects of a fully loaded 3000 lb. capacity forklift (8,400 lb. axle load), or for the mechanization loads given below, whichever is more stringent.

   Where floor supported mechanization is used, if the floor can be used for mail storage below the mechanization equipment then the uniform load used shall be 150 psf plus the actual mechanization load, otherwise the uniform load used shall be the larger of the 150 psf or the actual mechanization load.

   Verify floor load requirements for RCS (Robotic Containerization System).

2. Add 3 psf or actual ceiling loading, whichever is greater, where ceilings are required.

3. Or actual equipment and services, whichever is greater. At mechanical room floors, consider concrete housekeeping pads as additional dead load, not to be included in the live load allowance.

4. Plus hanging loads indicated. In regions where snow load is less than 20 psf, reduction in general roof live load below 20 psf may be made only where permitted by all applicable Codes.

5. For ballasted installation, may reduce to 4 psf for non-ballasted installation where approved by the USPS.

3-2.3.2 Not Used

3-2.3.3 Contract Drawings

Include the following structural criteria on the contract drawings if deemed appropriate by the USPS, as a minimum:

- Listing of applicable building codes.
- Tabulation of zones, exposure categories and calculated basic loading values for wind, snow and seismic loads.
- Listing of design dead and live loads.

- Snow drift and wind uplift loading diagrams.
- The dead load of rooftop mounted photovoltaic panel systems, including rack support systems, shall be indicated on the construction documents.

3-2.4 Not Used

3-2.5 Not Used

3-2.6 Rooftop Photovoltaic Panel Systems

Engage a licensed structural engineer to inspect and analyze the existing structural system to determine that it has the load bearing capacity for the rooftop photovoltaic panel system anticipated to be installed.

The analysis shall include the capacity to bear the additional dead loads and wind load imposed by the panel system.

3-3 Computations

In accordance with Handbook AS-506, Architect/Engineer Project Requirements, structural computations are to be provided for all MPF and CSF Medium Design-Bid-Build projects, for new construction, as well as for building additions. For Design-Build projects and R&A projects, the USPS Project Manager will determine whether structural computations are required, based on the scope and magnitude of the project. (If A/E services are being provided under an indefinite-quantity contract Work Order, structural computations must be included in the A/E fee proposal and spelled out in the Work Order.)

Provide structural computations for all load carrying members, in a neat, orderly and understandable manner. They must be complete with appropriate references and sources of design input and shall be submitted for review along with the scheduled design submittals.

Provide a table of contents with the computations. Computations must be signed and sealed by a professional engineer licensed in the state where the project is located.

Module 3 - Repair & Alteration Criteria

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope
4-1.2 Codes and Standards
4-1.3 Mechanical Commissioning
4-1.4 Mechanical Measurement and Verification (M&V)

4-2 HVAC

4-2.1 Energy Conservation
4-2.10 HVAC Controls
4-2.11 Central Heating Systems
4-2.12 Air Handling Systems
4-2.13 Central Cooling Systems

4-3 Plumbing

4-3.6 Compressed Air Systems

4-5 Fire Protection

Chapter 4 - Mechanical

4-1 Introduction

4-1.1 Scope

The design criteria within Module 3 define the mechanical requirements for design and construction of Repair & Alterations projects. Refer to applicable requirements contained within the Standard Design Criteria Module 1, Chapter 4, the MPF Design Criteria Module 2A, Chapter 4, the CSF Design Criteria Module 2B, Chapter 4 and Section 0-1 Policy Statement.

4-1.2 Codes and Standards

Whenever unique problems or conditions not covered herein are encountered, the A/E/Designer must follow generally accepted industry practices as reflected in the latest issue of the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) handbooks and the National Institute for Occupational Safety and Health (NIOSH) Criteria for a Recommended Standard for Occupational Exposure to Hot Environments. Refer potential solutions and their recommendations to USPS Design and Construction (D&C) Authority for final approval.

The A/E must provide a complete mechanical, plumbing, and fire protection design for the facility in accordance with the issuance of site specific program requirements. The A/E is responsible for the complete performance and installation of all systems; the provided systems must be fully coordinated between disciplines, trades and existing conditions, functional, and consistent with the architectural design developed for the building along with site-specific facility functional requirements.

Buildings must be designed in accordance with the requirements set forth by the applicable national, state and/or local codes and standards enforced at the time of design. In addition, the design criteria contained in this document must be followed. Where two or more codes, standards or USPS criteria are in conflict, the more stringent applies.

The A/E submits the documentation listed below with the 30% and 100% design levels as a minimum, and as specified by the Contracting Officer. Forms and drawings submitted must be stamped by a Professional Engineer.

a. Performance Rating Report.**
b. Building Envelope Compliance Documentation. **
c. HVAC Mandatory Provisions.**
d. Service Water Heating Compliance Documentation.**
e. Equipment selections and alternatives documented in a Life Cycle Cost Analysis (LCCA)*. The LCCA must use the:
    1. Latest edition of NIST Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program.
    2. Current USPS economic factors. These factors can be obtained from the USPS Intranet and will be provided by the USPS (USPS Memorandum titled “Decision Analysis Report Factors/Cost of Borrowing/New Facility Start-up Costs Update”).

f. Building heating and cooling load calculation summary output from the load simulation program.

g. Provide an electronic archive of the building models from the software system used to perform the simulations along with a brief description of the software and release version used to perform the simulation.

* Available from the Facilities Program Management, Energy/Standards Team Leader.

** ASHRAE 90.1 Appendix G Compliance Forms are available at *www.ashrae.org/standards-research--technology/standards-forms--procedures.*

Energy consumption for the purposes of calculating the 30 percent savings must include space heating, space cooling, ventilation, service water heating, lighting, and all other energy consuming systems normally specified as part of the building design except for receptacle and process loads.

These requirements apply to all new construction and additions greater than 15,000 SF.

The energy consumption levels for both the baseline building and proposed building must be determined by using the Performance Rating Method found in Appendix G of the current version of ASHRAE 90.1 except the formula for calculating the Performance Rating in paragraph G1.2 must be modified regarding exclusion of receptacle and process loads to read as follows:

- $t = 100 \times [(B_1 - P_1)/ B_1]$ where
- Percent improvemenB_1 = Baseline building consumption (w/o receptacle and process loads).
- P_1 = Proposed building consumption (w/o receptacle and process loads).

Materials, equipment, and systems must be designed and installed to comply with the EPA Safe Drinking Water Act.

Where required by the building code, provide seismic bracing and anchors. Comply with SMACNA Seismic Restraint Manual.

4-1.2.1 Clarification of HVAC Refrigerant and Equipment Selection for USPS Facilities

As the USPS continues at the forefront of facilities environmental stewardship, this clarification refines requirements for heating, ventilation and air conditioning (HVAC) refrigerant, and equipment selection. The following requirements are to be implemented on all USPS projects where construction contracts have not been awarded. For projects where construction has been awarded, the new requirements must be incorporated to the fullest extent possible.

In order to provide a sound business decision, HVAC refrigerant and equipment is to be selected based on life cycle cost, federal guidelines, and operational needs. Only select hydro fluorocarbon (HFC) refrigerants and alternative substitute refrigerants/blends that are listed as either "acceptable alternatives" or "subject to use conditions" in the U.S. EPA's Significant New Alternatives Policy (SNAP) Program are allowed to be selected for new construction or replacement systems. The Postal Service prohibits procurement of systems containing any chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) refrigerants and/or HFC refrigerants that are listed as "unacceptable". This allows USPS to remain at the forefront of environmental compliance.

Under the Clean Air Act, CFC refrigerants (e.g., R-11, R-12, R-111, R-115, and R-502) were phased out and banned from production by 1996. A phase out of HCFC refrigerants (e.g., R-22, R-123, R-221, and R-401a) will be complete by 2030. Previously acceptable HFCs, such as R-134a and R-410a, are currently being re-evaluated for environmental impacts and will be slated for phase out. Phase out of targeted HFCs will be accomplished through the prohibition of manufacturing refrigerant equipment utilizing the targeted HFC, rather than by a direct ban of the HFC itself. For example, beginning in 2024, chillers will not be allowed to be manufactured or imported that contain/utilize R-134a or R-410a. When purchasing new refrigerant equipment in the future, the Postal Service must procure systems using refrigerants deemed acceptable under the EPA's SNAP Program, that are not scheduled for phase out. Acceptable refrigerants will shift over time from HFCs to new alternative substitute refrigerants and blends.

The USPS follows these transition steps regarding refrigerant equipment containing CFCs, HCFCs, and HFCs:

- Recover, store, and reuse refrigerants to service existing refrigeration equipment.
- Retrofit existing equipment (and supporting components) to use an approved substitute refrigerant under the EPA's Significant New Alternatives Policy (SNAP) Program.
- Remove from service ("retire") equipment where refrigerant, retrofit, or energy costs are prohibitive, and/or operational needs or federal/state requirements are not attainable.
- As needed, purchase replacement or new equipment that utilizes an approved substitute refrigerant and meets energy efficiency standards.

All packaged and split systems and chillers purchased for new construction or replacement must use SNAP-approved alternative refrigerants. Selection is to be based on life cycle cost which is to include first cost, energy costs, maintenance, and refrigerant replacement costs.

All equipment is to be selected based on life cycle cost and compliance with local or federal guidelines, whichever is more stringent. Refer to Standard Design Criteria, 0-2.2 for Compliance with Energy Requirement for new construction. As a result, it will be necessary to install very high-efficiency HVAC equipment and systems which may exceed the criteria established below.

The HVAC industry continues to evolve and develop new technologies that provide better operating efficiencies and less impact on the environment. The USPS will continue to monitor these trends and revise our established policies when necessary to take advantage of the changes. The criteria used for HVAC refrigerant and equipment selection will be reviewed on an annual basis.

4-1.3 Mechanical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services.

For commissioning new systems at an existing facility, refer to Module 2A, 4-1.3 Mechanical Commissioning, for projects at Mail Processing Facilities, and Module 2B, 4-1.3 Mechanical Commissioning, for projects at Customer Service Facilities.

4-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” must be utilized to develop the Commissioning Plan and associated Test Procedures. In addition, the appropriate USPS specifications sections, i.e. “220800 - Commissioning of Plumbing”, “230800 - Commissioning of HVAC”, and “250804 - Building Automation System (BAS) Commissioning”, must also be utilized.

Also, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

4-1.3.2 Commissioning Requirements

Formal commissioning of systems and equipment of an R&A project at a facility less than 20,000 square feet is not required. However, all new HVAC systems and related controls must be inspected by the Energy Manager, Project Manager, and A/E to ensure proper installation and operation.

If the scope of an R&A project at a CSF over 20,000 square feet or an MPF will replace any major system component or more than 50% of an entire system, then the commissioning plan and requirements must comply with Module 2A, 4-1.3 Mechanical Commissioning, for Mail Processing Facilities, and Module 2B, 4-1.3 Mechanical Commissioning, for Customer Service Facilities.

The formal commissioning of equipment and systems for R&A projects that do not meet the above requirement is optional, but in developing the commissioning requirements the USPS Project Manager and the A/E should consider the work to be performed, the cost of commissioning, and the impact to Postal operations should the system or equipment fail. Consideration should be given to commissioning mission critical systems, such as:

- Chillers
- Cooling Towers
- Heat Exchangers
- Sewage Ejector Pumps
- Water Pumps
- Air Handling Units
- Variable Frequency Drives (VFD)
- Fire Protection Systems
- Plumbing Piping Systems

When commissioning systems or equipment, it must be performed on a sampling basis. See Module 1, 5-1.3.1 Observation and Testing Requirements, for the sampling rates for each system.

4-1.4 Mechanical Measurement and Verification (M&V)

See Module 1, 4-1.4 Mechanical Measurement and Verification (M&V), for general information about Mechanical M&V.

If the scope of an R&A project at an MPF will replace any major system component or more than 50% of an entire system, and one of the primary

objectives of that component or system is reducing energy consumption, then the performance must be measured and verified in compliance with Module 2A, 4-1.4 Mechanical Measurement and Verification (M&V).

In general, formal M&V is not required on R&A projects at Customer Service Facilities

However, regardless of the building type, special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generation, must be measured and verified.

4-2 HVAC

When evaluating a partial replacement or upgrade of an HVAC system, analyze and document all aspects of the system, not just for the current HVAC needs, but for future replacement needs, as well. For example, modeling the building for a new chiller must also take into account the future need for boiler replacement and air handler upgrades. Similarly, the controls selected must be compatible with all new and future equipment. Controls must be upgraded to the maximum extent that is life cycle cost effective at the time and moves the building closer to full compliance with existing building design standards. Document future anticipated upgrades of the HVAC system during the initial design phase. The USPS Project Manager must upload the recommendations into eFMS for future reference.

The use of chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants is prohibited in Postal Service facilities. Use only SNAP-approved alternative refrigerants, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends. Refer to Module 1, Section 4-1.2.1, Clarification of HVAC Refrigerant and Equipment Selection for USPS Facilities, for more information.

The value of refrigerant that exist in chilled water machines to be replaced must be credited to the owner unless a specific directive has been issued otherwise. Refrigerant removed from a chiller can only be utilized by another owner or sold if it has been reclaimed per the American Refrigeration Institute's (ARI) standards. Simple recovery (capture of removed refrigerant), or recycling (capture of removed refrigerant with limited processing, usually oil and moisture removal) is not sufficient for the resale or reuse by a different owner. Clean and process the reclaimed refrigerant to ARI standards. The credit associated with the reclaimed refrigerant must be based on the amount and current fair market value.

A licensed contractor must perform disposal of reclaimed refrigerant and submit verification of proper disposal to USPS.

4-2.1 Energy Conservation

Refer to Standard Design Criteria Introduction Module, Section 0-2.2, Compliance with Energy Requirements, for detailed energy mandate statement. See also Appendix M1-E, ASHRAE 90.1 HVAC Minimum Efficiency Requirements.

4-2.1.1 Repair Projects

Repair of an existing building component is defined in ASHRAE as the repair of internal parts of the component and not the replacement of the component as a whole and the repairs must be carried out in a manner that retains the component's original energy efficiency. Exceptions may be requested as applicable in the Technical Performance Sections of ASHRAE Standard

90.1. For repair projects as defined by ASHRAE, there is no need to create an energy cost budget simulation model.

Repair of building systems as defined by USPS may involve whole component replacements. For USPS-defined repair projects, the new replacement equipment must be subject to meeting the minimum standards set out in Module 2B, Chapter 4, Mechanical.

If the area served by the component has not significantly changed from original installation and documented operation indicates that the component has performed satisfactorily, a one-for-one replacement may be selected without revisiting building block loading calculations or simulations. If the component is at the end of its useful life, most likely other components in the system are as well and the complete system must be evaluated for possible replacement or upgrade.

For facilities larger than 60,000 SF, consider replacement of a major component (chiller, air handlers, controls) due to end of life needs an alteration project and evaluate in accordance with the alteration requirements indicated below.

4-2.1.2 Alteration Projects

Alteration projects and those that replace major HVAC components present special cases for the designer. When these projects are designed, the selection process for replacement building components will follow one of the two categories and Compliance Paths as defined in the Technical Sections of the current version of ASHRAE Standard 90.1:

- Facilities larger than 20,000 SF or a central plant: The designer must provide documentation demonstrating compliance with all ASHRAE Standard 90.1 Mandatory Provisions applicable to the Alteration or equipment replacement project, and an analysis using the Section 11 Energy Cost Budget Method as modified by Appendix G to determine a Performance Rating. These analyses must be performed on at least two (2) reasonable alternatives for solving the range of problems discovered during investigation and initial design. The goal of the Performance Rating must be to exceed the Baseline Building Performance by 30% or more, as calculated in ASHRAE Standard 90.1 Appendix G section G1.2., or the greatest amount that is life cycle cost effective. Trade-offs will be allowed between building elements as allowed within ASHRAE Standard 90.1. A life cycle cost analysis must be used to show the cost effectiveness of offered alternatives to achieve the desired performance rating for USPS use in the decision making process. However, in all cases the minimum efficiency requirements of the Standard Design Criteria Handbook or ASHRAE Mandatory Provisions, whichever is more stringent, must be demonstrated and met. The outcomes of these analyses must be recorded on the latest version of the USPS Energy Compliance Certification Standard (ECC-S) Form at 30% design and after project commissioning is performed.
- Facilities less than 20,000 SF with no central plant: The designer must provide documentation demonstrating that USPS Standard efficiencies for equipment or components are selected. Document any ASHRAE 90.1 Prescriptive Measures or USPS prescriptive measures considered in the selection. A statement must be prepared by the designer indicating that the USPS Standard Design Criteria was followed and the anticipated Performance Rating for the altered component is based on ASHRAE 90.1 Baseline Systems. Document these projects on the latest version of

the USPS Energy Compliance Certification for Low to Moderate Energy-Impact R&A Projects (ECC-EZ) Form.

4-2.1.3 General R&A Project Energy Conservation Measures

For all Repair & Alteration Projects, the designer must consider the following energy conservation measures when designing systems and selecting equipment:

- Cooling equipment, heating equipment, and domestic water heaters must carry the Energy Star label when available in the market.
- Provide systems that avoid reheating and/or re-cooling for humidity control.
- Provide automatic controls to de-energize heating, cooling, and/or pumping and fan equipment when not needed.
- Do not use systems that are oversized because such systems are not energy efficient or cost effective.
- Analyze part-load performance and keep as high as practical. To keep part-load efficiencies high while providing redundancy, use multiple smaller systems. Provide analysis demonstrating this part-load performance to the USPS.
- Reflect in the block loads (building heating and cooling requirements) the basic building requirements without adding safety factors and utilize peak-coincident loads to take into account plant/system diversity.
- Provide systems that avoid reheating and/or re-cooling for humidity control.
- Provide automatic controls to de-energize heating, cooling, and fan equipment when not needed.
- Provide maximum possible temperature differential on chilled water hot water systems in order to reduce pipe sizes and pumps horsepower.
- Provide variable flow systems for hot water and chilled water distribution through the use of Variable Frequency Drives (VFD's) and pressure based demand reset (requires use of 2-way control valves throughout the distribution system).
- Provide the most efficient heating and cooling systems available considering the building operation and local weather conditions, e.g., evaporative cooling or pre-cooling systems in dry weather conditions, hybrid heating plants where high heating water temperatures are required for a large part of heating season, etc. Also, consider air-air heat exchangers or heat wheels for preheating or pre-cooling ventilation air requirements.
- Provide pulse boilers and/or condensing furnaces having efficiencies over 90 percent when proven cost effective. When specifying and using condensing boilers, the heating plant must have the operational sequences to provide for low return water temperatures required for cost effective implementation. Coordinate with USPS Project Manager to ensure design meets USPS standards for compliance with ASME CSD-1 even for boilers under 400,000 BTUH.
- Ensure that VAV System sequences of operation include supply air temperature reset based on VAV zone demand in order to avoid the need for reheat of supply air at VAV boxes. Reheat of air that has been mechanically cooled is a waste of energy.
- Provide all necessary controls for hot water systems to reset water temperatures based on outdoor conditions.

- Use commercially available refrigerants approved under EPA's SNAP Program, which currently include many HFCs and other non-CFC/HCFC alternative substitute refrigerants and blends. The use of CFCs and HCFCs is not permitted.
- Analyze estimated energy consumption including peak consumption and recommend alternatives to proposed building roof or wall insulation, window to wall ratios, heating or cooling system sizes for part-load performance, heat recovery possibilities, and other items from ASHRAE 90.1 Prescriptive Measures that may be justified to reduce peak consumption or reduce size of mechanical equipment or lighting loads.

4-2.10 HVAC Controls

4-2.10.1 MPF Facilities

Repair and alteration of MPF facilities may require the installation of a completely new BAS including new components and system architecture, or may simply involve the renovation or upgrading of an existing system including the normalization of communication between dissimilar manufacturer equipment. In addition to the controlling of standard building equipment and features, the designed installation of a new or updated BAS must seek to optimize building performance as described in Module 2A, Chapter 4, Mechanical, 4-2.10 HVAC Controls and the associated subsections.

New or renovated BASs must provide the latest control strategies required in the current versions of ASHRAE Standard 90.1 and ASHRAE Standard 62 to ensure adequate Indoor Air Quality and maximum energy efficiency.

All new or renovated BASs must have built-in capability to be accessible via the enterprise wide monitoring network as described in Module 1, Chapter 4, Mechanical, General Criteria, 4-2.10 HVAC Controls.

A new or upgraded or replaced BAS must comply with the following Specification Sections:

- Section 250504 - Building Automation System (BAS) General.
- Section 251104 - Meter and Submeter Devices.
- Section 251404 - BAS Equipment, Software, and Programming.
- Section 250804 - Building Automation System (BAS) Commissioning.
- Section 230800 - Mechanical System Commissioning.

Use control technology that can monitor system performance and automatically adjust the initiation of system start-up times and warm up/cool down cycles to maximum system energy performance. At minimum, the BAS must close Outside Air (OA) ventilation dampers during warm up or cool down cycles.

If proposed control system architecture renovations intend to move portions or all of the existing control’s logic and/or functions, the change must be fully coordinated with the existing building equipment and automation system.

In all cases, provide all necessary controls hardware, software, and programming for a complete working system as intended by the BAS renovation.

4-2.10.2 CSF Facilities Smaller than 15,000 SF

Follow SDC Module 2B, Section 4-2.10.2 for requirements.

4-2.10.3 CSF Facilities 15,000 SF and Larger - Enterprise Energy Management System

All planned projects in CSF Facilities of 15,000 SF and Larger with significant replacement of existing equipment upgrade in the BAS controls shall meet EEMS requirements. Emergency component replacement projects shall be exempt from upgrading controls to meet EEMS requirements. Follow SDC Module 2B, Section 4-2.10.3 for requirements, except that advanced metering for gas and water must be installed only if the cost to install and connect to the building energy management system does not exceed 10% of the annual gas/water bill.

4-2.11 Central Heating Systems

4-2.11.1 Boilers

Heat-generating equipment must be the highest efficiency equipment available that is proven to meet ASME CSD-1 for boilers in the size range of 400,000 BTUH input to 12,000,000 BTUH input. For boiler systems under 400,000 BTUH, coordinate with the USPS Project Manager for CSD-1 requirements.

Select boilers based on part load requirements of the building and provide staging controls to minimize the number of operating boilers while maintaining space comfort. Use of condensing boilers in the heating plant requires periods of low return water temperatures where the efficiency improvements provided by utilizing condensing boilers can yield the energy savings necessary to pay for the extra first costs. Utilize hybrid plants where less than half the capacity of the heating plant is expected to operate with low return water based upon seasonal temperature resets.

Boiler plants must be sized to meet the heating load requirement of building as defined by computerized load calculations. Avoid redundant boilers and limit the quantity to three or four maximum at the boiler plant. Loss of a single boiler must be able to still provide up to 75% of the peak heating load for typical USPS facilities. Plant redundancy is provided by the number of boilers and not excess capacity.

Select primarily 2-way control valves to allow variable speed pump control, matching flow rate delivered with building demand and number of boilers in operation. Ensure that minimum pump flow is maintained to prevent dead-head pump operation. Note that new boilers must be inspected and approved by the USPS boiler inspection contractor, before they can be put into operation.

See Appendix M3-A, Boiler Replacement Guide, for boiler replacement projects.

4-2.12 Air Handling Systems

The preferred type of air handling unit for most USPS facilities is DX Roof Top Unit equipment. However, where necessary to match existing air handling systems, or where space or structural limitations may dictate or where it is more economical given the geographic location, indoor modular equipment is acceptable. Provide a life-cycle cost analysis including heating and cooling load calculations to determine which option is most economical and efficient. Use variable speed drives when life-cycle cost effective.

In some cases, a life-cycle cost analysis may show air handler refurbishment as an economical and efficient alternative to replacing an air handler, and will be considered by USPS on a case-by-case basis. Refurbishment shall not

produce any VOCs or odors, and shall meet all regulatory requirements, including, but not limited to, NFPA 90A and ASHRAE 62.1.
Mechanical equipment, appliances, and supports that are exposed to wind shall be designed and installed to resist the wind pressures determined in accordance with the local Building Code.
For High-Velocity Hurricane Zones, all rooftop equipment and supports shall be secured to the structure in compliance with the loading requirements of the local Building Code.

4-2.13 Central Cooling Systems

When considering repairing or replacement of packaged units, perform a life cycle cost analysis to determine if replacement with current, energy-efficient equipment, is more cost effective than repairing the existing system.

4-2.13.1 Refrigeration System

Many USPS central cooling systems were designed under previous USPS standards that recommended the use of a chiller plant. The new USPS standards require the use of roof top HVAC air handling units with DX (Direct Expansion) cooling and gas heat for all new Mail Processing Facilities. When an existing chiller requires replacement, analyze the building/mechanical system to determine if a new roof top air handling unit with DX cooling can be used to replace the old chiller instead of replacing with a new chiller. Some things to consider include: the age of the existing air handling unit, whether or not available roof space exists, the age of any other existing chillers, how a new DX rooftop unit could be integrated into the existing system including the possible impact for structural upgrades to the roof support system, and the age of the existing cooling towers (if the chiller system is water cooled).

Perform a life-cycle cost analysis to determine which option is the most cost effective. If it is feasible to replace the existing chillers with a new DX Rooftop HVAC air handling unit, then refer to SDC Module 1, Chapter 4, Section 4-2. 2 for the design criteria. If it is not, refer below for the criteria for replacing an existing chiller with a new one.

The primary consideration when replacing chillers within Postal Service facilities must be to improve the overall efficiency of the chilled water process. Give attention to the related factors such as capacity, load, system integration, and associated equipment.

Older chiller plants serving Postal Service facilities may not be of a capacity that is representative of the current load of the facility served. Replacement chillers must consider building load increases/decreases that have occurred due to building modifications and process equipment changes. Modern mail-handling practices, such as the use of ventilation filtration systems (VFS) that serve mail sorting machines, have increased internal equipment gains.

The design operating conditions of replacement chillers must match the existing parameters, unless it can be shown that the altered operating conditions can be supported by a larger/smaller chilled water system and are beneficial to plant operation.

The Postal service is aggressively pursuing alternatives to standard chiller technology that will run more efficiently, more reliably, and reduce operating and maintenance costs. The A/E must investigate the feasibility of specifying chiller technology that utilizes magnetic bearings to support the drive components of the compressor. Although several suppliers now carry products utilizing this technology, it was originally pioneered by a company

called Danfoss Turbocor compressors, Inc., and information can be found on their website: *www.turbocor.com*.

Replacement chillers must be completely functional and compatible with the overall chilled water system in which they are installed. The design of chiller replacements must analyze the existing support systems, including chilled water pumping, condenser water pumping, cooling towers, and water treatment. When replacing a chiller system including pumps, the A/E must evaluate a number of different methods to reduce chilled water flow such as: expanded chilled water delta-T or variable primary flow systems that provide higher overall system efficiency by maximizing the chilled water delta-T at the chiller(s). Two-way valves will be required at the air-handling units to take advantage of variable primary flow, so this modification should be included in any analysis.

It is anticipated that a chiller replacement for increased efficiency will incorporate a controls upgrade to some extent. The replacement equipment must perform, at a minimum, the same control functions and provide the same status and set-point reporting as the existing equipment. If proposed replacements intend to move portions or all of the existing controls logic and/or functions into or out of the chiller control panel, the change must be fully coordinated with the existing building automation system. In all cases, provide all necessary controls hardware, software, and programming for a complete working system as intended by the chiller replacement.

Replacement chillers are to comply with the following conditions and measurements per Air-conditioning and Refrigeration Institute (ARI) Standard 550/590-98. Depending on the application, utilize full or partial load efficiency applications:

- Air Cooled Scroll, Reciprocating or Screw <200 Tons:
  - Integrated Partial Load Value (IPLV) of 0.86 kw/ton.
  - Full load efficiency of 1.00 kw/ton.
- Centrifugal 150-300 tons:
  - IPLV of 0.52 kw/ton.
  - Full load efficiency of 0.59 kw/ton.
- Centrifugal 300-2000 tons:
  - IPLV of 0.45 kw/ton.
  - Full load efficiency of 0.56 kw/ton.

If it is determined that it is feasible to replace the existing chiller with new DX Rooftop unit(s), then refer to Standard Design Criteria, Module 1, Chapter 4, Section 4-2.

4-2.13.3 Cooling Tower

When a cooling tower needs replacement, study the entire system to determine if the central cooling system will remain a chilled water system with water cooled chillers. The new USPS standard is to install DX Rooftop HVAC air handling units instead of chilled water plants. If it is life-cycle cost effective to use the new standards, given the age of the other equipment in the system, then refer to section 4-2.13.1. If it is not practical to replace the chiller/air handling unit as well as the cooling tower, refer to the requirements below.

In general, replacement cooling towers must match existing capacities of replaced equipment. Whenever possible cross-flow, draw through cooling towers must be the basis of design for replacement towers in an attempt to reduce the motor brake horse power requirements.

Variable frequency drive (VFD) control of cooling tower motors not only reduces electrical energy usage of cooling towers, but enhances control of the condenser water supply temperature and prolongs component life through reducing equipment run time and eliminating motor hard starts. Unless special circumstances exist, incorporate all replacement cooling tower systems must incorporate VFD control of at least one tower cell. Motors connected to variable frequency drives must be inverter rated. Shaft grounding rings must be incorporated into motors 10HP and higher to prevent electrically induced bearing damage (EIBD) when VFDs are utilized on larger pump and fan motors.

4-3 Plumbing

4-3.6 Compressed Air Systems

Compressed air systems for R&A projects must comply with the technical requirements stated in the Standard Design Criteria, Module 1, Chapter 4, Section 3.6.

In some facilities, there are many opportunities to reduce the energy consumption of compressed air systems. Depending on project requirements, use the information in the following links as a guide to determine the best solution:

- http://www.mntap.umn.edu/focusareas/energy/compair/
- https://www1.eere.energy.gov/manufacturing/tech_assistance/pdfs/compressed_air_sourcebook.pdf

Copies of the documents can also be found in BDS folder G2.

4-5 Fire Protection

Refer to Chapter 2 – Architectural, Section 2-8 Fire Protection for Repair and Alteration Criteria.

Module 3 - Repair & Alteration Criteria

Chapter 5 - Electrical

5-1 Introduction
5-1.1 Scope
5-1.2 Codes and Standards
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5-2 Power Distribution
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5-4 Communications
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5-5 Fire Protection
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5-7 Integrated Security and Investigative Platform (ISIP)
5-7.1 Robbery Countermeasure/Retail CCTV System
5-7.2 Security and Enterprise Physical Access Control CCTV System
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5-7.4 Enterprise Physical Access Control System (ePACS)
5-7-5 Investigative Systems

5-10 Construction Closeout
5-10.4 Testing

Chapter 5 - Electrical

5-1 Introduction

5-1.1 Scope

The design criteria within this document specify electrical requirements for design and construction of Repair & Alterations projects. Refer to applicable requirements contained within the Standard Design Criteria Module 1, Chapter 5, the MPF Design Criteria Module 2A, Chapter 5, the CSF Design Criteria Module 2B, Chapter 5 and Section 0-1 Policy Statement.

5-1.2 Codes and Standards

The lighting power allowance and automatic lighting control shutoff requirements contained within the current version of ASHRAE 90.1, Chapter 9, apply to all “alterations” to interior spaces and exterior areas for existing facilities where the renovation involves more than 10% of the connected lighting power load in the space or area. Such “alterations” shall include all luminaires that are added, replaced or removed. Routine maintenance or replacement of lamps or ballasts shall not trigger the upgrade of the existing lighting power and lighting control requirements, provided the replacement lamps and/or ballasts are the same as the existing; replacement with a different type of lamp or ballast does constitute an “alteration”. The lighting standards in the current SDC Modules 1, 2A or 2B and the current USPS specifications should be used as the basis for the “alternation”.

The requirements for automatic receptacle control, Module 1, Table 5-2a shall apply to all building additions and alterations to existing building service equipment or systems. This control requirement is only applicable to those specific portions of the building and its systems that are being altered. Compliance shall not be required for the relocation or reuse of existing equipment at the same site.

5-1.2.2 Energy Conservation

Refer to Standard Design Criteria, Introduction, Section 0-2.2, Compliance with Energy Requirements, for detailed energy mandate statement.

One of the following two ECC forms must be submitted for all “energy impacting” projects:

- Energy Compliance Certification – Standard (ECC-S) for significant energy impacting projects. Submit with the 30% design and again after project acceptance.
- Energy Compliance Certification – (ECC-EZ) for low energy impacting projects. Submit after the design parameters have been determined.

5-1.3 Electrical Commissioning

See Introduction, 0-4 Commissioning, for general information about Commissioning and Commissioning Agent Services.

5-1.3.1 Commissioning Plans

The development of a Commissioning Plan must begin no later than at the 30% review of the design documentation.

When commissioning a new system, place priority on the operational dynamics of the equipment being commissioned. USPS specifications sections “019113 - General Commissioning Requirements” and “260800 - Commissioning of Electrical Systems” must be utilized to develop the Commissioning Plan and associated Test Procedures.

In addition, if a systemic problem is discovered or suspected during the commissioning process, the scope of the commissioning plan may be expanded to evaluate the feature or performance characteristic on all units.

5-1.3.2 Commissioning Requirements

The functional testing of a lighting control system is mandatory for all facilities and must be tested in accordance with the current version of ASHRAE 90.1, 9.4.3.

Formal commissioning of systems and equipment, excluding lighting controls, is not required for facilities less than 20,000 square feet.

If the scope of an R&A project at a CSF over 20,000 square feet or an MPF will replace any major system component or more than 50% of an entire system, then the commissioning plan and requirements must comply with Module 2A, 5-1.3 Electrical Commissioning, for Mail Processing Facilities, and Module 2B, 5-1.3 Electrical Commissioning, for Customer Service Facilities..

The formal commissioning of equipment and systems for R&A projects that do not meet the above requirement, excluding lighting controls, is optional, but in developing the commissioning requirements the USPS Project Manager and the A/E should consider the work to be performed, the cost of commissioning, and the impact to Postal operations should the system or equipment fail. Consideration should be given to commissioning mission critical systems, such as:

- Generators and Emergency Power Distribution System.
- Enterprise Physical Access Control System.
- Fire Alarm System.
- Security/ Enterprise Physical Access Control CCTV System.
- Electrical Advanced Metering.
- Electrical Distribution System Wiring.

When commissioning systems or equipment, it must be performed on a sampling basis. See Module 1, 5-1.3.1 Observation and Testing Requirements, for the sampling rates for each system.

5-1.4 Electrical Measurement and Verification (M&V)

See Module 1, 5-1.4 Electrical Measurement and Verification (M&V), for general information about Electrical M&V.

If the scope of an R&A project at an MPF meets any of the below conditions, then the performance must be measured and verified in compliance with Module 2A, 5-1.4 Electrical Measurement and Verification (M&V).

- The replacement of any major system component, and one of the primary objectives of that component is reducing energy consumption.
- The replacement of more than 50% of an entire system, and one of the primary objectives of that system is reducing energy consumption.
- The replacement of any portion of an interior or exterior lighting system.

In general, formal M&V is not required on R&A projects at Customer Service Facilities.

However, regardless of the building type, special projects, or projects that incorporate technologies such as Solar, Geothermal, Compressed Natural Gas, or Electrical Generation, must be measured and verified.

5-1.5 Electrical Computations

Refer to Standard Design Criteria, Modules 1 and 2A, Sections 5-1.5 for general information about Electrical Computations.

5-1.5.5 ARC Fault Hazard Analysis

ARC Flash Hazard categories for the existing distribution system must be calculated and utilized to establish PPE protection requirements during the R&A construction. Therefore, ARC Fault Hazard calculations and categories shall be prepared and established by the registered Design Engineer prior to the start of the electrical work.

The ARC Fault Analysis for minor R&A projects shall include the new construction and only those parts of the existing distribution system that are affected by the R&A construction.

The ARC Fault Analysis for major R&A projects shall be performed for the entire electrical distribution system (both proposed and existing high and low voltage equipment).

5-2 Power Distribution

5-2.1 Incoming Electrical Service

5-2.1.5 Advanced Metering

Advanced electric meters shall be programmable and capable of measuring kWh and other power characteristics (kw, amperage, power factor, etc.) on 5 – 60 minute intervals with built-in data storage. A fifteen (15) minute interval measurement shall be programmed at installation. The data must be accessible on a real-time basis and downloadable to the Building Automation System for management of data.

Advanced metering for the segregated loads required by ASHRAE 90.1, 8.4.3 shall be incorporated into the design for:

- R&A projects that have a *significant energy impact, or*
- Any large non-energy related R&A project that can utilize the opportunity to upgrade the building with advanced metering and avoid the extra cost of doing a separate project.

Unless advanced electric metering is part of the building electrical switchgear, the installation of a separate advanced meter(s) is required and shall be provided per specification section 251104, para. 2.7.

As a minimum, provide an advanced power meter(s) on the main service entrance feeders to the building. Power meter must measure electrical parameters for each feeder phase as well as system total. Parameters should include as a minimum, amperage, volts, kW, power factor, VA, VAR, kWh, THD. Power meter is to include a communication port to the Building Automation System through a Modbus RTU or TCP/IP connection. Coordinate the power monitoring with the BAS design. If it is not feasible or cost effective to incorporate metering into the switchgear, a separate meter offering the same features may be purchased and installed.

5-2.2 Distribution Voltage Levels

5-2.2.4 Lockout/Tagout

Lockout/Tagout procedures shall be performed in conformance with the current applicable edition of OSHA Standard 1-7.3-29, CFR 1910.47 and NFPA 70E.

5-2.3 Main Service Equipment

Major R&A projects requiring upgrades to the existing primary distribution system require that all existing medium voltage cables to be reused must be direct voltage, maintenance tested per Module 3, 5-10.4.1.

5-2.10 Power Factor Correction

Where a Postal Facility is subject to penalties imposed by the local utility and where the facility experiences a low power factor, require the application of power factor correction capacitors.

Power Factor Correction Capacitors must be the fixed load type applied at specific loads exhibiting low power factor.

House power factor correction capacitors in separate housing appropriate for the environment where installed and connect into the electrical distribution system in accordance with manufacturer recommendations.

The power factor must not be overcompensated to produce a leading power factor. Capacitors should normally be sized to maintain a level sufficient to avoid utility company penalties or to accommodate other system characteristics.

When applying capacitors for power factor correction, include provisions for dealing with potential hazards and negative consequences of their use, such as:

- Resonance: The harmonic content of building loads may incite resonance voltage conditions which could damage capacitors.
- Nonlinear Loads: Where non-linear loads are a significant factor of building loads, take care to ensure that capacitors do not form a harmonic filter which could damage capacitors.

If analysis indicates capacitance should be added in a condition where harmonics or significant non-linear loads are present, provide an anti-resonant, harmonic filtered, power factor correction unit.

Where an Enterprise Energy Management System (EEMS) is present, provide automatic power factor correction units with remote alarm reporting capabilities and connect to building monitoring system.

5-3 Lighting

5-3.1 Interior Lighting

If lighting solutions other than “LED” technologies exist in a facility, perform a design study and life cycle cost analysis, as outlined under relamping, to determine if the luminaires must be replaced with more energy efficient, solid state “LED” units, in accordance with the current USPS specifications.

5-3.1.1 Workroom and Enclosed Platform Lighting and Controls

Submit an Energy Compliance Certification (ECC) form to the Facilities Program Management, Energy/Standards Team Leader for all lighting upgrades at the 30% design phase for project approval and again at project

acceptance. For High Energy Impact projects, use the ECC-S form. For Low Energy Impact projects, use the simpler ECC-EZ form. The purpose of the form is for the A/E or Contractor to demonstrate that the lighting design is energy efficient and complies with Postal Standards. The Facilities Program Management, Energy/Standards Team Leader must approve the design before it can be implemented. ECC forms are Included in the Building Design Standards, Folder G.2.

MPF Workroom Lighting

Design workroom lighting systems within MPF that are totally upgraded to achieve the required light levels for the (4) four lighting groups described in the MPF Standard Design Criteria Module 2A, section 5-3.1.1. The control of these groups must be attained using integral, luminaire mounted occupancy sensors.

CSF Workroom Lighting

Design workroom lighting systems within CSFs that are totally upgraded to achieve the required light levels for the lighting groups described in the CSF Standard Design Criteria Module 2B. The control of these groups must be attained using integral, luminaire mounted occupancy sensors and digital, override, countdown timers.

5-3.1.3 Platform Task Light

Existing HID, incandescent and CFL platform task lights (dock lights) requiring re-lamping shall be equipped with retro-fit type “LED” lamps of equivalent light output. Damaged luminaires requiring replacement shall be replaced by “LED” dock light luminaire type P1 as specified in specification section 265100.

5-3.1.4 Exit Lighting

For R&A retrofits to existing exit signs, photo-luminescent signs may only be used if allowed by local code and the minimum ambient light requirements to energize the sign are met. Otherwise, photo-luminescent signage may be used to augment code-required electric exit signage but must not be used in lieu of electric exit signage.

5-3.1.5 Emergency Lighting

The A/E or DBE is responsible for examining all existing emergency egress lighting in the project area for operation and reliability, and must include any needed upgrades or replacements as part of the lighting project. Provide additional ELG lighting as needed to comply with NFPA 101 and other applicable codes, for any corridors or egress routes that do not comply.

5-3.1.11 Re-lamping/Re-ballasting Existing Luminaires

When a lamp burns out in normal use, replace it with a lamp of the same specification as the old one. Mail Processing Facilities currently use a variety of legacy lighting systems that include High/Low Pressure Sodium Vapor, Metal Halide and T8 & T12 Fluorescents.

When light levels diminish because the lamps in a given area are approaching the end of their useful life, perform an analysis to determine the cost to re-lamp the entire affected area, compared to the cost to upgrade the lighting system with new, more energy efficient, “LED” luminaires. Note that the lighting upgrade must include the new lighting power and lighting controls requirements of the current version of ASHRAE 90.1, Chapter 9. Use the lighting standards in the current SDC Modules 1, 2A or 2B and the current USPS specifications as the basis for the upgrade. Energy efficient, solid state “LED” technologies are currently the required lighting system for all major

lighting upgrades inside a building. In applications where a LED luminaire is found to be more cost effective than a T8 fluorescent type, due to utility company incentives, rebates or discounts, it is recommended that the LED luminaire be considered. A deviation request is not required for the use of LED lighting solutions that are found to be more cost effective, however payback calculations must be performed to determine the cost differential between the different possible lighting alternatives, The Return on Investment (ROI) and life cycle costs are as important as the lighting solution. When a ballast fails, the ballast used to replace it should be energy efficient electronic type. Retrofit the luminaire with lamps, and holders if it did not previously have them. The lamps used must have similar color to the other lamps prevalent in the area. Return removed lamps found to be in good condition to stock and use to replace lamps in remaining luminaires.

If multiple ballast failures are occurring, evaluate the cost to convert all the ballasts and lamps in the area/facility using the same criteria outlined above.

5-3.1.12 Existing T12 Fluorescent Lighting Systems

Many older facilities are presently illuminated using T12 fluorescent lamps and ballasts, which will no longer be supported or available from the manufacturers, due to recently adopted DOE Guidelines. Existing T12 fluorescent lighting systems must therefore be revised as follows:

- Where small numbers of luminaires are involved, replace existing burned out T12 lamps with new T12 lamps for as long as they remain available, or with suitable replacements. In addition to the available basic substitutions that don't require replacement of the ballast, some manufacturers also offer more energy efficient replacement options that also require replacement of the ballast.
- Where existing electromagnetic T12 ballasts have failed, either replace the ballasts with new electronic ballasts, or retrofit the fixtures with reduced wattage, LED luminaires, whichever approach is the most cost effective.
- Where a larger number of luminaires have failed (more than 10% of the existing connected lighting load in the space), use Life Cycle Cost Analysis to determine whether a complete LED lighting system replacement is warranted, with respect to available funding. Keep in mind that fewer total luminaires may be required in a total system replacement, to meet the requirements of applicable Criteria, Subsection 5-3.1 for interior lighting.

5-3.1.13 Existing T8 Fluorescent Lighting Systems

Many facilities are presently illuminated using T8 fluorescent lamps and electronic ballasts which were the USPS preferred lighting solution for facilities constructed or upgraded prior to 2018. Utilize R&A specification section 265100ra for those existing facilities requiring only luminaire replacements to match existing luminaire types.

- Where small numbers of luminaires are involved, replace existing burned out T8 lamps with new T8 lamps.
- Where existing electromagnetic T8 ballasts have failed, replace the ballasts with new high ballast factor, program-start electronic ballasts.
- Where a larger number of luminaires have failed (more than 10% of the existing connected lighting load in the space), use Life Cycle Cost Analysis to determine whether a complete LED lighting system replacement is warranted, with respect to available funding. Keep in mind that fewer total luminaires may be required in a total system

replacement, to meet the requirements of applicable Criteria, Subsection 5-3.1 for interior lighting.

5-3.2 Exterior Lighting

5-3.2.9 Re-lamping /Re-ballasting Existing Exterior Luminaires

When a lamp burns out in normal use, replace it with a lamp of the same specification as the old one. Postal Facilities currently use a variety of legacy exterior lighting systems that include High/Low Pressure Sodium Vapor or Metal Halide Luminaires.

When light levels diminish because the lamps in a given exterior area are approaching the end of their useful life, perform an analysis to determine the cost to relamp the entire affected area, compared to the cost to upgrade the exterior lighting system with complete new LED type luminaires that offer more energy efficiency. Note that the lighting upgrade must include the new lighting power and lighting controls requirements of the current version of ASHRAE 90.1, Chapter 9. Use the lighting standards in the current Standard Design Criteria Modules 1, 2A or 2B and use the current USPS specifications as the basis for the upgrade. Solid state LED lighting solutions are currently the required lighting system for all exterior lighting upgrades, however, payback calculations must be done to determine the cost differential between the different possible lighting alternatives. The ROI and life cycle costs are as important as the lighting solution.

When a ballast fails, the ballast used to replace it should be energy efficient electronic, pulse start type. The lamps used must have similar color to the other lamps prevalent in the area. Return removed lamps found to be in good condition to stock and use to replace lamps in remaining exterior luminaires.

If multiple ballast failures are occurring, evaluate the cost to retrofit all the luminaires in the exterior area using the same criteria outlined above.

Where a larger number of exterior luminaires have failed (more than 10% of the existing connected lighting load in the area), use Life Cycle Cost Analysis to determine whether a complete replacement of the exterior lighting system is warranted, with respect to available funding. Refer to applicable Standard Design Criteria, Subsection 5-3.2 for exterior lighting.

5-4 Communications

5-4.1 Scope

Telecommunications cabling standards have changed over the years. If a few existing cables are damaged, then replace with the same as the existing to ensure system compatibility. If an entire network or sub-network is being replaced or added to an existing system utilize the current USPS standards, but ensure that the resulting network cabling is compatible with any remaining system components before proceeding with the work.

5-4.3 Telecommunications - Structured Cabling System

5-4.3.1 Backbone and Horizontal Cable Design

Existing facilities must require a minimum of twenty-four (24) strands of armored, tight buffered, single mode Fiber connecting the MPE and IT LAN rooms. A USPS IT engineer must provide specific information for the location and size of the interconnecting fiber optic cable(s).

5-4.3.2 Telecommunication Outlets (T/O)

If expanding the workroom, provide new telecommunications outlets and their associated power outlets per the SDC mounting height requirements. In existing workrooms, relocate telecommunications and power outlets only if they are to be disturbed.

Exterior T/O's are not to be utilized for new construction projects, but existing T/O's (remaining after completion of an R&A project) that are located within unsecure, public, outdoor areas must be equipped with locking coverplates.

5-4.3.12 Wireless Access Points (alternative to Fiber Optic Cabling)

Cameras located remote from the main building (examples include, but are not limited to: remote employee parking areas, vehicle gates and guard booths), where the existing fiber cabling and/or conduit has failed, where the cost to retrench is significant or where the area to be retrenched spans a canal, body of water, tunnel or contaminated brownfield may be equipped for wireless transmission when justified and approved by deviation. An outdoor wireless mesh network solution connected to the Postal Service network and consisting of outdoor access points, dual band omni antennas and wireless controllers using standard network cameras may be utilized to extend Wi-Fi coverage in these applications.

The wireless solution shall be a USPS approved "Cisco Aironet Outdoor Wireless Mesh Network" system and compatible for use with all major camera manufacturers. Refer to MPFS specification section 272134.

The outdoor access point shall be building, roof, structure or pole mounted and is to be powered from a continuous 24/7, 120 VAC or 12 VDC power source. The digital fixed camera (installed in conjunction with the access point) will be powered from the Wireless Access Point (WAP) using the "PoE output" and outdoor rated Cat 6 cable.

Hardwired electrical power connections are required to support the WAP and associated exterior fixed camera. A toggle type switch contained within a NEMA 4 box shall be provided at the "WAP" to disconnect the 120 VAC input power to the access point.

Existing remote sites may strap mount the camera and access point to existing site lighting poles and utilize existing circuits serving the site lighting luminaires to power the outdoor access points and cameras. The existing site lighting circuits may be extended to the WAP's utilizing factory manufactured power tap adapters per MPFS 272134.

WAP's and cameras to be powered from existing site lighting circuits controlled "dusk to dawn" through central time switches or photo sensors must be provided with continuous power bridges and battery power supplies to provide continuous, 24/7 video surveillance.

Outdoor access points and exterior cameras that cannot be powered from a continuous 120 VAC or 277 VAC power source may be powered from a continuous, 24/7 solar power source with battery reserve. The WAP shall be powered with 12 VDC input and equipped with "DC" rated, watertight, exterior, cable assemblies.

Note that the locations of the outdoor access points and antennae require un-obstructed, line-of-sight paths for proper video transmission.

Approved requests for wireless services must be supported with a Telecom Expense Management (TEM) request (http://tem.usps.gov/) and submitted

by the USPS Project Manager. After receiving the necessary approvals and funding, support shall be provided by the USPS Telecom Wireless Team - Wireless Network (WAP, Work Group Bridges, eTouch) Group.

The contractor will install the wireless mesh system using Postal-supplied Cisco Access Points and Postal or national contract-supplied IP Cameras. Contractor must provide wiring from the controller location to the Root Access Point (RAP) on the building or structure and provide suitable power connections to the RAP. USPS IT and Securitas E.S. will provide programming support.

5-5 Fire Protection System

5-5.1 Fire Alarm System

New devices, components and wiring added to an existing fire alarm system shall be the product of the existing manufacturer and must not void any vendor service warranties.

Existing fire alarm systems must remain operational throughout any construction activity. Existing fire alarm systems modified as a result of any repair or alteration project must be operationally tested prior to acceptance and deficiencies found must be corrected prior to final completion. All fire alarm modifications must be provided in accordance with the “AHJ”: and applicable codes.

Projects requiring replacement of the main fire alarm control panel must be completely upgraded to comply with the Standard Design Criteria Modules 1, 2A or 2B, Section 5-5. Complete fire alarm design drawings shall be prepared by a Registered Engineer and signed and sealed by the Engineer of Record.

5-6 Lightning Protection

Refer to applicable requirements contained within the Standard Design Criteria Modules 1, 2A or 2B, Section 5-6.

5-7 Integrated Security and Investigative Platform (ISIP)

A VMF’s security requirements will depend on whether the facility warrants ePACS & CCTV, and whether it is co-located with a Mail Processing Facility or is located on a totally independent site. Refer to Module 4D, Section 3-6 for VMF security requirements.

An integrated security and investigative platform (ISIP) solution allowing the remote control and operation of the CCTV systems is not required if resident Domicile Inspector Offices presently exist within the facility.

The security requirements for temporary leased spaces with a term of 6 months or less, such as for “peak season” or Emergency Alternate Quarters (EAQ), are to be determined on a case-by-case basis, in coordination with Inspection Services and the OIG.

5-7.1 Robbery Countermeasure/Retail CCTV System

The robbery countermeasure/retail CCTV system requirements are outlined within the Standard Design Criteria, Module 2B – Customer Service Facilities.

When adding or replacing, cameras to an existing CCTV system, perform a cost analysis to determine whether to use equipment from the current Direct Vendor or to match the existing.

Open Merchandising Areas are no longer provided in facilities. Existing cameras viewing the Open Merchandising slat wall and EAS areas can remain, since removing them would add costs. Since the function of those cameras is loss prevention, the decision to repair non-functioning cameras in those areas must be driven by operational specifics, such as type of product, if any, displayed and analysis of actual shrinkage.

Utilize USPS CSFS section 282304 for small CCTV projects that are independent from an existing, or planned, IP CCTV System when 16 or fewer cameras are required. Typical use would be for small access control projects, retail, security, burglary and robbery countermeasures projects and replacement of failed components in existing analog CCTV systems.

Larger CCTV projects requiring more than (16) cameras shall utilize USPS CSFS section 282305 or MPFS section 282305 dependent on the specific application.

A digital-hybrid, stand-alone, CCTV system specified in specification section 282306 – Digital-Hybrid, Stand-Alone, IP Based CCTV System shall only be utilized when replacing an existing Legacy system that is not currently connected to the Postal Service Network. Use of a digital-hybrid CCTV system must be justified and approved by Deviation.

Repair and/or one-on-one replacement of existing Countermeasure/Retail cameras are allowed if the following conditions are met:

1. If the VRAT (Vulnerability and Risk Assessment Tool) CAP score is greater than 500 in the overall, crimes against persons or crimes against property categories, countermeasure/retail cameras are required.
2. If the CAP score is greater than 400 in the overall, crimes against persons or crimes against property categories AND any TWO of the following statements apply, countermeasure/retail cameras are required.
    - A security incident has occurred within the past 12 months (vandalism, robbery or burglary).
    - The walk-in cash revenue is greater than $1 million year.
    - The retail facility is easily accessed from a major highway.
    - The retail facility is located near a bar, liquor store or adult oriented store.

Securitas (the current Direct Vendor) is the only approved CCTV provider for any new install within a building or within an existing building where no prior CCTV system exists. The A/E must determine the location of the cameras, headend equipment and CCTV components. Refer to BDS folder F – Other Requirements & Info for “USPS CCTV Security Design Requirements”. The A/E shall produce to the direct vendor, AutoCAD electronic copies of the camera placement drawings and camera schedules for preparation of the preliminary and final cost estimates.

Other approved CCTV providers may be utilized for a repair or less than full system replacement on a (16) channel or less system, provided the facility meets the current eligibility requirements for repair.

When existing CCTV systems are to be upgraded, the existing coaxial, CAT-5/5e or fiber optic camera wiring may be reutilized provided the cabling is field tested by the contractor for integrity and of appropriate lengths. Refer to testing of existing coaxial, CAT-5/5e or fiber optic camera cabling within Module 3, 5-10.4.2.

5-7.2 Security and Enterprise Physical Access Control CCTV System

When adding or replacing, cameras to an existing CCTV system, perform a cost analysis to determine whether to use equipment from the current Direct Vendor or to match the existing. Securitas Customer Support Contact Information can be found in BDS Folder F – Other Requirements & Info.

Repair and/or provide one-on-one replacement of existing Security cameras if the following conditions are met:

- In high crime area with CAP score of 500 or more, or CAP score of 300-500 with a significant security event in the last 12 months.
- The unit becomes a collection point for remittances from other units in the area, even if it isn't in the high crime area as defined in item #1 above.
- Replacement of a broken VCR with a DVR.

When existing CCTV systems are to be upgraded, the existing coaxial, CAT-5/5e and fiber optic camera wiring may be reutilized provided the cabling is field tested by the contractor for integrity and of appropriate lengths. Refer to testing of existing coaxial, CAT-5/5e and fiber optic camera cabling within Module 3, 5-10.4.2.

When reusing the existing coaxial, CAT-5/5e, and/or fiber optic camera cabling, the contract documents must contain the following:

- Appropriate USPS Specification Sections: CSFS 282304, CSFS 282305, or MPFS 282305, which contains the testing procedures described in Module 3, 5-10.4.2.
- A lump sum allowance to replace 10% of the coax or CAT-5/5e existing cabling with CAT-6 type. The dollar amounts will be based on the A/E's estimate. Each lump sum allowance amount will be indicated on the Schedule of Values.
- A lump sum allowance to replace 10% of the existing fiber cabling. The dollar amounts will be based on the A/E's estimate. Each lump sum allowance amount will be indicated on the Schedule of Values.
- A.unit price for each type of cabling to be added. The offerors will submit with their offer the cost per linear foot to provide (furnish and install) new cabling of each type. Space must be allocated at the bottom of the Schedule of Values for the offeror to write in the dollar amount for each unit price.
- After the contractor tests the existing cable, the quantity of cable that is suitable to be reused can be determined. The allowances and unit prices can then be used to appropriately adjust the contract amount to accommodate any need for new cabling.

When adding or replacing cameras to an existing CCTV system, existing CAT-5/5e cable runs in excess of 300 feet (total horizontal and vertical length) and no more than 800 feet may be utilized if equipped with midspan, Ethernet cable extenders. Provide 120 Volt power at the midspan cable extenders.

Damaged "PTZ" cameras connected to small CCTV systems (16 cameras or less) shall be replaced by "fixed" cameras. Replacement PTZ cameras shall only be utilized upon approval of deviation.

All non-functioning cameras, that are not to be replaced, must be removed regardless of their location (public or employee areas). CCTV systems must not utilize "dummy" or non-operational cameras.

5-7.3 Intrusion Detection System (IDS)

The IDS requirements for new facilities have changed in recent years. If a facility has a non-functioning IDS, then follow current standards for the facility type and coordinate with USPIS to determine if it is still required.

5-7.4 Enterprise Physical Access Control System (ePACS)

All new or replacement access control projects must use the Enterprise Physical Access Control System specification (ePACS) included in the USPS MPF specification Section 281304 unless an approved deviation request has been issued. The decision to proceed with an enterprise physical access control system project must be judicious and approved only when security is compromised due to broken or failed existing access control system (PACS) components. Existing access control systems must not be replaced and shall be repaired until the annual maintenance cost exceeds $10,000/year. Upgrades to functional physical access control systems (PACS) are not authorized.

Additionally, when it is determined that an access control project must proceed, the procurement of the computer hardware is not to be in our construction contracts. To have a certified solution, the software and computer hardware acquisition must be managed and approved by the Headquarters IT Portfolio and must meet a strict set of requirements.

Upgrade of the ePACS may require the addition of a "CIM" application to support the Facility's data traffic and guest enrollment and badging assignments. The A/E shall contact "pacs-support@usps.gov" during the design phase to confirm the need of an additional "CIM" application to be added as part of the server farm hosted at the Eagan Facility.

Tandem turnstiles may be utilized in R&A projects where the available space is insufficient to accommodate the required number of regular sized turnstiles. The tandem turnstiles are slightly smaller than regular sized turnstiles, therefore every effort should be instituted to maximize the number of regular turnstiles.

When replacing existing turnstiles, the number of employees shall be re-evaluated. The total number of current employees may have decreased resulting in the need of fewer replacement turnstiles. The replacement of turnstiles should not be assumed to be a one-for-one replacement.

It is now a requirement to install an Emergency Evacuation Pushbutton at all new turnstile installations, to address the issue of emergency egress in situations not related to power outages or activation of the fire alarm system.

Emergency Evacuation Pushbuttons should be added to existing turnstiles only when other major work is being done to the system. Refer to Module 2A and the Turnstile specification for details.

When existing ePACS are to be upgraded, the existing wiring routed from the controllers to the reader interface modules may be reutilized provided the cabling is shielded, 6/C-#18 AWG, approved by the controller manufacturer and field tested for integrity, and is of appropriate lengths.

When existing ePACS are to be upgraded, only those card readers located at the exterior doors require FIPS201 compliance; existing non-compliant readers at interior doors need not be replaced and can be reutilized if compatible with the current Vanderbilt controllers and interface modules.

The existing door hardware and devices that are not to be reused shall be removed to prevent the ePACS from being circumvented by utilizing existing devices after an ePACS upgrade project. Any associated wiring and accessible conduit shall also be removed.

Existing card readers located at door openings that do not require secured areas (as directed by Exhibit 5-7.4a) shall be removed and not replaced.

5-7.4.1 Existing Audio Intercom Systems

When “telephone rollover” for failed entry attempts at the vehicle gates is requested to an existing audio intercom system, like components shall be utilized and must include the Viking #K-1900 dialer and #C-250 gate release. The existing audio intercom system shall not be replaced by a new video/intercom equipped with exterior gate control.

5-7.5 Investigative Systems

When existing CCTV systems are to be upgraded, the existing coax or CAT-5/5e camera wiring may be reutilized provided the cabling is field tested for integrity and is of appropriate lengths. Refer to testing of existing coax or CAT-5/5e camera cabling within Module 3, 5-10.4.2.

5-7.5.3 Cameras and Junction Boxes

Mount camera junction boxes on a rigid structural member, as high as practical where exposed. Place junction boxes as indicated in Modules 2A or 2B, Exhibit 5-7.5.3a.

5-7.5.8 Lookout Galleries

Lookout Galleries (LOGs) are no longer required in new facilities. However, for locations where LOGs are currently installed and it is necessary to eliminate, modify or relocate an existing LOG or Breakout due to a mechanization or mail processing equipment project, the following electrical criteria must be followed:

- The design and construction of the “LOG” modifications must comply with standard details P2-9-1a thru P2-9-2k1.
- The location of the existing building luminaires must be adjusted as necessary to avoid directly or indirectly blocking the view from the modified LOG. Workroom luminaires must be located at least 5 feet above the finished LOG floor level to avoid obstructing the line of vision from the observation units. Luminaires must not be attached to the outside of the LOG structures.
- Projects resulting in the removal of “LOG” sections will require additional PTZ cameras to monitor the workroom areas previously viewed from the

LOG. The placement of these additional cameras must be coordinated with the “OIG”. Cameras to be added to older, existing analog CCTV systems shall be analog type to easily interface with the existing CCTV headend equipment.

- Convenience outlets must be provided at all changes in direction, at deadends, at the end of mailing and carrier loading platform observation laterals and at three-way intersections. Center each receptacle on the wall (at 24 inches AFF to centerline) so the “glow light” is clearly visible indicating a change in direction. Convenience outlets must be provided as follows:
  a. Standard 20 Amp, 125 Volt, duplex grounded-type receptacles are to be provided for the “glow (night) lights” that are furnished by the Postal Service and installed by the contractor.
  b. Convenience outlets are to be mounted at a maximum of 50-foot intervals in long LOG runs, with at least one outlet in each run.
  c. All obstructions (including ladders that project into the side of the LOG, fire doors, beams, pipes, etc.) must have a convenience receptacle for “glow lights” on each side of the obstruction.
  d. Convenience outlets must be placed at all changes in floor elevation (top and bottom) and at the top and bottom of ladder wells. Where changes in elevation require two ladders, each ladder must have properly located convenience outlets. At the top of the ladder well, a receptacle must be placed on the wall opposite the ladder, centered between the safety rails. At the bottom of wells or the bottom of changes in elevation, an outlet must be located adjacent to and on the same wall as the ladder, between the ladder and the Breakout door or an adjacent corner.
- Provide (1) quadruplex, grounded type receptacle (2 duplex @ 20 Amp, 125 Volt) below every observation window, flush wall mounted – bottom at 18 inches AFF.
- “Cleaning lights” must be provided to illuminate the interior of the LOG for cleaning purposed only. Cleaning lights shall be very low profile, 4 foot long, single lamp, fluorescent or “LED” type with lens cover (maximum 1½ inch deep); equal or similar to “Lithonia” #UCLD series under cabinet luminaire. Cleaning lights are to be provided as follows:
  a. All changes in elevation and direction must be properly illuminated.
  b. In long runs of the LOG, cleaning lights must be located every 40 feet. All entry and Breakout wells must have cleaning lights installed at the top of the LOG ladder well on the wall, at the intersection of the wall and ceiling.
  c. The cleaning lights are to be controlled with (1) toggle switch located in the LOG Breakout nearest the janitor’s closet and (1) at the exterior entry to the LOG or entry to the CIO.
  d. In multi-inspector domiciles, the on/off switch and pilot light are to be installed in the inspector’s suite. The pilot light must be a red jewel light in a single gang box located in an inspector’s office. If the facility does not have a domicile office, the pilot light may be placed in the postmaster’s office.
  e. The cleaning lights are to be controlled from the same electrical panel as the convenience duplex outlets for the LOG.
- The following branch circuits for the CIO, LOG or Inspection Service offices must be fed from a dedicated circuit breaker with lockouts:

Convenience outlet circuits, cleaning light circuits, IDS power circuits, CCTV system circuits and all other Inspection Service related circuits.

- The Postal Service does not require fire and smoke alarms or fire sprinkler systems inside LOGs. If the Postal Service is required by local code to install a fire alarm system smoke detectors they must be flush mounted or recessed. They can be mounted in the center of the LOG ceiling or at the top of a sidewall.
- Telephone systems are no longer required within LOGs since the advent of cellular communications.

5-10 Construction Closeout

Refer to applicable requirements contained within the Mail Processing Facilities Design Criteria (MPFDC), AS-503a, Section 5-10.

5-10.4 Testing

5-10.4.1 Major R&A Projects

R&A projects requiring upgrades to the existing distribution system must require the following testing be performed by the contractor:

- Proposed and existing cables to be reconnected, 600V or less and size number 3 or larger must be meggered using an industry – approved megger with a minimum of 500V internal generating voltage. All inspection, cleaning and testing procedures must be in compliance with the recommendations and standards outlined in the "Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems", current edition, published by International Electrical Testing Association (NETA). Measurements shall be recorded in the presence of design engineer or Project Manager. Insulation resistance test values must be no less than 250 megaohms. The contractor must prepare and submit a typewritten report of all readings.

Major R&A projects requiring upgrades to the existing primary distribution system must also require the following testing be performed by the contractor:

a. Existing medium voltage switchgear, panelboards, breakers, disconnects and transformers that are to remain shall be infra-red scanned for hot spots. The contractor must prepare a typewritten report of all readings including thermographic photographs for each piece of equipment.

b. Existing installed medium voltage cables to remain shall be direct voltage, maintenance tested to verify the integrity of the aged cable. Refer to specification section 260514r&a – Field Maintenance Testing of Aged Medium Voltage Cables (5 KV - 15 KV).

c. The test reports shall be typewritten and shall provide complete listings of all tested parameters.

5-10.4.2 Testing of Existing Coaxial, CAT-5/5e and Fiber Optic Camera Cabling

When existing CCTV systems are to be upgraded, the existing coaxial, CAT-5/5e and fiber optic camera wiring may be reutilized provided the cable is tested as follows:

1. The test reports shall be typewritten and shall provide complete listings of all tested parameters.

2. The Testing Company shall perform tests on all presently installed Coaxial, Category 5/5e and fiber optic camera wiring to be reutilized. Fluke Copper/Fiber equipment shall be utilized for the testing of all existing copper and fiber camera cabling to be reused. For Category 5/5e copper, the supplier shall employ Level III compliant test equipment. The contractor shall provide camera cabling test results to the USPS.
    a. The test reports shall be typewritten and shall provide complete listings of all tested parameters. Testing instruments shall be annually tested and calibrated.
    b. The Contractor shall provide all equipment and services necessary to test the cabling.
    c. The Contractor shall replace, re-terminate and retest any existing cable found to be defective.
    d. Cable testing shall be performed prior to installation of any proposed cameras or node cabinets.
3. Coaxial Cable Testing:
    a. Perform end-to-end tests of the center core conductor and copper shield. Test parameters shall include:
        - Visual Inspection.
        - Mapping: Continuity, shorts and opens.
        - Ground Fault.
        - Signal Strength at varying frequencies.
        - Proper Termination.
4. Copper Cable Testing
    a. Test parameters shall include:
        - Wire Map
        - Insert loss (attenuation)
        - DC Loop Resistance
        - Return Loss (RL), RL @ Camera
        - NEXT, NEXT @ Camera
    b. Perform end-to-end tests of each 4-pair cable as follows:
        - Pair/conductor for proper pinouts and continuity.
        - Ground fault.
        - Proper termination, shorts, and crossed pairs.
        - Channel attenuation per ANSI/TIA/EIA-568-A(B), including all addendums.
        - Channel bi-directional worst case near end cross talk (NEXT) at frequencies up to 100 MHz, per TIA-568-C, including all addendums.
        - Measured effective cable run length.
5. Fiber Optic Testing: 62.5/125 micron, OM1, multimode fiber optic cable testing.
    a. The installer shall perform Tier 1 Testing with Optical Loss Test Set (OLTS) that includes testing for length.
    b. The installer shall perform Tier 2 testing with OTDR to show all splices.
    c. The supplier shall perform bi-directional testing on all installed fiber optic cabling. Supplier test equipment shall perform testing of fiber in accordance with the fiber type being tested, TIA-526-14-A, Method B for Multimode Fiber (One Jumper/Two Adapters).
    d. The fiber testers and test heads shall have passed calibration within one year of actual test date.

e. Multimode fiber optic cable shall be tested bi-directionally at wavelengths of 850nm and 1300nm.

f. Existing fiber cabling reutilized to serve proposed or replacement cameras and terminated with “ST” type connectors must be reterminated utilizing “SC” style connectors.

6. The A/E shall ensure that the existing coaxial, CAT-5/5e and fiber camera cabling test results, prepared by the Contractor, have been submitted to the USPS prior to installation of the proposed CCTV system.

Appendix M3-A

Boiler Replacement Reference Guide

This booklet *mainly* focuses on the application of and compliance with the CSD-1 code as well as some boiler operation requirements which may seem *unique* to those unfamiliar with Postal requirements, which demand a *higher standard in safety*. This booklet highlights historical problem areas.

Application: Most cast iron sectional boilers, having a BTU input of 400,000 or more, and less than 2.5 million. (approximately 75% of Postal boilers)

This material not intended for distribution outside the realm and scope of the U.S. Postal Service and its affiliates.

Recommended Initial Assessment Checklist

This checklist is intended to be utilized prior to the actual writing of the "Scope of Work," with a goal of avoiding the omission of minor, yet important, details that frequently fail to be noted in the initial scope and contract. Viewing or checking the following items can help to avoid contract modifications.

1) *Age of circulation pumps:*
   10 years of age or older? If so, replace, or rebuild.

2) *Expansion tank/Condensate tank:*
   15 years of age or older? Is it properly sized for the new unit to be installed?
   Note: If the system utilizes a safety or safety relief valve of 30 lbs or less, then the less expensive bladder type tank may be used. But if the system is to use a larger valve such as a 50 lb, then the more costly ASME rated expansion tank must be used.

3) *Backflow preventer:*
   It is recommended to always ask for replacement. Also, most states now require the device to be re-located to a position within 4 foot of the floor so as to allow for inspection and testing. Note location of backflow preventer and pressure reducing valve and related piping. Do these items need to be relocated to make accessible for inspection and testing?

5) *Stack:*
   Does the stack need to be replaced? If there is an existing brick type chimney, there may need to be an insert of some type placed into it. If the new unit is to be a *condensing* boiler, the stack may need to be of stainless steel or PVC type construction.

6) *Pad:*
   Is there an existing pad for the unit? Is it re-useable?

7) *Existing controls:*
   Are the existing temperature and/or boiler controls compatible with the newly proposed boiler unit?

8) *Motorized Outdoor Air Dampers (If applicable):*
   Check the outdoor air damper assembly thoroughly!
   This is very important. On several previous occasions, neither the design engineer nor the contractor realized that the assembly did not function. Some of these larger damper assemblies are quite costly. Contract modifications may be avoided by checking this very important item.

Listing of Historical Problems Found During Initial Acceptance Inspections, As Related To The Original Design Specifications

ITEM:

1) *Pilot control:*

On power burner units, be sure to specify an “interrupted pilot”, not the “intermittent”. The interrupted is *required* upon boilers that are 2.5 Million Btu and above. It is considered to be safer. When ordering a new unit, simply state that *all* power burners be equipped with the controller that operates with the interrupted pilot. Also, the intermittent type pilot is a constant maintenance problem, due to the pilot valve solenoid failures. This solenoid is energized at all times the boiler is operating. With an interrupted pilot, this solenoid is only utilized during start up.

2) Motorized *Outdoor air damper (if utilized):*

There must be an end switch attached directly to the moving member of the outdoor air damper that proves their opening prior to firing of the boiler. There must be a *reasonable* means of testing this switch. Additionally, it is highly *desired,* that the dampers close anytime the boiler disconnect is opened, the boiler control is turned off, or the boiler goes into a safety shut-down. This will aid in preventing boiler room piping freeze ups in event of a shutdown during a winter weekend. This is *not* a specific code requirement.

3) *Outside air induced draft fan (if utilized):*

If a fan is used to provide outdoor combustion air, there must be a switch which proves its operation prior to the firing of the boiler. There must be a *reasonable* means of testing this switch.

4) *Probe type low water cut off devices:*

The probe type low water cut out device, if utilized, shall be a manual reset type. The device must remain in a locked out condition, after a low water condition, should there be a power loss and reinstatement.

5) *High limit control:*

The high limit or high pressure control shall be of the *manual reset* type.

6) *Test gauge ports:*

All gauges shall have an inspector’s test port installed to allow for an inspector’s gauge to be attached and verify the unit’s gauges.

7) *Backflow preventer:*

A new backflow preventer is to be provided. The unit is to be located within 4 foot of floor level to allow for inspection and testing. The unit shall have overflow piping plumbed to the floor drain.

8) *Hydrostatic testing:*

Provide documentation of hydrostatic testing, at 1 and ½ times max allowed pressure, at time of acceptance inspection.

9) *Initial burner adjustment settings and readings:*

Provide combustion efficiency test and burner adjustment documentation at time of acceptance inspection.

10) *Provide isolation valve(s) for the expansion tank.*

A means to isolate the expansion tank shall be provided.

11) *Safety relief valve or relief valve discharge piping:*

The discharge piping shall be supported and *should* terminate at approximately 6 to 10 inches above floor level. The piping shall be *angle-cut* to prevent *capping.* The code does not give a specific height above floor level. Contractors continually ask the height of the cut.

12) *Marking and tagging of valves:*

All valves shall be tagged. Ex: Supply valve, N/O.

13) *Concrete or grout pad(s):*

The boiler, as well as the expansion tank, if mounted at floor level, shall be provided with a pad of 4 inches high minimum.

14) *Pressure reducing valve and bypass:*

Provide a bypass around the make-up water pressure reducing valve.
Do *not* provide a bypass around the backflow preventer.

15) *Power supply and control circuit:*

The codes require that the control circuit be *fused.* It is simpler, just to state that the boiler shall be provided with a fused and lockable disconnect.

16) *Single power source:*

It is highly desired, that all items attached directly to the boiler, as well as the outdoor air damper motor or fan motor, as applicable, be powered through a single lockable, preferably fused, disconnect. The disconnect shall be as close to, or attached, to the boiler as is possible. Additionally, the newer OSHA codes now require that an “Arc Flash” warning sticker be placed upon the disconnect.

17) *Insulation:*

It is usually preferred, that all piping be neatly cleaned and painted and/or insulated as applicable. Hot water piping within reach of the floor level must be insulated to prevent scalding an employee.

18) *Proper mechanical support:*

All piping shall have proper mechanical support.

19) *Adequate clearances:*

Provide adequate clearances around boiler and equipment so as to allow for inspection, maintenance and testing. Any low level piping should be re-located to a higher level so as to prevent head injury by an employee, if at all possible.

20) *Fuel Train:*

The fuel train shall not be supported by any drip legs. The codes require low and high gas pressure switches on units 2.5 million Btu and up.
The preference is for switches on most all units.
The fuel line piping must be painted yellow, or be clearly identified with the proper type and size yellow stickers, as required by ANSI 13.1.

21) *Purge timer:*

The CSD-1 requires *90 second pre-purge timer*, not the 30 which is often standard issue.

22) USPS, *Heating Boilers* must comply with the applicable CSD-1 code requirements.

23) USPS, *Domestic Hot Water* type boilers, which have an input rating of 200,000 Btus or more, and/or have a capacity of 120 gallons or more, are subject to the USPS Boiler Inspection program. These units must comply with applicable CSD-1 requirements.

24) In most cases, Postal policy applies the more stringent CSD-1 codes. There is a written policy which deals with hot water heaters that states the lesser stringent Z-21 code is not to be recognized.

25) In reference to the outdoor air damper assemblies (if used), the code required end switch which proves opening of the dampers, prior to the firing, **must** be mounted on the **driven member.** A driving motor with an internal switch does **not** meet the CSD-1 requirements.

26) Be sure to include a listing of any applicable codes, such as:

BOILER INSTALLATION CODE LIST

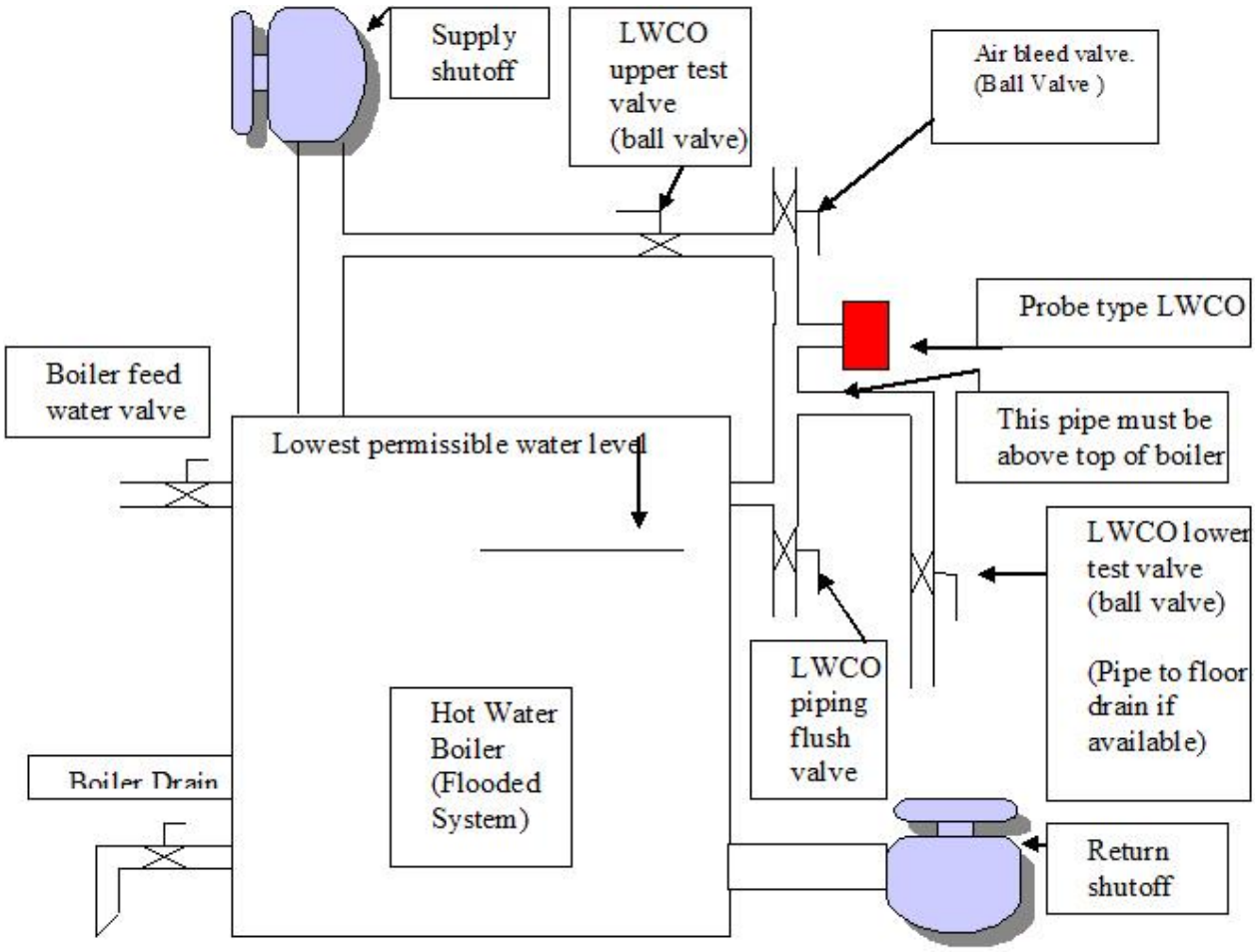
The LATEST EDITION of the applicable Codes and Standards shall be utilized. The listing includes, but is not limited to:

A) ASME - Boiler and Pressure Vessel Code Section IV
B) ASME - Boiler and Pressure Vessel Code Section VI
C) ASME - Boiler and Pressure Vessel Code Section VIII
D) ASME CSD-1 - Controls and Safety Devices for Automatically Fired Boilers.
E) ANSI Z-223.1/NFPA 54 - National Fuel Gas Code.
F) National Boiler Inspection Code.
G) National Electric Code
H) National Plumbing Code.
I) ANSI - A13.1 - Scheme for the identification of piping systems.
J) OSHA - Regulations
K) National Building Codes (UBC - BOCA - SBC).
L) Local Codes - It is the policy of the U.S. Postal Service that the contractor must comply with all state and local building code requirements unless otherwise specifically provided. Matters concerning the applicability and/or conflict of any codes and regulations shall be brought to the immediate attention of the Project Manager via the Project Manager.

27) If any welding is performed on a boiler or pressure vessel, it must be inspected before it's placed back into operation. This should be taking place as part of the welded repair, with the NB Commissioned Inspector being provided by the repair firm.

28) If any of the safety devices are replaced/repaired on a boiler or pressure vessel it must either be inspected or the specs of the replacement part must be reviewed before it's placed back into operations, i.e. Safety Relief Valves, LWCO, Flow Switches, etc.

29) If any component on the fuel gas train is replaced/repaired, an inspection of the boiler must be completed to ensure that the new components work smoothly and properly with the rest of the boiler controls and safety devices.



Test procedure for the **probe type** LWCO, when utilized upon a **Hot Water Boiler**.

1) Isolate the boiler by shutting off the Supply, Return and Feed water valves. The Expansion tank may also have to be isolated.
2) Open Boiler Drain just long enough to obtain 0 psi in the boiler. Close drain valve.
3) Close the upper LWCO test valve and Open the lower LWCO test valve to drain.
   This will drain the water in the LWCO piping. The probe is now exposed.
   The probe type LWCO should go into a lock-out condition within 90 seconds.
4) Close the lower test valve and air bleed valve.
5) Open the boiler feed water valve.
6) Carefully bleed air from the piping with the air bleed valve.
7) Open the upper test valve.
8) The LWCO should remain in a locked out condition.
9) Shut off power to Boiler Controls for a moment then restore power.
10) Verify that the LWCO remains in a locked out condition.
11) Insure that all valves are in normal operating positions.
12) Reset the LWCO probe type device and verify that the equipment is operating properly.

NOTE: All piping for the LWCO must be 1 inch NPS.
NOTE: *Nearly,* any configuration of the above, which accomplishes the same task, is acceptable. The objective is to *positively* test the device with absolute minimum loss of water and treatment.
Drawing by M. Tyler, USPS.-GL-FSO

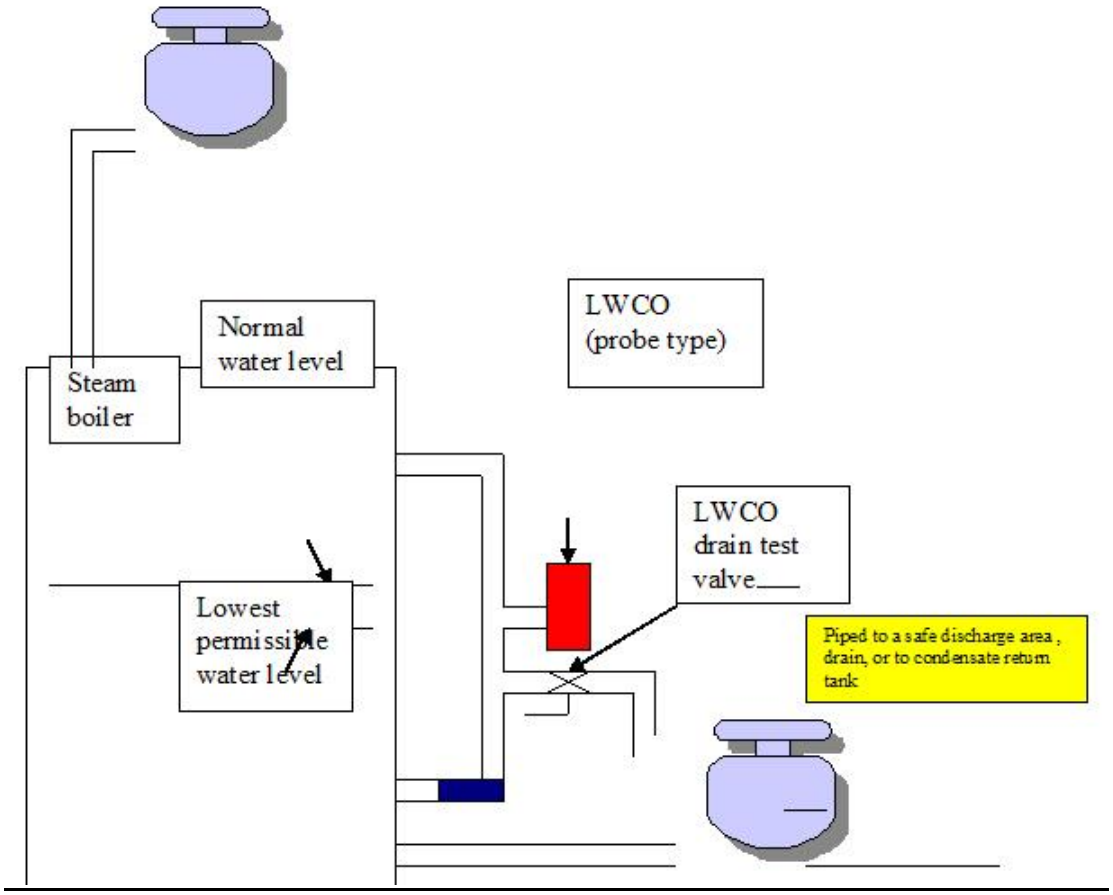
Test procedure for testing a **probe** style LWFC on a **steam boiler**.

1) Isolate boiler by shutting off Supply and Return valves.
2) Heat boiler to a low pressure 1 or 2psi or lower.
3) Open LWFC test valve.

NOTE: The drain piping for this valve shall be to a safe area and anchored. Or, if applicable, to the condensate return tank.

4) When mostly steam and little water come from the drain, the probe should be exposed.
5) The LWCO should go into a lockout condition.
6) Close the LWCO test valve, the device should remain in lockout condition.
7) Remove power to boiler.
8) Restore all valves to their normal operating position.
9) Restore power; Verify that the LWCO remains in a lockout condition.
10) Reset the probe type low water cutoff device.
11) Verify that the boiler operates normally.
12) Insure that all items have been restored to their normal operating condition.

Note:
The lowest LWCO shall be set to function 1/4" above the lowest visible spot in the sight glass and above the lowest permissible safe water level.



New Technology and The Term "Code Case", Cast Aluminum Boilers

The following narrative refers to the newer type, cast aluminum condensing boilers that are now available on the market.

The continuing demand for more efficient and dependable heating systems is the driving force behind new technology. The various code committees and their related code books can not always maintain pace with heating industry advances.

When a manufacturer designs and builds a unit, such as a cast aluminum condensing boiler, and wants to place it onto the market, there is a standard procedure that *should* be followed.

Caution: *Not all manufacturers follow this procedure.*

This procedure includes submitting drawings, specifications, and design criteria concerning the proposed unit to be offered for sale. This information is then sent to the ASME, asking for approval. If the various committees agree that the proposed unit is safe for operation, although there is no specific allowance for the unit in the actual ASME Sect IV code book, then a *"Code Case"* is approved.

When a code case is approved, the manufacturer is then allowed to display the ASME sticker, bearing the "H" stamp upon the shell of the boiler. *However,* there is *not* an actual "H" stamp placed into or upon the cast aluminum vessel itself.

The *"Weil McLain Ultra"* condensing boiler is one example of this type of boiler, which has gone through the procedure and has received the *"Code Case"* approvals.

At the present time, the ASME Section IV has no language or allowances for a cast aluminum vessel. It has been stated that these types of vessels will be included in future editions of the code.

Caution:
Check with your locally assigned USPS boiler inspector prior to installing one of these units to verify that he or she will certify it for use. And remember, *not all* of the manufacturers selling this type of boiler have actually performed required procedures and obtained the necessary code case approvals.

There is a photo of one of these newer type units in the following pages of this booklet.

This photo shows a typical power burner installation upon an 800,000 Btu input cast iron boiler. Notice the additional indicator lights on the unit itself. This particular unit is manufactured by *"Power Flame Co."* Any burner which meets the CSD-1 requirements is allowed, however, this particular manufacturer has re-designed this unit with additional safety enhancements. This burner is equipped with additional relays that enable the contractor to wire the outdoor air dampers in such a way that they will close any time there is a safety shut-down. This prevents any boiler room freeze up conditions during a weekend where there has been a shut-down occurrence. This photo also shows the typical indicator lights that are desired upon a power burner.

Some units will have even more lights which will aid in troubleshooting, etc.

This particular unit is called the *"Power Flame CSD-1 Burner"*. This burner is equipped with lights showing, power on, pilot flame, main flame, flame failure and low water.

In addition to the above, the unit is equipped with a *"Honeywell"* 7800 series controller, with the optional read-out panel, which assists in troubleshooting the unit. This readout panel will also give an "indication of point of failure" upon the loss of the combustion air motor (power burner type unit).

When the *"Honeywell"* controller is utilized, it is *highly desired* that it be equipped with this readout panel. *Some* inspectors may actually *require* it. The 'jumpers' MUST be properly configured for the particular application according to size of the boiler.

Also, there must be a 90 second purge timer installed, *not* the 30 second timer.

The contractor or mechanic is allowed to use the *"Fireye"* controller instead of the *"Honeywell"*. However, if utilized, it MUST be equipped with the indication lights showing the various point of failure indications which are required by code.

NOTE: Most any brand controller is allowed as long as it meets the code requirements. Any brand of power burner is allowed as long as it meets the requirements.

Photo of a newly installed boiler, Sept-2005. This is a 787,000 Btu input cast iron, *Weil McLain* boiler, equipped with a *Power Flame* burner.

The photo above shows one acceptable alternative for smaller Postal facilities where space is a problem. This is a *" Weil McLain Ultra"*, high efficient condensing, *cast aluminum,* hot water heating boiler. The vessel itself holds only 1 ½ gallons of water. This unit is a 230,000 Btu unit. An optional CSD-1 kit, was also installed with the unit.

This unit bears the ASME sticker with the "H" stamp. It does *not* have an actual H stamp in the vessel itself. The sticker means that the unit has been *"Code Cased*". For more information on "Code Case," see explanation earlier in this appendix.

If you would like to use one of these units, check with your locally assigned USPS Boiler Inspector to verify that he, or she, will certify it following the installation.

This particular unit has been in operation at the Kendallville, Indiana Postal facility for the past 2 heating seasons, without any breakdown problems. A substantial energy savings has already been realized.

The expected life is about 15 years. The unit itself, following the initial installation, can be replaced for considerably less than standard replacement costs associated with boiler retrofits.

This photo shows an acceptable heating alternative for Postal Vehicle Maintenance Facilities. Use of this type of system shall be coordinated with the Project Manager.

Often times there is a problem controlling the different heated areas of the offices and the outer work bays.

In this Indianapolis VMF project, the boiler was *down-sized.* Additional *infra-red,* gas fired heating units were then installed in the work bay areas. The theory behind this concept is that *infra-red* (object-heating) system is not as affected by the opening and closing of the work bay doors, when compared to the more conventional type *convection* (ambient air-heating) systems.

This particular manufacturer produces a unit that it is equipped with many safety features and indicator failure lights. This includes flame failure, combustion air failure, etc.
These particular units are called "*Ambi-Rad Heating Systems*" which are manufactured by a company called "*ARS-Advanced Radiant Systems*", of Fishers, Indiana.

Appendix M3-B

Abatement Project Design Guide

An abatement project design must be a written plan furnished by the abatement contractor which includes the following information to be considered complete. The purpose of this document is to ensure an adequate project understanding and how the abatement contractor intends to comply with applicable EH&S regulations as well as USPS policies in an effort to promote open communication amongst the involved parties and prevent work stoppages. The USPS and a third-party industrial hygienist will review work plan for completeness and compliance with applicable federal, state, and local regulations prior to initiation of site activities.

- Estimated abatement time (which days, hours per day, shift start and end time, etc.) and proposed schedule including project phasing.
- Description of the type, quantity, and location of asbestos containing building material to be abated.
- Written description of the construction of regulated areas, including but not limited to:
  - Critical barrier construction and placement
  - Negative air machines (NAMs) utilization and placement
  - Decontamination unit and waste load-out design
  - HVAC isolation
- A basic site sketch showing area/building materials to be abated, the containment system, NAM placement and exhaust, airlocks, etc.
- Air exchange calculations for NAMs (if utilized).
- Detailed description of all asbestos work practices to be employed during the abatement including techniques and equipment. If Negative Exposure Assessments (NEAs) are to be utilized for any work practices, supporting documentation and data shall be provided.
- Description of asbestos waste management, transportation, and disposal practices including but not limited to:
  - Waste bagging practices
  - Proposed method of transportation
  - Name and location of waste disposal facility
- Description of Personal Protective Equipment (PPE) to be donned by abatement crew.
- Description of personal air monitoring to be conducted including number of employees to be monitored.
- Copy of 10-day notification and/or permit to the appropriate NESHAP authority (US EPA, state environmental agency, or local air quality agency). If notification and/or permit are not required the abatement contractor shall state why.
- Copies of Safety Data Sheets (SDSs) for all products and chemicals to be brought onsite.
- Copies of current certification and/or licenses for all asbestos supervisors and workers working onsite. Abatement contractor shall furnish OSHA-required respirator fit test and medical clearance documentation for each person entering the regulated area.
- Contact information for the abatement supervisor(s).

ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING COPIES OF ALL PERSONAL AIR MONITORING RESULTS AND FINAL SIGNED WASTE MANIFESTS/DISPOSAL RECORDS.

Appendix M3-C

Elevator Replacement & Upgrade Design Guide

1 General Information

This USPS Elevator Replacement/Upgrade Design Guide shall apply to Electric Traction and Hydraulic elevator applications including New Construction, Upgrades, Modernization, Repairs, Alterations and Routine Maintenance. This document is intended as a guide to Architect/Engineers, USPS Project Managers and elevator equipment suppliers. Use USPS specification Section 142000mpf as a basis for specifying USPS elevator projects.

USPS facilities may include passenger elevators and/or freight elevators and this Design Guide will cover both. However, since freight elevators move the mail, they are considered to be the most critical to USPS operations, and will be addressed first.

2 Freight Elevator Project Overview

USPS freight elevators are intended to move loaded mail transport equipment (MTE) on a time sensitive, rapid, and repetitive basis. The general nature of loaded MTE movement guarantees that walls, floors, gates and doors will be continuously impacted. Loaded MTE may commonly reach hundreds of pounds each with the potential to exceed a thousand pounds on a limited basis. There is also the potential for power equipment operators to drive forklifts and electric pallet jacks onto freight elevators. Appropriate freight elevator classifications shall be applied to withstand the dynamic forces exerted by powered industrial trucks (PIT) and loaded rolling stock without experiencing alignment issues, downtime and high wear rates. Safety and reliability are of paramount importance.

The objective of freight elevator upgrade/modernization projects or replacement is to improve elevator reliability for mail processing operations. Key features of the projects shall be the use of industry leading equipment with the intent of minimizing premature equipment obsolescence. Freight elevators, freight doors and all associated equipment specifications shall be of sufficient classification, quality in materials and workmanship to withstand the rigors of transporting loaded mail transport equipment (MTE) and powered industrial trucks (PIT) such as forklifts and electric pallet jacks where/when applicable.

3 Passenger Elevator Overview

USPS passenger elevators shall meet industry standards in terms of safety, performance, reliability and aesthetics. ASME A17.1, ABA and other applicable guidelines shall be referenced in the design and installation of passenger elevator systems.

4 Freight Elevator Replacement/Upgrade Design

4-1 Preliminary Analysis Required

Facility site-specific surveys and analysis shall be required for upgrades/modernization and new construction projects. Freight Elevator designs and applications shall include the following determinations/analysis:

a. The ASME A17.1 loading classification of the current elevator/s in use by the subject facility (see class definitions in chart below).
   - Class A, Class C1, Class C2, Class C3

   Weight/Loading Capacity shall also be included in the analysis.

b. The ASME A17.1 loading classification of elevator/s recommended for use by the subject facility.
   - Class A, Class C1, Class C2, Class C3

   Weight/Loading Capacity shall also be included in the analysis.

   The following are the ASME A17.1 freight loading classifications to be used in designing freight elevators in Postal Facilities

Class A	Class C1	Class C2	Class C3
General Freight Loaded by Hand Trucks	Forklift Loading and Forklift Carried	Forklift Loading but Forklift Not Carried in Elevator	No Forklifts, No Electric Pallet Jacks
Static Load: 25% Item Limit	Static Load: More than 25% but not more than 100% capacity	Static Load: More than 25% but not more than 100% capacity with a forklift	Static Load: More than 25% but not more than 100% capacity
		Increment Loading shall not exceed 150% when loading or unloading	

4-2 Use of Passenger Elevators for Freight Loading

Passenger (service elevators) shall not be substituted in the design of freight elevator requirements without the written consent of the USPS Elevator Subject Matter Expert (SME), or the USPS Contracting Officer if a contract has been awarded. If the classification or weight rating does not support unrestricted operational usage, the elevator usage limitations shall be identified in writing to the USPS Elevator SME, USPS Contracting Officer if a contract has been awarded and the receiving Installation Head.

4-3 Customization for a Particular Need

A freight elevator of sufficient classification, size and weight capacity may be required to accommodate the largest piece of mechanization, automation, utility or other equipment to be installed in the building. Facility (site) analysis as to the methods and means of moving-transporting mechanization, automation, utility or other equipment between floors during installation, removal or use shall be documented during the inspection and/or design phase of projects.

5 Elevator Replacement/Upgrade Design

5-1 Applicability

This section is applicable to passenger and freight elevators.

5-2 Required Design Documentation

Elevator designs and applications shall include documentation specifying the following:

a. Whether or not an Original Equipment Manufacturers (OEM) Service Tool is required to maintain.
b. The current status of the proposed equipment in regards to Product Life Cycle:
   - New Product (Less than a year on the market, limited or no service data available)
   - Established Product (Industry standard, supported by OEM, service data available)
   - Discontinued Product (Close out product, not supported by OEM, becoming obsolete)
c. Provide more than one OEM supplier solution for upgrades/modernization and new construction.
d. Identification of new technology or evolving industry best practices that may be not be included in common references yet, but should be considered by USPS should they be known.
e. The seismic zone of the facility (site) and how that impacts the freight elevator/s specifications.
f. Any freight elevator application (installation) where the classification or weight rating does not support unrestricted operational usage shall be identified in writing to the USPS Facilities Program Manager, USPS Contracting Officer if a contract has been awarded and the receiving Installation Head. Freight elevators shall otherwise support that facility's customary, intended usage.

5-3 Use of Hydraulic Cylinders

Elevator designs and applications using hydraulic cylinders shall ensure they are "double bottom" designs or meet the most current ASME A17.1 and/or local code requirements, whichever reference is more stringent. PVC outer cylinder jackets shall be used during upgrades/modernization or new construction unless improved cylinder protective systems have been developed or the facility (site) conditions will not accommodate this design feature. The USPS Facilities Program Manager or the USPS Contracting Officer if a contract has been awarded shall approve of any deviations in writing.

5-4 Standardization of Equipment in a Given Facility

Equipment standardization at a facility should be considered to the greatest extent practicable. Equipment standardization across the entirety of multi-facility projects should be considered to the greatest extent practicable.

5-5 Quality Assurance During Design

a. Comply with ASME ANSI A17.1 “American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks” except where more stringent requirements are imposed by local regulations,

b. Comply with USPS Handbook RE-4 for accessibility.

c. Make it clear in the construction documents that the elevator installation is to be inspected, approved and certified by a USPS designated elevator inspector.

5-6 Construction Submittals Required

a. Product Data

b. Shop Drawings

c. Operational and Maintenance Manuals

d. Copy of final inspection report from the USPS designated elevator inspector.

5-7 Preferred Manufacturers

Provide elevator systems such as those manufactured by: ThyssenKrupp Elevator, Otis Elevator, Schindler Elevator, Minnesota Elevator (MEI), Canton Elevator, Peelle Elevator Doors, Courion Doors (Freight Tech), Motion Control Engineering (MCE), Elevator Controls (EC), etc.

5-8 Specific Equipment Requirements

a. Hydraulic or Traction elevators may be specified. Facility (site) operational requirements, safety, reliability, product longevity-support and Best Value shall be the primary factors in determining the type of elevator application.

b. Elevator controls: parity and functionality with the elevator application shall be a determining factor as well as references throughout this section, the ASME A17.1 and other applicable references.

c. Capacity: Classifications in accordance with ASME A17.1, references throughout this section, facility (site) analysis and other applicable references shall be the determining factors.

d. Speed: shall be in accordance with industry standards, ASME A17.1 and/or OEM guidelines

e. Operation control system: shall be in accordance with industry standards, ASME A17.1 and/or OEM guidelines

f. Doors: shall be vertical bi-parting freight doors in accordance with industry standards, ASME A17.1 and/or OEM guidelines

g. Door operation: motorized.

h. Car enclosure:

   Freight Elevators: freight style cab (car), ruggedized stainless steel walls and floor, with steel, synthetic or hardwood (oak, maple) bumpers to support USPS mail transport equipment (MTE) and powered industrial truck (PIT) loading as applicable.

Passenger Elevators: materials, fit and finish shall be commensurate with facility usage, industry standards and requirements specified during design.

i. Signals: shall be in accordance with industry standards, ASME A17.1 and/or OEM guidelines
j. Special features: multi-leveling; fireman's recall feature; battery lowering emergency power.
k. Install all products in accordance with ASME A17.1, manufacturer's guidelines and printed instructions as well as any additional applicable references-requirements.

6 USPS Operational Information

The following information is provided for general understanding of USPS operations, and includes some of the mail transport equipment (MTE) and powered industrial trucks (PIT) that are more commonly used in Mail Processing facilities. This is critical for the design of freight elevators in such a facility.

The following types of MTE have the potential to be loaded onto USPS elevators:

Mail Transport Equipment (MTE)			
Container Type	**Tare Weight (lbs)**	**Load Capacity (lbs)**	**Total Potential Weight (lbs)**
Post Con	240	1,200	1,440
ERMC	209	1,200	1,409
ERMC w/ Shelf	235	1,200	1,435
BMC OTR	385	1,500	1,885
Wire Cages	400 (est)	2,000	2,400
Pallets	25-45 (est)	2,200	2,245

- ERMC = Eastern Regional Mail Container
- BMC OTR = Bulk Mail Center Over-the-Road container

The following types of PIT have the potential to load or be loaded onto USPS elevators:

Powered Industrial Trucks (PIT)				
Equipment Type	**Tare Weight (lbs)**	**Battery Weight (lbs)**	**Load Capacity (lbs)**	**Total Potential Weight (lbs)**
Electric Pallet Jack	640-1,620	1,000-1,400	4,500-8,000	6,140-11,020
Electric Fork Lift	5,050-5,330	1,000-2,100	2,800-3,750	8,850-11,180
Electric Tug/Tow Motor	1,190	1,000-1,400	NA	2,190-2,590

- PIT weights are estimates based on weights provided by USPS equipment supplier.
- PIT, batteries, freight and PIT operators must be factored into elevator classification assessments.
- The weight of PIT operators is not factored into the columns above or the charts below.
- Powered industrial truck (PIT) types may vary in type, size and weight at different USPS facilities.

	Freight Elevator Minimum Weight Rating Required (lbs) if MTE or PIT has Maximum Rated Load			
	Class A	**Class C1**	**Class C2**	**Class C3**
Post Con	6,000	5,000	5,000	5,000
ERMC	6,000	5,000	5,000	5,000
ERMC/Shelf	6,000	5,000	5,000	5,000
BMC/OTR	8,000	5,000	5,000	5,000
Wire Cages	10,000	5,000	5,000	5,000
Pallets	9,000	5,000	5,000	5,000
Electric Pallet Jacks	None	7,000-12,000[1]	7,000-12,000[1]	None
Electric Fork Lift	None	9,000-12,000[1]	9,000-12,000[1]	None
Tow Motor/Tug	None	5000	5000	5000

Note 1: Facility specific assessment required to determine PIT usage. Numbers are estimates of low and high ranges.

Module 4 – Other Components

4A – Retail Design Standards

4B – Business Mail Entry Units (BMEUs)

4C – Exterior Signage

4D – Vehicle Maintenance Facilities (VMFs)

4E – Storage Tank Standards

4F – Historic Buildings and Fine Arts

Appendices

Appendix M4-A	BMEU Space Estimating Procedure
Appendix M4-B	Exterior Signage Site Survey Package
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Module 4A – Retail Design Standards

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Checklists

Retail Design Standards

1 Introduction

G2-5-1a→d2

Retail Design Standards must be used for the design of all new, full renovation, and alternate quarters (AQ) construction of retail facilities.

These Retail Design Standards were developed to better serve USPS customers and improve the financial performance of retail facilities. The designs set a standard for consistency of style, color, materials, and graphics that are cost effective, durable, and easy to maintain. They are designed to convey a professional, efficient, and consistent image beneficial to the United States Postal Service.

Retail Design Standards were developed with several design features and relationships essential to the success of a retail facility. The following elements are included in most retail facilities. Consult USPS Handbook AS-504 Space Planning Requirements for Retail prototype design selection requirements.

- Self-Service Lobby.
- Post Office Box Lobby.
- Full-Service Lobby.

The layout of these elements presents a hierarchy of service options, which allow for speed and cost efficiency. This arrangement improves the promotion of Postal products and services by providing easy visual and physical access between areas. Designated changes in floor materials, ceiling heights and graphics help to define these distinct areas.

For projects in temporary space, for which the lease, including options, does not extend beyond two years, it is possible to waive these Retail Design Standards without Deviation, if it is felt that the costs would be unjustifiable. In such a case, use prior standard colors, finishes, casework, and signage.

Similarly, lobby remodeling projects that involve only partial remodeling, without new casework, new flooring, and elimination of the storefront that separates the lobbies, should also use prior standard colors, finishes, casework and signage.

2 Critical Layout Relationships

The Retail Design Standards maximize efficient use of square footage while creating a professional environment for customers and employees. The following critical relationships ensure successful implementation of the Retail Design Standards concepts:

- The Self-Service Area is immediately visible to the customer from the entry. Self-Service options in this area must be easily accessible.
- The full-service counters are placed at the rear of the lobby, and Sales & Service Associates (SSAs) have unobstructed visual contact toward the Retail Display Units, if any, and the Entry area, to create visual security control.
- The Full-Service area is preferably located to the right-hand side of the lobby upon entry (due to the natural tendency of a customer to move to the right).
- In certain cases, the layout relationships may be "mirrored" to accommodate existing conditions. See 4-4, Mirroring the Plan.
- Full-service counters, POS, P.O. Box, and parcel locker requirements are provided per the Retail Requirements Worksheet (RRW).

3 Area Functional Requirements

3-1 Customer Entrance

G2-5-1e→e3

The entry must present a consistent, identifiable image to the customer. It must be easily visible from the exterior of the building and from the customer's main arrival route.

Provide only one point of entry into the main retail area. Other entry points cause confusion in the Full-Service Counter queue and are a security concern.

Install windows with performance characteristics as defined in Module 1, 2-6.1.2, so as to insure good, unobstructed visibility between the exterior and the interior. Security requires elimination of the view to cash register money drawers and the back of SSA stations. Address security issues in the construction detailing and coordinate with local Postal Inspector.

The ceiling height in the entrance area, and throughout the lobby, will typically be about 9'-0" AFF, according to current CSF standard designs. In alternate quarters projects, it may vary somewhat, depending on existing structure and on the height of existing storefront glazing. If space allows, writing tables may be provided in the entry area.

Locate one, and only one, C314 Non-Recyclable Waste Unit in the retail area, near the customer entrance, to provide customers with a place to deposit non-recyclable waste on their way out of the facility.

3-2 Self-Service

G2-5-2a→d

Self-Service should be the first area the customers see as they enter the facility. This area provides the automated equivalent to personal service for the majority (but not all) of the transactions currently performed at the full-service counters, such as weighing parcels, purchasing postage, mailing letters and packages. This minimizes the customer's wait time and enables SSAs to focus on services for which their assistance is essential (return receipts, money orders, etc.)

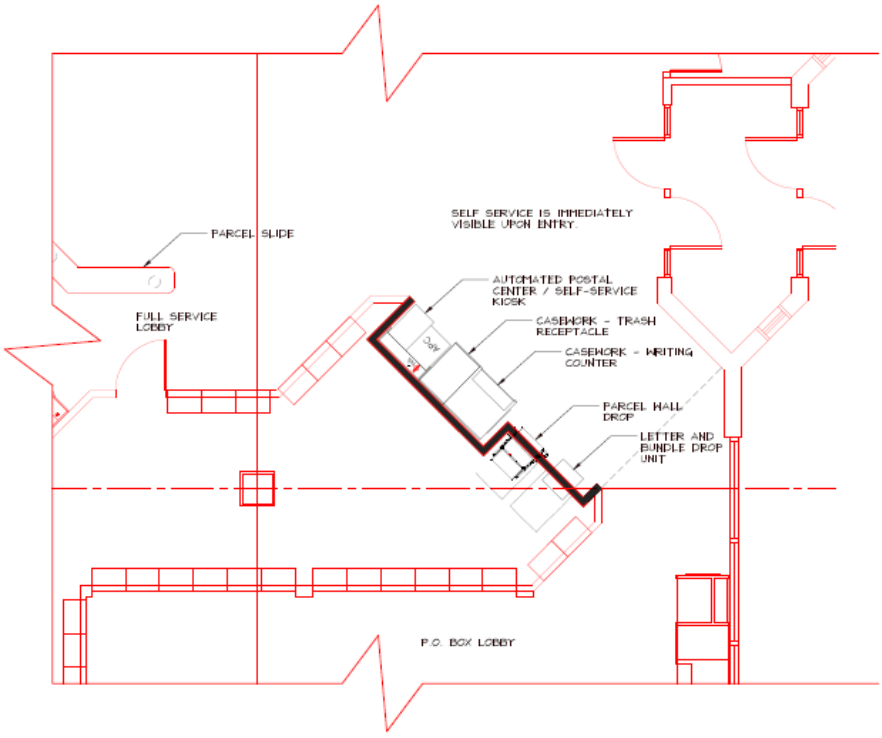
Stamp vending machine equipment has been phased out of Post Offices and no new, or old, machines should be installed.

The Self-Service areas on standard drawings have been updated to reflect the new designs. The core elements of the Self-Service area include Letter & Bundle Drop Units and an In-wall Parcel Drop Unit. In selected locations, the Self-Service area elements will be augmented by the Automated Postal Center (APC) or Self-Service Kiosk (SSK). For APC/SSK and Parcel Drop design details, see BDS Folder E4, Retail. Note that when APC/SSK equipment is to be included in the Self-Service area, it should be placed in an APC/SSK alcove, if possible. If APC/SSK equipment is not to be included, don't provide an APC/SSK alcove. If it just isn't known at the time of design, a good rule of thumb is, if the facility has three or more full-service counters, include an APC/SSK alcove. If it is later decided to hold off on installing the APC/SSK equipment, place a writing desk in the alcove instead. Letter drops and/or in-wall parcel drops should go in a shallow alcove if space permits, with a Mail Drop Counter.

All the elements of the Self-Service area must be visible from the entry. Locate all core equipment and letter drops in a single area of the lobby.

If space is available, provide two to four linear feet of blank wall area to accommodate future mailing or vending needs.

Exhibit 3-2a
Self-Service Area



Note: For APC and Parcel Drop design details, see BDS Folder E4, Retail. Also note that sufficient maneuvering room must be provided between the back of the PO Boxes and any physical obstructions, such as structural columns.

The Self-Service area must be perceived as a distinct area. The lighting level must be brighter than the main circulation path, and focused accent lighting must be provided over equipment.

3-3 Full-Service Lobby

G2-5-3a→e

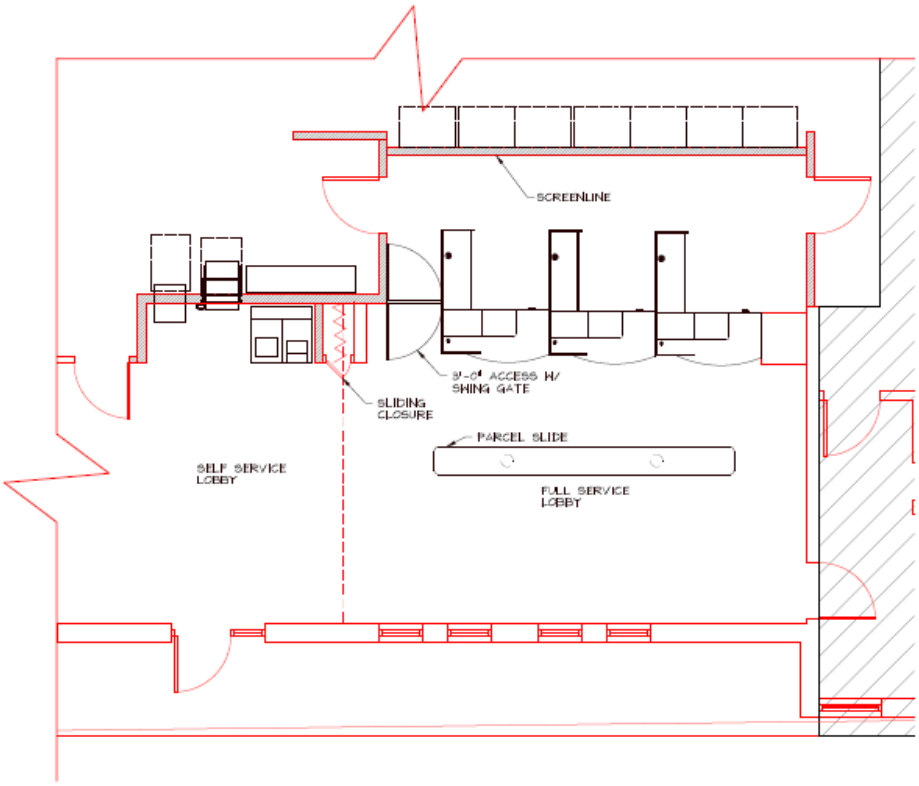
3-3.1 Full-Service Counters

Full-service counters are located at the rear of the lobby. This is the customer's primary contact with postal employees and they derive an important part of their impression of the United States Postal Service from this interaction.

Exhibit 3-3.1a

Full-Service Counters with 3’- 0” Counter Opening

G2-5-5a→f1



Provide a clearly delineated, single queue system using the new modular parcel slide, which is available through the USPS Casework Approved Vendor. Provide customers with a clear line of sight to all full-service counters from the front of the queue. Provide wall-mounted information menuboards for easy identification of available services. Locate them above the full-service counter line, preferably on a bulkhead that extends across the front of the full-service counters.

Provide a folding/sliding closure with solid panels for off-hours security of the Full-Service Lobby. It must be key-lockable and secured with bolts with a minimum 1-inch throw. The folding closure should be the full height of the ceiling and not use a dropped soffit. Exceptions: In remodeling situations only, where there is not sufficient space for a folding closure storage closet, an overhead coiling shutter may be used. Also, Compact Buildings, and plans based on Compact Buildings, may continue to use overhead coiling shutters in front of the Full-Service counters, if there is not sufficient space for a folding closure storage closet.

Tubs, hampers and other equipment used by the Post Office must be coordinated with the USPS. This equipment will reside behind the screenline wall and will allow the SSA to place incoming mail and packages directly into the appropriate container.

The screenline wall will be located directly behind the full-service counters to provide easy SSA access and eliminate the need for clerks to leave the customer view. The optimal distance between the front of the screenline wall and the back of the full-service counter return is 5’-0” in. Customers must be

able to see SSAs as they place their package and mail into the pass-through to the hampers. The pass-through opening should be the full width of the screenline wall, or as wide as possible, to allow for a large number of hampers behind the wall for packages to be deposited in. However, customers must not be able to see into the workroom. This is accomplished with an opaque plastic strip curtain. Provide one handicapped accessible full-service counter in each retail facility.

Designs must accommodate the current full-service counter footprint along with a 3'-0" opening in the counter line to allow for retail staff to access the customer lobby (this opening is not to be provided when only one counter is required). The counter opening will typically be on the end nearest to the main entrance to the Full-Service Lobby and must include a two-way swinging gate as standard, installed so as to have a clear opening of not less than 32 inches.

No Design Deviation Requests are required for the following conditions:

- The local Inspector recommends adding a latch to the swinging gate, and the recommendation is supported by a Risk Assessment. (Note that RE-4 requires 18” min. latch side clearance on the pull side for doors and gates that have a latch and closer, so if a latch is added to the gate, the width of the counter opening must be increased accordingly)
- The local Inspector recommends eliminating the counter opening completely. In such case, the recommendation will need a USPIS HQ concurrence signature before the Risk Assessment Report is submitted to the responsible USPS Project Manager. The Project Manager must keep such Risk Assessment Reports in the Project files for audit.
- In a remodeling situation, such as an Alternate Quarters build-out, where the size and configuration of the existing space makes inclusion of a counter opening physically impossible, it may be eliminated.

Both the standard two-way gate, and the optional latched gate are available through the USPS Casework Approved Vendor.

To accommodate the 3'-0" counter opening in an existing facility, if it must be located between the counters instead of at the end, provide power and data outlets/supply on both walls adjacent to the full-service counters.

The Full-Service area is no longer secured from the workroom with keyed, lockable doors. Door type must be Door Type-C. Door hardware must be CSF Small Set 29, which includes a passage latch, hinges, door stop and closer. The threshold and bottom shoe may be omitted.

If directed to include one or more SSKs in the Full-Service Lobby, refer to the SSK standards in BDS folder E4, Retail, for functional requirements.

The floor tile plan must indicate a color transition in the floor tile at the clerk side edge of the counters, in line with the counter gate. The intent is that the color transition line will reinforce the idea that the clerk area is not a part of the public lobby. See 3-3.2 below, for details.

For more information regarding bullet-resistant counterlines and other retail security requirements, see Module 4A, 6-1.

3-3.2 Post Office Paint Colors and Finishes

The paint colors are bold and simple to unify the many graphics that are found in the Post Office lobby. However, the bold colors and graphics may not be as effective in very small lobbies with low ceilings, and may even make those lobbies feel smaller and darker than they are. As a rule of thumb, do not use the new colors and graphics in lobbies with only one full-service counter, if the ceiling is lower than 9'-0" AFF.

Because the new paint colors are deep and relatively dark, they may be particularly prone to showing scuffs and scrapes. In order to provide some level of protection, be sure to provide corner guards on all outside corners. Refer to specification Section 102600 – Wall and Door Protection.

Referring to Exhibit 3-3.1a, the walls on either side of the full-service counter line (in this exhibit, the walls with the doors to the workroom) are to be painted P-4 Red (for specifics, refer to standard detail G2-5-1a, Standard Color and Material List). This will also match the screenline wall behind the full-service counters that will have the zip code graphic on the upper wall and PL-2 Red laminate on the lower wall, below the screenline opening. The red on the side walls extends to the outer edge of the soffit above the full-service counter line and/or to the edge of the USPS “eagle” logo that is discussed later in this Standard Design Criteria.

Most of the Full-Service Lobby and outer lobby will be painted P-5 Blue from floor to ceiling, with the exception of a white Sign Band, which is not painted but is a fabric wallcovering graphic that is to be installed in alignment with the menuboards. The primary purpose of the Sign Band is to contain Descriptor Graphics (See Section 5-4 for details on the Descriptor Graphics.) The Sign Band height will depend on the height of the ceiling. If the ceiling is at 10’-0” AFF or higher, which occurs in some older existing lobbies, the Sign Band will be 2’-0” high. If the ceiling is lower than 10’-0” AFF, the Sign Band will be 1’-6” high. Current new construction standards for Customer Service Facilities typically have the ceiling at 9’-0” AFF, or lower. The Sign Band does not continue above the “eagle” logo graphic or on the exterior lobby walls. The lobby graphics and signage are discussed in detail in Section 5 of this module. Note that the blue walls do not extend into Post Office Box alcoves, where P.O. Boxes and/or parcel lockers are installed in actual alcoves. The walls in the P.O. Box alcoves will be painted P-2 Light Gray. The preference is for a bulkhead that carries the sign band and graphics across the entrance to the P.O. Box alcoves. The back wall of an APC/SSK alcove or Mail Drop alcove is to be painted P-2 Light Gray, so the blue Postal equipment won't disappear against a blue wall. If it isn't possible to include an alcove for the mail drops, paint an area of the wall behind the mail drops P-2, matching the dimensions of a P.O. Box bay. Wicket doors/frames and office doors/frames in the lobby areas are typically to be painted the same color as the walls they are in on the customer side, although the frames should be painted P-2 on the Workroom side.

The Postmaster/Manager Office walls should be painted P-1, Warm White.

If there is a Passport Office, its walls should be painted P-5 Blue, but with one area of the wall that is designated to be the backdrop for passport photos to be painted P-1. (Note that if a Passport Office is being added to an existing facility with lobby walls that are <u>not</u> painted with the new Retail colors, all the walls of the Passport Office should be painted P-1.)

As indicated above, the Sign Band does not continue along exterior lobby walls. However, if there is room along this wall for retail display units, Sign

Banners will be hung from the ceiling above those units, angled, to identify retail items. These are described in Section 5 of this module as well.

Note that the new graphics are a key element of the lobby design. For an R&A re-painting project in a lobby, it is important to also incorporate the new graphics, if possible. If it is not possible to include the new graphics, do not use the new paint colors. Use the standard colors in effect for the 2014-1 BDS update. These colors continue to be included in the paint specification and on the Standard Color and Material List, on standard detail G2-5-1a. Also, for an R&A lobby remodeling project, if not replacing existing casework with the new standard casework, don't use the new paint colors or graphics.

The floor finish shall be Resilient Floor Tile: RFT-1 (dark gray) as field tile, and RFT-2 (light gray) as accent tile. The field tile is used throughout the customer portions of the lobbies. The accent tile is used to designate the employee-only space behind the front face of the counter line. For an R&A lobby remodeling project, if the existing flooring is in good condition, or if it isn't cost effective to replace it with the new standard flooring, the Project Manager must make a judgment call: if the existing flooring is a gray color that would be compatible with the new colors and finishes, then incorporate the new colors/graphics/casework, etc.; if the existing flooring is of a color that would not be compatible with the new colors and finishes, then incorporate the new casework only, and use the wall colors and signage in effect with the 2014-1 BDS update. Also, if asbestos is an issue in existing flooring or adhesive, and the NAFES asbestos containment system will be utilized, the preferred color of the Versa Quartz tile to be used in lobby areas is "Norfolk" for the field tile and "Reno" for the accent tile.

3-3.3 Parcel Slide

The parcel slide provides a visual and physical guide to direct customers to the full-service queue. It is a simple counter that allows customers to slide their packages while waiting in line rather than having to hold them.

The parcel slide will vary in length depending on the size of the Full-Service Lobby. It is modular and comes in 5 ft. long sections. Parcel slides may be dog-legged as well, depending on the layout in the Full Service Lobby. The ends are squared off, with rounded corners, and all sharp edges are eased for safety. The top of the parcel slide is covered with white solid surfacing material instead of the gray tops used on all lobby writing desks and work surfaces. Use of a different top material is intended to signal that the parcel slide is not to be used as a writing desk, because allowing it to be used for last-minute addressing or packaging activities slows the queue and increases wait time in line. The parcel slide base consists of 6" diameter metal tubes bolted to the floor. Parcel slides should be placed so that the customer queue forms on the side away from the full-service counters. If the parcel slide should run perpendicular to the full-service counters then the parcel slide should terminate four to five feet from the full-service counter to deter customers from forming a second queue. If the parcel slide runs parallel to the full-service counters then the parcel slide should be placed four to five feet from the front edge of the Full -Service counter.

3-4 Post Office Boxes

G2-5-4a→h2

P.O. Box signage must be properly located so that it is clearly visible to the customer from the entry. Visibility must be maintained to all parts of the P.O. Box area from outside the facility. Provide clear lines of sight to all interior parts of the P.O. Box alcoves. Avoid designs with hiding places behind

columns, pilasters, or writing desks. If necessary, use convex mirrors to allow surveillance of all parts of the P.O. Box area.

P.O. Boxes and parcel lockers are to be logically arranged and clearly numbered. Both are designated by number on the Fixture Plan. P.O. Box modules, racks, and trim are furnished by USPS and installed by contractor. Parcel lockers may be furnished by USPS as well, or they may be furnished and installed by contractor. Size 2904 and 2905 P.O. Boxes (with self-trapping keys) may also be used as parcel lockers. Trim pieces for both P.O. Boxes and parcel lockers must be powder coated before installation. P.O. Boxes are often a long-lead item, requiring close coordination with USPS.

Locate writing desks within or near the P.O. Box area to provide customers with a place to sort their mail. Be sure to include at least one accessible writing desk, in compliance with Handbook RE-4. In support of the Postal Service's renewed emphasis on package delivery, be sure to include a Pack and Ship Station, if possible, to provide a designated place for package wrapping activities.*(Also refer to USPS Handbook RE-5)*

USPS Handbook RE-5

Provide a wicket door with extended hours in this area for will-call customers. A wicket door has an upper panel that opens to the workroom (a Dutch door is not acceptable). Verify that a wicket door is required by the local Postmaster/Manager and local Postal Inspector. If not required, substitute a standard door with a peephole for employee access to and from the Workroom. The wicket door can serve as another full service counter during busy times. Often it serves as the service counter for businesses bringing in large tubs of mail. Locate the wicket door so that while in use as a service counter it does not impede the flow of customers to the Full Service Lobby.

Maintain clearance to push hampers behind P.O. Boxes (44 in. min. preferred for saw-tooth layout, 6 ft. 0 in. min. for straight hallway) and provide adequate work space for workers to sort mail behind the boxes. Space is also required to store full and empty hampers (usually behind the Self Service area). Provide sufficient accountable mail storage based on local requirements.

A saw-tooth alcove wall layout may be used to help define this area, if space allows. This configuration also improves visibility into each alcove. Lighting must be at a level sufficient for reviewing mail and locating P.O. Box numbers.

Coordinate recycling requirements with the District. Incorporate recycling receptacles as required.

3-5 Postmaster's/Manager's Office

If the facility is large enough to warrant an enclosed office for the Postmaster/Manager, locate it adjacent to the full service workstations and accessible to the full service lobby. The office must have a professional appearance and be convenient to customers.

Coordinate the size and placement of the Postmaster's/Manager's equipment, personal computer, and CCTV monitor. Locate the monitor for CCTV cameras so it is clearly visible at the manager's desk, but not visible from outside, through a window. Place associated equipment in a lockable metal cabinet or in the Investigative Office (IO) (if present).

4 Application of Standard Retail Plans

When working within existing space, such as for an Alternate Quarters (AQ) project, or a major lobby renovation, it will be necessary to take a current prototype plan that comes closest to matching the facility's operational requirements, and adapt it to fit the space's structural envelope. Ideally, the Retail portion of a particular Customer Service Facility standard plan would fit within the available design space, without any alteration to the plan. More often than not, however, it is necessary to shift elements of the standard plan in order to make it fit within the space.

4-1 Lengthen the Self-Service Wall

If there is additional equipment to be installed in the Self-Service wall, create extra space by shifting the entire Self Service wall in either direction, as requirements allow. This may decrease the size of an adjacent P.O. Box alcove, while maintaining the Self-Service wall's orientation toward the entry and the main circulation path.

4-2 Sizing the Box Lobby

Expanding the Box Lobby — Often, the number of P.O. Boxes required for a particular site is greater than the number of boxes shown in the standard plan. When more boxes are warranted, expand the box lobby, as required. Additional box alcoves are to be added in a uniform manner, maintaining security sightlines from the building exterior into each alcove. Note that P.O Box alcoves should not be any deeper than 20 feet typically, or as stipulated by applicable code.

Decreasing the Box Sections — Occasionally, the number of P.O. Boxes required for a particular site is less than the number of boxes shown in the standard plan. In those cases it is acceptable to reduce the number or size of box bays or box alcoves accordingly, but design the layout to accommodate easy future expansion, should the need arise.

4-3 Decreasing the Lobby Footprint

It may be necessary to reduce the Retail footprint in order to fit the critical design elements within the available space. By shifting the Retail Display area, the security sightlines from all of the SSAs to all of the displays are maintained.

4-4 Mirroring the Plan

Whenever possible, the functional areas within the Retail Design Standards must be oriented as they are shown in the prototype plans (Self-Service directly in front of the main customer entrance, Full-Service to the right after entry, P.O. Boxes to the left, etc.) There are cases, however, where existing conditions demand that the plan be "mirrored", so that the Full-Service Lobby is to the left, and so on. When the plan is mirrored, each individual full-service counter must be re-mirrored so that the return portion of the workstation is to the right of the SSA (as it would be in the standard, unmirrored plan). Self-Service equipment and signage must be mirrored back to the proper order from left to right. Also, when the overall plan is mirrored, pay extra attention to the customers' circulation path. Studies show a natural tendency for entering customers to move to the right. In a mirrored plan (with

the Retail Display area on the left), it is often useful to shift the parcel slide slightly to the right of its normal position, to help guarantee that customers will queue on the left side of the parcel slide.

Note: In a mirrored plan, do not include the Eagle graphic, because it would have to face toward the counter instead of away from it. See 5-3.

5 Interior Signage and Graphics

This section defines sign selection and positioning guidelines for all interior retail signage and graphic elements. Refer to sample elevations found in the Standard Building Designs for additional placement and use examples of the interior signage elements.

No Retail Identifier is to be used within Post Office facilities. Only the Corporate Brand Signature may be used. The Corporate Brand Signature occurs on such applications as uniforms, product packaging, Merchandise, menu board inserts, and packaging supplies. Refer to Module 4C, Exterior Signage, for definitions and illustrations of the Retail Identifier and Corporate Brand Signature.

Module 4C

All of the new signage and graphics will be available through the USPS Signage Approved Vendor.

The following are the interior signage and graphic elements for retail facilities:

- Descriptor Sign Band Wall Graphics and Descriptor Banner Graphics, either 1'-6" high or 2'-0" high, with large grey letters, red letters, and a diagonal red stripe, on white background.
- ZIP Code graphic on the screenline wall, with 3'-0" tall white numbers on a red background.
- USPS Logo wall graphic on a blue background.
- Frames for mandatory posters.
- *Employees Only Beyond This Point* sign centered at the top of the counter line gate.
- Collection Times plaque.
- Box Mail Availability plaque.
- Post Office Box Information plaque.
- Push/Pull door decals on swinging entrance doors.
- Non-illuminated (sustaining) menuboard hardware.
- Mail Drop Identification plaques.
- *Next Station Please* service counter plaques.

5-1 Self-Service Area Signage

The Self-Service area in Postal retail facilities is an important service feature of the delivery system. Consistency of presentation is an important attribute of the overall program. The interior sign elements that are used in the Self-Service area are, mail drop identification plaques, mail collection times plaque, and parcel security decals.

5-1.1 Mail Drop Identification Plaques

G2-7-5s

Mail drop units must be labeled with the appropriate Identification Plaque.

5-1.2 Mail Collection Policy Decal

G2-7-5s

Every mail drop unit is required to have a DECDDD1 Mail Collection Policy Decal placed prominently on it. If any 1577D Letter & Bundle Drop Unit, or 1577F In-Wall Parcel Drop Unit installed in a Retail facility does not have such a decal, the local Postmaster/Manager is responsible for contacting Field Maintenance, and requesting that they send someone to the site with current decals and apply them as soon as possible. Decals must be centered on the units, horizontally and vertically.

5-1.3 Mail Collection Times Plaque

G2-7-5t

Place the Mail Collection Times plaque on the wall between mail drop units, or if there is only one mail drop unit, it should be positioned adjacent to the Mail Drop ID Plaque, aligning the tops of each plaque with each other. The information on the plaque is changeable.

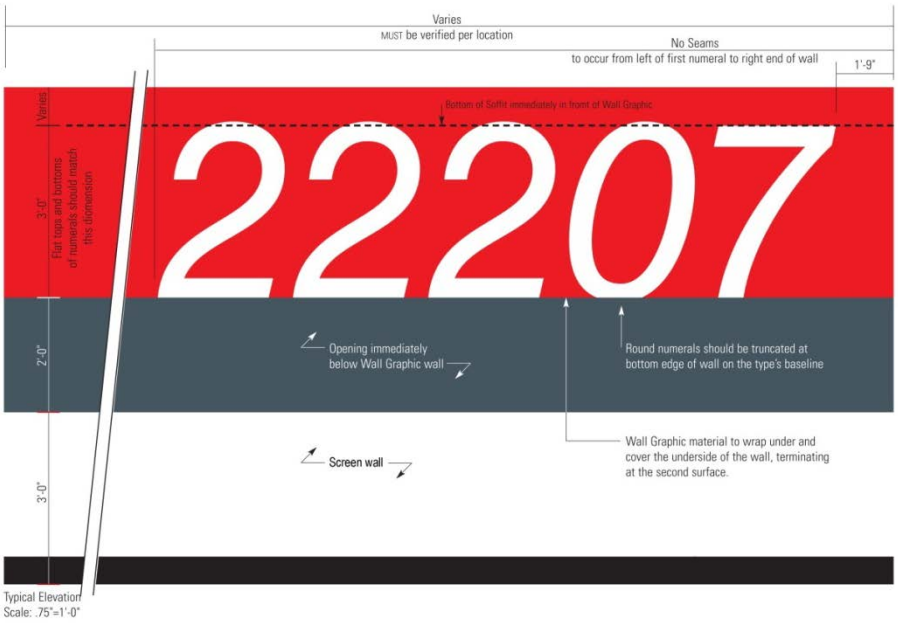
5-2 ZIP Code Wall Graphic and Screenline Wall

The ZIP Code wall graphic is a fixed height of 3'-0", and depending on the length of the wall onto which it will be applied, it may cover the entire wall. The ZIP Code number to use in each specific Post Office should be the ZIP code for its physical location. Note that if the visible screenline wall is not wide enough for a full size ZIP Code Graphic, such as locations with only one full-service counter, a reduced scale version may be used. See the Gable Signs Order Form for more information.

The red color of this graphic is intended to match Postal Red. The color of the plastic laminate that is applied as a protective surface to the lower screenline wall below the Workroom pass-through opening, is intended to match it as closely as possible, but may not be a perfect match.

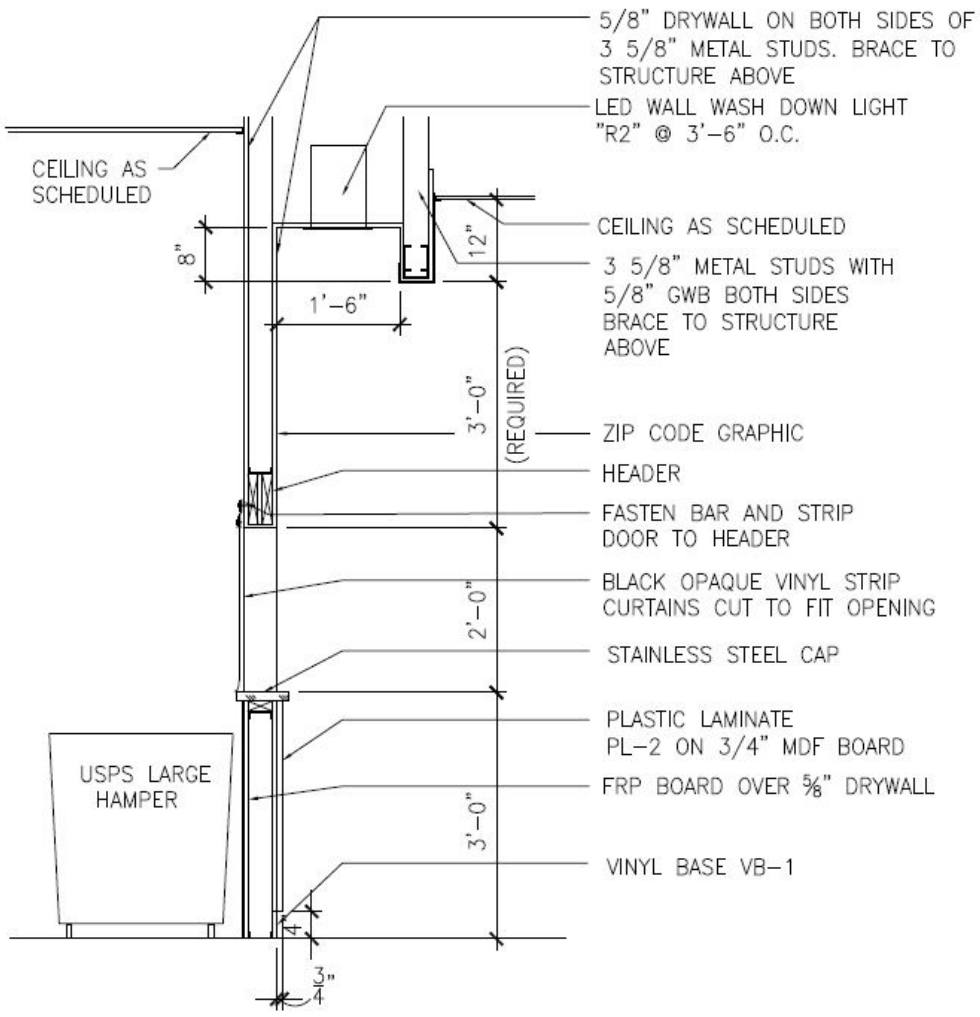
Note that for remodeling projects, if the ceiling height in the full service lobby will be less than 9'-0", the menuboards will need to be mounted on the screenline wall rather than on a bulkhead in front of the counters. If this is the case, omit the ZIP Code wall graphic.

Exhibit 5-2a
ZIP Code Wall Graphic



Critical Installation Note: Typically, the right edge of the last numeral of the location specific ZIP Code should be 1'-9" from the end of the wall on which the zip code wall graphic is to be installed. If the configuration of the screenline wall in some instances will result in an unusually odd positioning of the graphic, consult with the Building Design Standards Manager for assistance.

Exhibit 5-2b
Section at Screenline Wall



5-3 USPS Logo Wall Graphic

The USPS Logo “eagle” Wall Graphic is to cover the entire wall onto which it is designated to occur.

Exhibit 5-3 a
USPS Logo Wall Graphic

Critical Installation Notes: The left edge of the installed graphic MUST be aligned with the face of the adjacent Customer Service area overhead soffit so that there is no deviation from the inside 90° corner of this soffit where it meets the installation surface so that the entire left vertical edge travels to the floor without a jog left or right. No mechanical or electrical devices should be located on the eagle graphic wall, or at least within 5 feet of the eagle.

The USPS logo portion of the wall graphic is to be printed on 54” wide material installed running vertically ceiling-to-floor. (The USPS logo portion of this graphic must be accompanied by the trademark symbol.) The balance of the wall graphic is to be matching solid blue (as needed to cover the wall plane).

Note that in an R&A project or AQ project incorporating a Retail lobby, if the layout of the lobby does not allow placement of the eagle graphic so that it is facing away from the counters, then do not include it. If there isn’t enough wall space for a full size eagle graphic, a reduced scale version that will fit in a wall space 54” wide may be used. See the Gable Signs Order Form.

5-4 Descriptor Graphics

Descriptor Graphics identify important functions and services to customers. There are two types of Descriptor Graphics that are used, depending what they are identifying, and where the item is located. Items built into or attached to walls will utilize Sign Band Wall Graphics that are applied directly to the wall in the Sign Band. Freestanding items located along an outer wall will utilize Banner Graphics that are individual signs suspended from the ceiling at a 45 degree angle to the wall.

Graphics use capital letters and appropriate sized lowercase letters. Only the following descriptor titles are currently approved for use: *PO Boxes* (plus ranges of PO Box numbers), *Parcel Lockers, Passport Office*, *Deposit Mail Here*, *Self Service Mail Kiosk*, *Business Caller Services*, *Pack & Mail*, *Mailing Supplies*, *Free Mailing Supplies*, *Greeting Cards, Passports (with arrow pointing left), and Passports (with arrow pointing right)*.

5-4.1 Sign Band Wall Graphics

Locate Sign Band Wall Graphics in the Sign Band that runs around the mostly interior walls of the Customer Service lobbies. Sign Bands are either 1'-6" high or 2'-0" high, depending on the ceiling height, and the associated Wall Graphics are sized accordingly. Note that if the folding closure storage pocket door is in an interior wall and extends to the ceiling, the Sign Band must continue across the pocket door. The rest of the pocket door will be painted the same color as the wall it is in.

Refer to the dimensional lettering positioning information in Exhibits 5-4.1a and 5-4.1b.

Exhibit 5-4.1a
Sign Band Wall Graphics

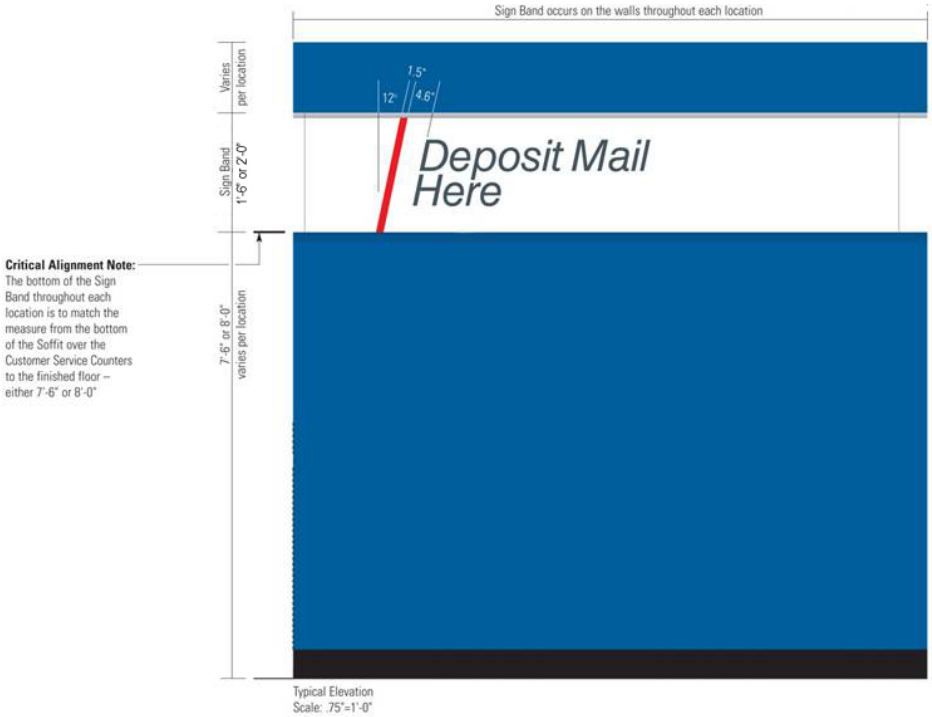
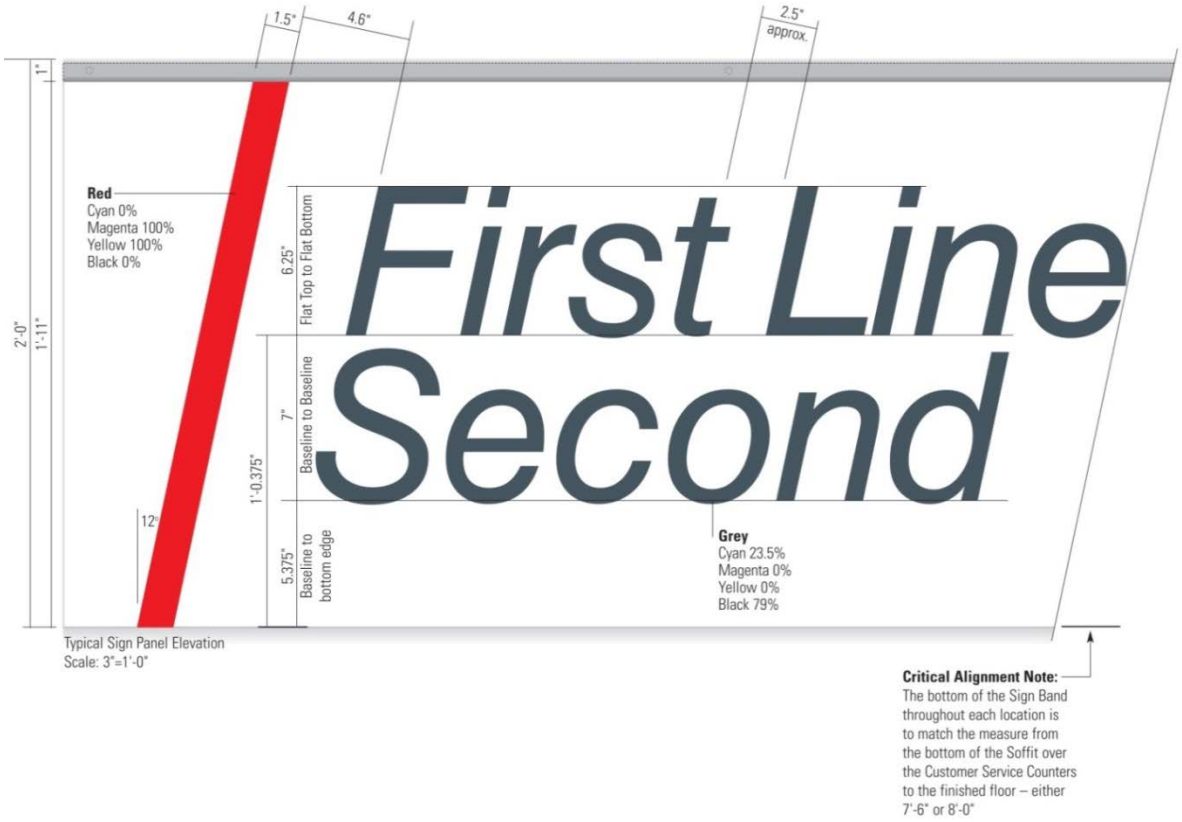


Exhibit 5-4.1b

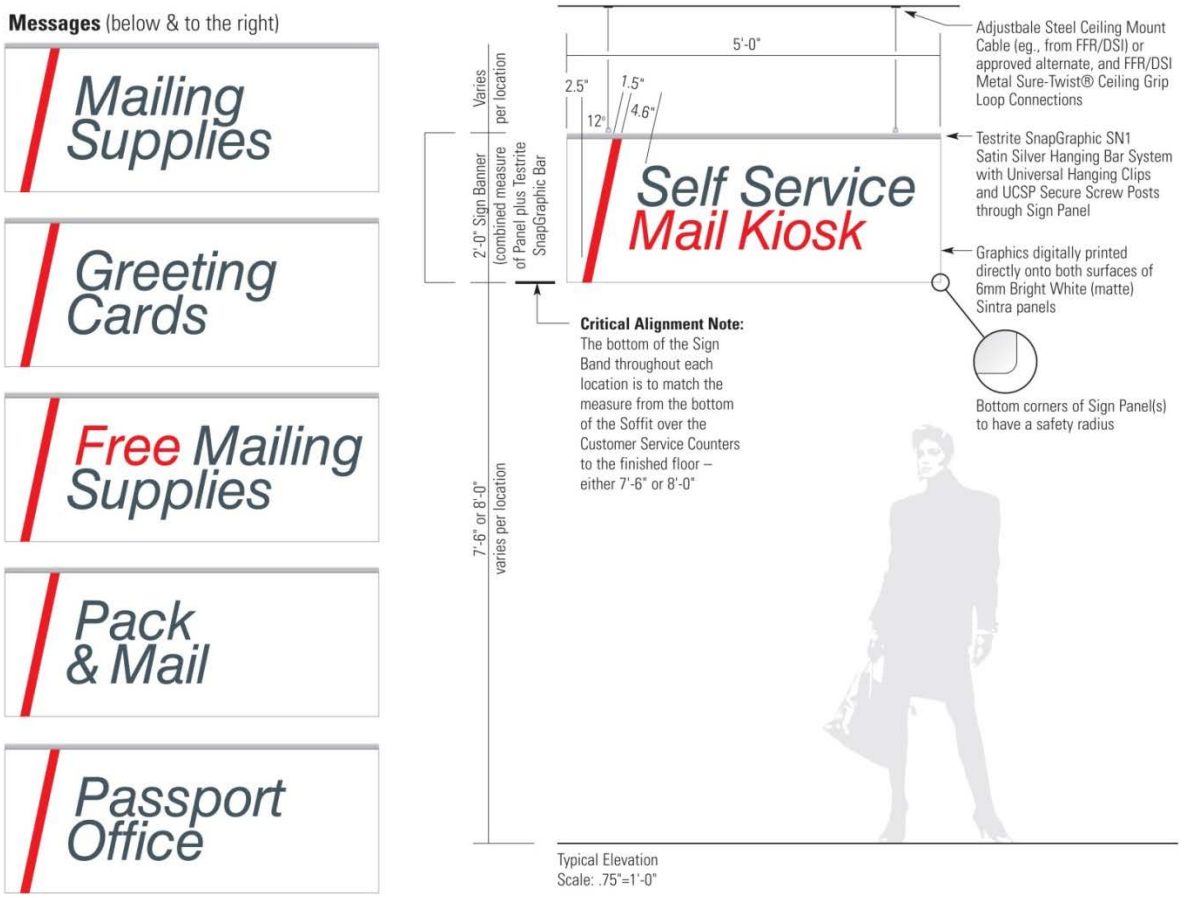
Sign Band Wall Graphics



5-4.2 Descriptor Banner Graphics

Just as the graphics in the Sign Band are descriptors so are the Banner Graphics that hang at an angle above retail display units and Pack & Mail casework units. Retail display units, if any, would be placed along the outside wall of the Full-Service Lobby so that customers pass by them on the way to the Full-Service queue. The banners accent and identify the retail items on display. These banners will be along a wall that does not have the sign band painted on the wall and are mounted at a height to match the sign band used elsewhere. If ceiling space allows, it is preferred that these banners have a blue "top" running to the ceiling.

Exhibit 5-4.2a
Banner Graphics



5-5 Menuboards

Menuboards provide customers with information and costs regarding Postal products and services. Two types of menuboards may be found in Postal facilities: illuminated and non-illuminated. Illuminated menuboards will typically be found in older existing facilities. For R&A projects, if existing menuboards are illuminated and in good shape, they can be re-used. The current standard for new construction is for non-illuminated menuboards. Sizes of menuboard units vary but should match Sign Band height.

The non-illuminated menuboard systems (also referred to as "sustaining") are lightweight graphic and aluminum hardware suspension systems in one of two horizontal formats (34 1/2"w x 23 5/8"h or 25 3/8”w x 18"h). All non-illuminated menuboard configurations consist of a minimum of three (3) and a maximum of six (6) menuboards. The preferred number of menuboards is six (6) so that promotional displays are maximized. Actual menuboard configuration is to be determined by local management.

Position menuboards above the full-service counters so they are visible by customers waiting in queue or standing at the full-service counter. Menuboard displays must run parallel to the full-service counters. They should be mounted to align with the Sign Band that runs on the interior walls of the lobby. For maximum viewing and customer attention, the standard location requires the front face of the menuboard to be aligned with the front straight edge of the full-service counter. If, however, the menuboard display cannot be located in the standard position because of limited ceiling height, or other architectural or structural constraint, it should be positioned on the screenline wall, in place of the ZIP Code graphic. Inspection Service security camera viewing angles must be maintained.

5-6 Frames for Mandatory Posters

G2-7-5n

Mandatory posters display essential legal and community information to postal customers. These elements must be placed in close proximity to the front entrance of the facility in the Self-Service area. Each poster frame measures 8 5/8" x 1'-11 7/8" and holds two 8 1/2" x 11" vertical format sheets of paper.

Provide two (2) poster frame units at each facility for a total of four (4) posters displayed. Mount frames at 6'-0" to the top edge of the poster frame so the top edge of the frame aligns with the top edge of the Post Office boxes. When wall space is limited, frames can be separated into two groups of two and placed in close proximity to each other. The fifth mandatory poster is the Hazmat poster, which is available in two sizes (18" x 24" or 24" x 36"). Place this poster on the wall in an aluminum frame adjacent to the full service counter.

5-7 Box Mail Availability Plaque

G2-7-5u

The Box Mail Availability plaque provides information to customers regarding P.O. Box mail delivery times. This sign must be placed in a highly visible location so it can be seen by customers as they approach the Box Lobby area. This sign must always be displayed with the Post Office Box Information plaque. Align the top edge of the box mail availability plaque with top of the Post Office boxes. Position the plaque horizontally so that it is visually balanced with the architectural features in the space. For example,

when placing the plaque on a column or narrow wall space, center the plaque leaving equal distance on either side.

5-8 Post Office Box Information Plaque

G2-7-5u1

The Post Office Box Information plaque provides customers with the box sizes, rental rates and availability information. It must be centered 1" below the box mail availability plaque.

5-9 Ring Bell for Service

G2-7-5v

The *Ring Bell for Service* plaque provides customers with the ability to pick up packages (from will-call) or ask other questions when the full-service counters are closed. Position the plaque at the wicket door above the bell push button. Mount the plaque 60" from the floor to the centerline of the sign.

5-10 Push/Pull Door Decals

G2-7-5w

Push Pull door decals reinforce entry and exit pathways for customers. These decals are printed on both sides. Each set of decals is placed on either the inside or the outside of the glass. For situations where there is heavily tinted glass, the decals must be placed on both the outside and the inside surface of the glass so they are visible from both directions. In these situations, decals on opposing sides of a common glass surface must be aligned with each other exactly. For situations where glass is clear or lightly tinted, only application of the decal to the interior side of the glass surface is required. The entry decal must be positioned 2" below the Hours of Operation vinyl sign. One decal must align with the left hand margin of the Hours of Operation vinyl sign. The corresponding decal must be positioned at an equal distance from the door pull to create a symmetrical display.

5-11 Next Station Please Counter Plaque

G2-7-5x

A *Next Station Please* plaque must be provided for every full-service counter in a retail facility.

5-12 Dedicatory Plaque

For new construction as well as for major lobby remodeling projects, refer to Module 1, 2-7.5.7 Building Dedication Signage for guidance concerning dedicatory plaques.

5-13 Employees Only Beyond This Point Plaque

The *Employees Only Beyond This Point* plaque must be provided when there is an opening in the Full-Service counter line to allow Sales and Service Associates to engage with customers in the lobby. Place the *Employees Only Beyond This Point* plaque near the top of the counter line gate, centered.

6 General

6-1 Security

When required, place CCTV cameras so that they cover the retail area. Refer to Section 5-7 in SDC Modules 1 and 2B for detailed requirements.

Provide a 180-degree peep hole, doorbell and security lighting at the back entrance to the facility.

Locate safes near the manager's office. When more than five (5) security containers are required, consider providing a UL rated, Class M, modular vault in the workroom for storage of stock, as it is more efficient than multiple containers. Coordinate requirements with local Postal Inspector.

Provide a security wall between the Post Office and other leased spaces as well as a security wall between the public areas of the Post Office and Workroom spaces. At folding closure location in the Full-Service Lobby, provide a security partition above the closure, from ceiling level to the underside of the roof structure above.

A bullet-resistant counterline may be provided only with an approved Deviation that is supported by the Inspection Service and documented with a recent risk assessment. When using bullet-resistant counterline, each clerk workstation must be equipped with a small parcel pass-through, and at least one workstation must have the parcel pass-through and counter at a height that is compliant with RE-4. Every Full-Service Lobby with bullet-resistant counterline must have at least one large parcel pass-through to accommodate oversized parcels. If space permits, in large lobbies additional large parcel pass-throughs may be used so that customers need not walk far to make use of one. The service counter casework from the direct vendor will also need to be modified to accommodate bullet-resistant counterline wall. Bullet-resistant counterline lobbies must also utilize a Counterline Customer Control System to direct customers to the next available clerk. Personnel doors adjacent to or within 5 feet of the bullet-resistant counterline must be a ballistic-rated steel door and frame assembly meeting UL Standard 752 Level 3, and walls located within 5 feet of either side of the bullet-resistant counterline must be reinforced with ballistic fiberglass and meet UL Standard 752 Level 3.

G2-5-6g-g4

134273csf

6-2 Materials and Finishes

The materials and color scheme have been carefully selected for all floor, wall, and ceiling applications in each area of the Retail space. Variation from these standards is allowed only with approval of a Deviation Request. Material and color selection for Retail facilities shall be consistent with the Retail Design Standards. Refer to Standard Detail G2-5-1a for the full Prototype Color and Material List.

6-3 Casework, Furniture, & Equipment

Standard casework exists for each area of the retail facility. Coordinate consistent use and placement of all casework items with the Design Standards. The casework has been designed and detailed to meet safety and RE-4 requirements. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

USPS has a Direct Vendor agreement for Postal Casework. See Specification Section 123504 for current contact information. Materials, placement and installation requirements of the Direct Vendor must be followed explicitly.

Casework finishes – All casework shall have the following finishes:

- Exterior counter finish: PL-4 Grey Glace.
- Counter top finish: PL-5 Lead, with matching gray edge banding.
- Parcel Slide top finish: S-1 Samsung Staron "Solid Bright White".

Only Headquarters-approved retail lobby casework or furniture may be installed in a Postal retail lobby. No custom designed or constructed casework may be used. However, in historical properties, custom millwork may be considered, which will require an approved Deviation.

All retail lobby casework, furniture, & equipment must be inherently tip-resistant, so that a horizontal force applied to the working surface in the short dimension equals or exceeds 100 lbs. without tipping the unit. All lobby casework must be fastened securely to the floor; however, the fastening system is a second, independent safety system in addition to the tip-resistance.

Install two-section, multi-outlet, surface raceway complete with receptacles and T/Os at each Full-Service workstation. The short sections of multi-outlet raceway at each workstation shall be interconnected utilizing flexible conduits and must be furnished and installed by the electrical subcontractor. Refer to Standard Detail G5-2-8a for further information. G5-2-8a

A list of USPS casework items can be found in the USPS Casework Catalog.

6-4 Retail Lighting

Design the lighting systems within the Retail Area to achieve the required light levels and lighting power densities shown within Module 1, Exhibit 5.3.1.6a. Refer to Module 1, Exhibit 5-3.7.1a for cross-reference to the standard Postal luminaire types contained in the USPS specifications.

The Retail area depends heavily on the proper application and intensity of lighting. The intended effect is to provide proper levels of retail lighting to establish the distinction between areas, and accent special elements with downlights, wall washers, and under cabinet lights.

- Provide good quality lighting to enable customers and clerks to carry out visual tasks effectively and comfortably using lights as specified.
- The Self-Service Area must be perceived as a distinct area, therefore the lighting level within the Self-Service lobby must be a higher illumination level than the Main Box Lobby.
- Highlight the package wrapping areas, package material displays, package and ship stations, gondolas, and writing surfaces with downlights or wall washers to facilitate locating these items and merchandise.
- The parcel slide is not to be used as a writing desk for last minute addressing or packaging activities that slow the queue and increase wait time in line. Accent lighting shall therefore not be provided above the parcel slide.

- Provide continuous row of down lighting behind the screenline header to illuminate the ZIP Code graphics as shown in the Exhibit 5-2b and standard detail G2-5-5e4.
- The workroom side of the box alcoves must be sufficiently illuminated to allow employees to sort the mail behind the P.O. boxes. Provide continuous, LED strip lighting cantilever, wall mounted above the P.O. boxes. Refer to standard detail G2-5-4m.
- Sufficient lighting (1 footcandle minimum) is required to stay on 24 hours a day in the Retail areas to allow the CCTV system to function properly. This allows the CCTV system to record an identifiable picture and to record it if an alarm is triggered.
- Lighting within the full-service areas must be wall switch controlled utilizing manual switches during hours of business. Provide time control to de-energize the lighting after full service hours. Wall switches must have pilot lighted handles and provide selective control of the accent display and ambient luminaires within the full service spaces. Locate pilot lighted switches for lobby lighting in employee areas. Clearly arrange and circuit light switches to allow zone control of lights.
- Limited hour Self-Service and Box Lobbies shall be time controlled to de-energize the lighting during “closure” hours. In 24-hour Self Service and Box Lobbies, a time controlled circuit shall be provided to reduce the lighting level to the ambient of 15 footcandles after full service hours. Occupancy sensor(s) control shall be provided to increase the light level up to 30 footcandles upon entry of an after hour patron. Occupancy sensors shall be set for 15 minute time-out delay.

10% Retail Design Checklist

Facility Name:

City, State, Zip:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

Section No.	Detail/ Ref	✓	Item	Comment
2			**CRITICAL LAYOUT RELATIONSHIPS**	
			Self-Service area is immediately visible to the customer from the entry.	
			Full-Service Lobby is placed to the right of the Self-Service area, and at the rear of the space, and SSAs have unobstructed visual contact with all elements of the Retail Display area, if there is one.	
			Full-Service SSAs have a clear view of the entry.	
			Full-service counter(s), POS, P.O. Box, and parcel locker requirements are provided per Retail Requirements Worksheet.	
3			**AREA FUNCTIONAL REQUIREMENTS**	
3-1			Walk-off floor mat is provided at entry.	
			Writing desk is provided near entry.	
3-2			Self-Service items are placed in a shallow alcove, if space permits.	
			A Standard layout has been used as the basis of design.	

Section No.	Detail/ Ref	✓	Item	Comment
3-3			No windows are shown behind the service counters. Cash register drawer and storage area are not visible from the outside of the facility.	
			Retail Display Units, if any, are placed along the exterior wall opposite the full-service counters and arranged for optimum surveillance by clerks.	
			Circulation around Retail Display Units meets requirements of USPS Handbook RE-4.	
			An adequately sized closet has been provided to accommodate the folding closure. The hinges for the closet door are on the exterior edge (public side).	
3-3.1			A counter opening, with a two-way gate, is provided on the end of the Service Counters closest to the main entrance.	
3-3.3			The parcel slide is a dog-legged unit only when appropriate.	

Section No.	Detail/ Ref	✓	Item	Comment
			The parcel slide is parallel to the full-service counters and the dog-leg, if any, angles toward the customer entrance so that the queue forms on the side of the parcel slide away from the full-service counters.	
			The parcel slide terminates 4'-0" to 5'-0" from the full-service counters to deter customers from forming a second queue.	
			A 2- or 3-post pedestrian guidance barrier is provided to initiate queue formation, when appropriate.	
3-4			P.O. Boxes and parcel lockers are arranged so that all parts of the P.O. Box area are visible to the customer from outside the facility.	
			If deeper alcoves are required to meet local requirements, clear lines of sight from the entry of the alcove to all interior parts of the alcove have been maintained.	
			P.O. Box alcoves have been sized to meet standard panel opening dimensions.	
			No hiding places (i.e., columns, pilasters, writing desks) are included in the design.	
			Writing desks are provided and have been placed in the Box Lobby so as not to block visibility into Box alcoves, and at least one accessible writing desk is included.	
			Sufficient clearance has been maintained to push hampers behind the P.O. Boxes (44" min. preferred for saw-tooth layout, 6'-0" min. for straight hallway).	
3-5			An enclosed office has been provided for the Postmaster/Manager, which is adjacent to the Full Service Counters and convenient to the lobby.	
			Space for safes has been provided near the Office.	

30% Retail Design Checklist

Facility Name:

City, State, Zip:

Reviewer (Individual/Firm Names):

Telephone Number:

Date:

Section No.	Detail/ Ref	✓	Item	Comment
2			**CRITICAL LAYOUT RELATIONSHIPS**	
			Elevations are coordinated with standard elevations for exact locations of all signage and graphics.	
3			**AREA FUNCTIONAL REQUIREMENTS**	
			The Facility ID Plaque is applied to an exterior wall near the entrance, and Door Vinyls with operating hours are applied to an entrance door.	
3-2			Letter Drops and/or parcel drops are provided if called for in the FPC or RRW.	
			Alcove is provided in Self-service area for APC/SSK equipment if one is called for, or if 3 or more Full Service counters if not known.	
			Focused accent lighting is provided over equipment.	
			Letter drops and counters meet all accessibility requirements for a side approach.	
	Signage Catalog		The collection times wall plaque is located between letter drops.	
3-3			The ceiling height in the Lobby is at least 9'-0", if structure permits.	
			All partitions (including structure above the folding closure) are of a security type.	
			All fixtures (writing desks, Retail display units, parcel slide, etc.) are appropriately located and will be bolted to the floor or wall.	
			Power & data outlets at full-service counters provided per Std. Detail G5-2-8a.	Std. Detail G5-2-8a is included in drawing set.
3-3.2			The flooring material in the lobby areas is resilient floor tile.	Std. Detail G2-5-1a is included in the drawing set.

Section No.	Detail/ Ref	✓	Item	Comment
			Correct wall colors are identified on all interior elevations for the lobby areas, and all graphics are properly depicted and identified. [Eagle graphic is used only when Full Service Lobby is located to the right of the Self-Service Lobby.]	
			Sign band and menuboards are 18" high if ceiling is below 10'-0" AFF, but no lower than 8'-0" AFF, and are 24" high if ceiling is at or above 10'-0" AFF.	
5-5			The menuboards are surface mounted on a dropped header at the front edge of the Full Service Counter, and extends the width above the counter opening, in accordance with menuboard requirements.	
			2' x 4' LED fixtures are provided above the Full Service Counters recessed LED wall washers are in front of the Full Service Screenline. Downlights (one per counter) are located to highlight transaction counters.	
			Adequate outlets have been provided for the equipment and tasks required. Additional power strips have been provided at the Full Service Counters as directed by USPS.	
			A door bell push button has been located adjacent to the wicket door on the lobby side. The bell has been located so that it can be heard in the workroom, but not in the Full Service Counter area.	
3-3.2			The floor in the Manager's Office is resilient floor tile.	
			The monitor for the CCTV cameras is clearly visible from the Manager's Office, but not from exterior windows.	
			Adequate space and sufficient electrical outlets have been provided for the size and placement of equipment (CCTV monitor, personal computer, etc.).	
4			**GENERAL**	
4-1			Security walls are provided between the public areas of the facility, workroom and leased spaces.	
			A security partition is provided above the ceiling to the underside of the slab at all security grille locations (Full-Service areas).	
			Cameras are placed in accordance with the Security Plan.	

Section No.	Detail/ Ref	✓	Item	Comment
			Security system devices, such as CCTV and alarm systems, are on their own circuits. Coordinate specific security and power requirements with local Postal Inspector.	
			Minimum 36" clear aisles are provided throughout for circulation (increase width if required by local code). A 44" minimum aisle width is desired at open display areas.	
			Security design complies with USPS Handbook RE-5.	
			All public area furnishings and casework are anchored to the floor or wall.	
			Floor tile runs under casework to accommodate future modifications.	

Module 4B – Business Mail Entry Units

1 Introduction

2 Critical Design Relationships

2-1 BMEU Relationship to Other Operations within a Postal Facility

3 Area Functional Requirements

3-1 Exterior Space Design Requirement
3-2 Platform Design Requirements
3-3 Customer Service Area Design Requirements
3-4 Administrative Design Requirements
3-5 Mail Handling Space Design Requirements

4 General Requirements

4-1 Security Requirements

Business Mail Entry Units (BMEUs)

1 Introduction

A Business Mail Entry Unit (BMEU) is composed of a Customer Service module and a Platform module. The design will vary with each project. The Customer Service modules range from two to four customer service counters. The Platform modules are composed of a series of 30" high and 47" loading docks and a corresponding staging and holding area. The Platform modules accommodate various combinations of these loading dock configurations.

The function of a BMEU is to accept, verify, and prepare properly paid bulk mail for movement to dispatch areas.

BMEU design provides customers with a visually attractive and professional atmosphere in which to conduct bulk mail transactions, improves functionality and mail flow, and provides a pleasant, business-like working environment for the BMEU employees.

2 Critical Design Relationships

2-1 BMEU Relationship to Other Operations within a Postal Facility

2.1.1 Location

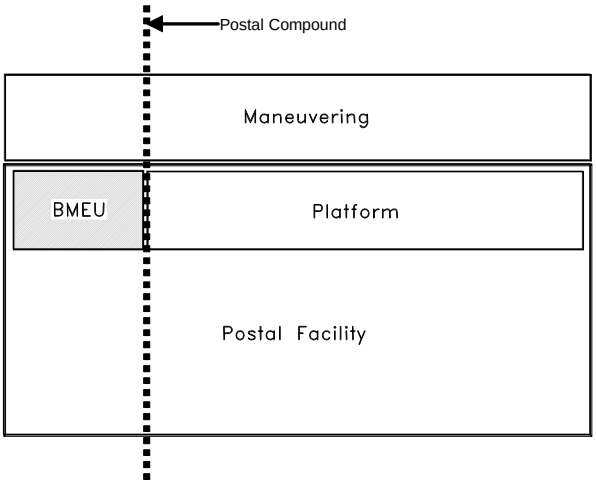
Locate a BMEU outside the secure postal compound, at a corner of the postal facility or at the end of the platform. Never locate a BMEU in the middle of the platform area. This allows easy and safe customer access to and from the BMEU, improves security by limiting customer access to processing and distribution areas, allows better control of mail flow, and ensures revenue protection.

The BMEU Platform space must have a sufficient number of dock stalls dedicated exclusively for BMEU customer use. Whenever a BMEU Platform is adjacent to other postal operations, the two spaces must be separated on the platform by a chain link barrier.

Wayfinding onto the postal facility site and to the BMEU service area is a primary issue. The BMEU must be “visually understandable” to the customers. Upon entering the grounds of the postal facility, customers must be directed to the BMEU by clear use of site signage. Refer to Module, Exterior Signage for further information.

Exhibit 2-1.1a shows the design relationship of a BMEU located within a postal facility.

Exhibit 2-1.1a
BMEU Relationship to a Postal Facility



2-1.2 Relationship of Spaces within the BMEU Design

The relationship of areas within the BMEU is governed by functional relationships between activities. The BMEU design intentionally separates the servicing of small volume mailers from the medium and large volume mailers. Hence, the use of the BMEU is largely determined by the volume of mail a particular customer is presenting. Small volume customers must park and proceed directly (with their mail) to the Customer Service area in the small mailer lobby. Medium and large volume mailers must use one of the loading dock spaces and proceed to their Customer Service area at the dock workstations on the Platform.

2-1.3 Entry & Customer Service

From the parking area, small volume customers enter at the vestibule to access the customer service counterline in the lobby. Small volume is defined as 4 or less trays or sacks per bulk mailing. These customers have access to a counter/re-work area. A Mailer Training Room is optional Customer Service features. Medium and large volume customers (more than 4 trays or sacks per bulk mailing) access the facility at the Platform. Dock workstations must facilitate their mailing activities.

2-1.4 Mail Handling

The Mail Handling space relates directly to the Platform and Customer Service areas. This space houses the workroom workstations, mail holding, and mail staging functions.

During busy periods, mailings are staged in order to provide timely service to the next waiting customer. Completion of the remaining acceptance procedures is performed later in the day.

The primary use of the workroom workstations is to perform verifications and complete the acceptance process for the staged mailings. The verification process involves examination of the mailing including: obtaining the total weight of the mailing; the weight of a single mail piece; verification of the mailing's piece count; determination of the mailing's qualification for the rate claimed; checking of the mailing labels, mail preparation, and mailing statement, etc. Once a

mailing passes the verification process, the mailing is accepted. The clerk bills the customer's permit account for the postage owed and the mailing is moved to the cleared mail staging area. Verification will typically be accomplished using automated Mailing Evaluation Readability and Lookup Instruments (MERLINs), but manual workroom verification workstations may also be utilized. The number of MERLINs and manual workstations will vary with the size of the BMEU.

Mailings that cannot be released due to a discrepancy detected after the customer has left and which the customer must correct (i.e., in sufficient funds, preparation errors) are held in the mail holding space.

2-1.5 Administrative

The Administrative functions relate to both the Customer Service area and Mail Handling space. The BMEU plans must locate these functions to facilitate the operation of the BMEU.

The Administrative space includes the supervisor's office, clerk desk work space, BMEU file space, and storage. The size of the administrative space will vary with the size of the BMEU.

2-1.6 Corral Storage Area

An exterior corral storage area is provided for storage of mail carts used by customers to transfer material into the BMEU customer service area. The area must be enclosed with a wall of similar materials to the exterior of the facility. See BMEU Customer Service Modules for location and additional information.

3 Area Functional Relationships

Since most BMEUs are part of a larger postal facility, the efficient and safe movement of customers to and from the BMEU is important. The design requirements for the exterior space of a BMEU can be found in Module 2A, Chapter 1, Section 1-2. *(Also refer to Module 2A)*

Module 2A

3-1 Exterior Space Design Requirements

3-1.1 Accessibility

The BMEU entrance must be accessible, and on an accessible route from customer parking. This involves the use of accessible parking stalls, passenger loading zones, curb ramps, stairs, and accessible ramps. This access to the BMEU must be directly adjacent to the BMEU and avoid crossing and/or interfering with main facility traffic flow.

3-1.2 Stairs/Ramps/Sidewalks

Locate pedestrian ramps d near the BMEU Customer Service entrance and away from vehicular traffic to guide pedestrians in a safe path. Provide proper lighting and railings on all ramps.

3-1.3 Signs and Pavement Markings

Provide signs for control of all vehicles entering and exiting the site. Signs must properly identify designated parking spaces and dock stalls. Signage must control separation of differing vehicle sizes and separation of customer and postal vehicles. All site signage used to identify a BMEU must correspond with existing or new facility signage for a consistent appearance.

A customer must receive a clear indication of where to find the customer entrance, or the BMEU dock stalls, upon entering the site in their vehicle. If the entrance drive is not denoted by a freestanding facility identification sign or is unclear, an entrance sign must be used. If the BMEU is located away from the entrance drive, use BMEU directional signs to direct customers.

Each BMEU dock stall must be identified by dock stall number signs and must be coordinated with dock stall signs used for the total facility.

All pedestrian crosswalks must be striped to guide pedestrians in a safe path and to warn drivers of a pedestrian crossing point. This must be followed for both exterior conditions and on the platform.

For further information on exterior signage, see Module 4C, Exterior Signage. *(Also refer to Module 4C)*

Module 4C

3-1.4 Parking

Provide each BMEU an adequate number of small mailer parking stalls (typically car/van parking) adjacent to the BMEU entry.

Accessible parking must conform to the requirements of USPS Handbook RE-4. When only one accessible parking stall is required, it must be van accessible. *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

3-1.5 Exterior Building Identification

Identify a BMEU with two signs, an externally illuminated plaque and an entry door decal. Position the entry door decal as shown in the BMEU documents. The position of the plaque may vary per BMEU, but the plaque must be located in a position of high visibility.

Additional signage may be provided to allow for additional visibility. When a BMEU is located at a corner of the building, structure mounted signs may be used. When a BMEU has a dedicated site entrance and is not intermixed with other postal operations, a monument or pylon sign may be desired to identify the site. If a BMEU has more than one dedicated building entrance, each entrance door must have an entry door identification plaque or decal.

3-1.6 Grade Transitions

To separate the grade difference between differing dock heights provide a sloped area with yellow striping at 45 degrees. Bollards may be used along the sloped transition for additional safety. If bollards are used, space them at approximately 10' o.c. for the entire length of the dock stall (typically 45' out from the face of the dock) and paint them yellow.

If existing conditions do not allow for a sloped transition, a retaining wall may be used; however, a retaining wall must only be used when the transition cannot be accomplished by a slope. Provide properly designed guard rails on the top of any retaining wall. To minimize the length of these walls, warp paving and adjust grades where it is practical and safe.

3-1.7 Dock Stalls and Maneuvering

The number and mix of dock stalls will vary for each BMEU. Each BMEU must accurately determine the number of both 27"/30" and/or 47" dock stalls needed for efficient BMEU operations by using the BMEU Space Estimating Procedure, found in Appendix 4B-A at the end of this section.

3-1.8 Remote Truck Parking

Remote truck parking provides temporary truck parking for those customers awaiting the use of a dock stall. This will eliminate vehicular congestion at the dock stall maneuvering areas. Remote truck parking stalls must be striped in a similar manner as used at the dock stalls.

3-2 Platform Design Requirements

3-2.1 Introduction

The Platform space is used by both customers and BMEU employees. For most medium and large mailers, this is their regular contact point with postal employees. This space must allow efficient and safe use to all users. Design of the platform area must conform to the criteria contained in Module 2A. The following descriptions provide design requirements for the Platform area at the BMEU. *(Also refer to Module 2A)*

Module 2A

3-2.2 Platform Separation

As a means of separating customers unloading at the BMEU Platform from other postal operations, provide a stanchion-supported chain barrier or horizontal woven chain closure on the platform between the BMEU and other postal operations on the platform. Provide a two door 6' wide traffic gate and a 3' wide pedestrian gate connecting the two platform areas. Provide adequate fire egress with handicap hardware if required.

3-2.3 Platform Floor Scales

Floor scale(s) are to be provided by the local facility. Each BMEU must have a minimum of one 5'x7' (min.), 3,000 pound (min.) capacity, low profile electronic floor scale for the weighing of medium and large bulk mailings. The scale must be an electronic load cell type with two digital indicators. Locate one indicator at a dock workstation for clerk visibility; mount the other on the back wall of the Platform for customer visibility.

Locate the platform floor scale(s) to provide efficient transfer of weighed mail from the scale to either the Mail Handling space, Processing and Distribution (usually adjacent to a BMEU), or staging and holding areas located on the Platform.

For safety purposes, the floor scale must have a 4"-6" yellow stripe at the perimeter. If the scale is located in a high pedestrian traffic area, a painted safety zone may be provided around the scale. Provide railings on the sides of the scales.

3-2.4 Staging and Holding Areas

Designated areas must be provided on the BMEU Platform for staging and holding of bulk business mail. Define these designated areas by yellow striping around the perimeter. The minimum clear depth for these spaces must be no less than 4' from a wall. Coordinate actual location of staging and holding spaces with the USPS.

3-2.5 Dock Workstations

To better assist medium and large mailers, dock workstations must be provided on the BMEU Platform and are similar to the workroom workstations in the Mail

Handling space and the customer counterline workstations the lobby. Design this workstation to be used in a standing position only with an anti-fatigue floor mat.

Locate an employee call bell/buzzer button at each dock workstation to notify clerks in the Mail Handling workroom that additional assistance is needed on the dock.

3-2.6 Rework Desks

Locate rework desks on the Platform near the entry door to the Customer Service Lobby. This area consists of rework counters specially designed for mailer needs.

3-2.7 Signage

Provide coordinated, clear, and informative signage for both customer and employee use. Provide customer signs which convey only the necessary information to inform a customer of proper operations, procedures, and the location of customer oriented functions. Provide employee signs to clearly identify staging and holding areas. Identify each dock on the interior with a number which corresponds to the exterior number.

Clearly mark all doors leading to postal operational spaces with a 'Authorized Personnel Only' sign to deter customers from entering these spaces. Clearly mark the Customer Service Lobby door with a 'No Rolling Stock Permitted In Lobby' sign to eliminate equipment in the lobby area. Coordinate the requirements and location of these signs with the USPS.

Use room identification signs to identify the Customer Service Lobby, Processing and Distribution, Mail Handling, and any other adjacent functional areas. These signs must match the type used throughout the entire facility.

Locate all Platform signs in a position of high visibility, whether wall mounted or overhead. The size of each sign must be as large as necessary to convey the appropriate information.

3-2.8 Materials and Finishes

The materials and finishes in the Mail Handling space must conform to the finishes of the adjacent facility Workroom/platform areas.

3-3 Customer Service Area Design Requirements

3-3.1 Introduction

The Customer Service area includes the customer service lobby, counter/rework area, counterline, and screenline. The appearance of this area is vital to the perception customers have towards the USPS. The size of the module for the Customer Service area will vary with each BMEU. The following descriptions provide design requirements for the Customer Service area.

3-3.2 Entry

The Customer Service entry (primarily used by small volume mailers) must be easy to see and identify from the exterior of the building and from the customer's main arrival route and mode (by car, truck, foot, etc.). The design and location of the entry must be as shown on the BMEU drawings. The BMEU entry and windows (if applicable) must conform to the overall exterior building and glazing

system designs while providing visibility to the parking area from the lobby. The vestibule must be provided for comfort and energy conservation.

Ingress/egress requirements may vary based on local codes. Doors must be bi-parting sliders with high frequency use automatic door operators.

Provide a Corporate type J-1 BMEU Entry Wall Plaque. Also provide Corporate type N-1 Door Vinyls.

Use a bell/buzzer system on the customer entry door(s) to notify employees in the workroom of entering customers.

3-3.3 Customer Service Lobby

The Customer Service Lobby must provide the necessary amenities a BMEU customer needs to efficiently present their bulk mail. This area consists of casework items designed particularly for this use, a bulletin board for customer information and mailing instructions, and a wall mounted publications holder. If space allows, provide a bench(s) for customers.

3-3.4 Rework Area

Locate this area in the Customer Service Lobby near the counterline. The casework requirement for the rework area is at least one accessible rework desk, one desktop storage unit and one storage and waste unit. Additional units may be required depending on the size of the BMEU.

3-3.5 Bulletin Board (Customer)

To provide customers with mailing instructions and other bulletins, mount framed display case(s) with lockable glass front panels above the rework counters. Locate the display case(s) as indicated in the BMEU drawings. Display case(s) must be a minimum of three feet high by six feet long.

As indicated in the drawings and specification, install a wall mounted publications holder for display of postal publications.

3-3.6 Counterline Workstations

A string of clerk workstations forms the counterline. An anti-fatigue floor mat must be provided at each workstation. Standard workstation components are available through the USPS Direct Vendor Program. See order forms for current contact information.

Provide one accessible counter at the counterline to service customers.

In addition to the casework items, each counterline workstation must have a 300 pound scale, a 25-pound sampling scale, a Permit System terminal, keyboard and printer, an adding machine, and various other BMEU clerk acceptance and verification tools. All these items will be USPS-supplied. The BMEU drawings and specifications outline the power requirements for these items. The design must also provide for telephones.

Locate an employee call bell/buzzer push button at each of the counterline workstations. This is a button located on the casework unit which when pressed sounds a bell or buzzer in the Mail Handling workroom space to alert clerks working in this space that additional assistance is needed at the counterline to assist customers.

3-3.7 Screenline

A screenline, located directly behind the counterline workstations, provides a visual barrier between the Customer Service lobby and Mail Handling workroom space. This is located directly behind the counterline workstations. The screenline consists of base cabinets and optional wall cabinets on the Customer Service side and mail handling equipment on the Mail Handling side. The total length of the screenline is less than the length of the customer counterline. The cabinets must be recessed in an alcove. If wall cabinets are not used, provide a light cove. The walls on the Mail Handling side must have wall bumpers for protection as detailed in the BMEU drawings.

3-3.8 Mailer Training Room (Option)

The Mailer Training Room is an optional module offered for BMEUs needing space for the training of bulk mail customers as well as BMEU personnel. It consists of a meeting room that is conveniently located near the Supervisor's Office and the Customer Service Lobby.

To project a professional image, this area must have finish materials that match the Customer Service lobby. Refer to the BMEU drawings for plans and elevations of this room.

3-3.9 Interior Signage

Provide 'Next Station Please' signs at each counterline workstation. As well, if a Mailer Training Room is incorporated into the BMEU, room identification is required. Provide a 'No Smoking' sign in the lobby.

3-3.10 Materials and Finishes *(Also refer to Module 2A)*

Refer to the BMEU drawings and interior finish schedule Appendix M1-D for the identification of materials.

Module 2A

3-4 Administrative Design Requirements

3-4.1 Introduction

The following descriptions provide the design requirements for the Administrative area. Furniture items are USPS supplied. The USPS will determine exact items and quantities to be included in the BMEU project.

3-4.2 Supervisor's Office

Locate the BMEU supervisor's office for easy access to both the Customer Service Area and the Mail Handling space. In smaller BMEUs where space is limited, it may be combined with the bulk mail clerk's work space, but in most BMEUs the supervisor's office must be an enclosed room of approximately 120 square feet.

3-4.3 Bulk Mail Clerk Administrative Work Space

The BMEU Designs provide an open area in the Mail Handling space for bulk mail clerks to perform administrative work. This area primarily consists of standard office furniture which will be provided by the USPS. This space must accommodate desks with returns, file cabinets, a Permit System terminal with keyboard and printer, a large format printer and possibly a personal computer and printer. Provide maximum flexibility for future changes in electrical and telecommunications.

3-4.4 Storage Room

Provide space to store postal forms, postage statements, and miscellaneous supplies vital to BMEU operations. This space must be able to accommodate both upright and lateral files (to store official postal documents), and shelving. The size of the Storage room will vary accordingly with the size of the BMEU Design. The storage room may be eliminated depending on local needs.

3-4.5 Signage

Identify the supervisor office and storage room with a room identification sign indicating the room name and, if applicable the room number. These signs must be coordinated with the rest of the postal facility for a consistent appearance.

3-4.6 Materials and Finishes *(Also refer to Module 2A)*

The materials used in the Administrative space are designed to promote a professional office environment. Refer to the BMEU drawings and interior finish schedule Appendix M1-D for identification of materials.

Module 2A,
Module M-1D

3-5 Mail Handling Space Design Requirements

3-5.1 Introduction

The Mail Handling space is critical to the functioning of a BMEU. The following descriptions provide design requirements for the Mail Handling Space.

3-5.2 Mail Handling Space

Configure the Mail Handling space to allow an efficient means of moving, verifying, and accepting bulk business mail.

Locate an employee bell/buzzer in the workroom space to notify clerks of entering customers and/or assistance needed at the customer counterline or dock workstations. A Criminal Investigative System CCTV observation is mandatory in this space.

3-5.3 Staging Area

Locate this space for easy accessibility by the clerks and be out of the main circulation path. Identify all staging spaces by signage and by striping on the floor. A clearly identified staging space will eliminate any unnecessary congestion of mail handling equipment.

Each BMEU Design includes the additional space in Processing and Distribution (as specified in Handbook AS-504) for the staging of cleared mail. The allocated space varies with the size of the BMEU Design. This space must be identified similar to the pending verification staging area. *(Also refer to USPS Handbook AS-504)*

USPS Handbook AS-504

3-5.4 Workroom Area

The BMEU Workroom includes the MERLIN automation, as well as the clerk workstations used to complete verification and acceptance of staged mailings. Similar to the counterline workstations, the quantity and configuration of MERLINs and manual verification workstations varies per BMEU design, as well as per individual facility.

Each MERLIN unit requires a maximum level concrete floor area of 156" x 164" for installation, maintenance, and operational access. Each MERLIN unit weighs

950 lbs. If necessary, MERLIN unit footprints may be overlapped and the units nested up to the limit shown in MERLIN vendor drawings. Coordinate all arrangement of MERLINs in BMEUs with the USPS.

Each MERLIN draws up to 22.3 A/2.8 kVA from a 115 V, single phase, 60 Hz electric power source, 3-wire circuit and generates 9,000 Btu/hr of waste heat.

Provide a LAN connection for each MERLIN: the connecting cable must be a UTP, cat 5 (100/10 BASE T) with an RJ-45 connector,

The equipment requirements for the manual verification workstations are similar to those at the customer counterline workstations. However, unlike the counterline workstations, some of the equipment (i.e., 25 pound scale, Permit terminal) may be shared between clerks and these workstations have the option of being designed for use with a chair if desired. Optional storage units may only be used if the workroom station is design for standing use only. For standing use, provide an anti-fatigue mat at each workstation. All workstations must have the necessary electrical provisions for a 25-pound sampling scale, a Permit System terminal, keyboard, and printer, an adding machine, and miscellaneous verification and acceptance tools.

When sharing of the Permit System terminal and keyboard is necessary, provide an adjustable monitor arm with keyboard tray. Mount this item between shared workstations in a location easily accessible by both employees.

3-5.5 Bulletin Boards (Employee)

Provide bulletin board(s) or tack boards in the BMEU workroom to display official information for employees. In addition, small size tack boards for clerk use at workroom workstations only must be provided.

3-5.6 Signage

Signage must be used to properly identify mail staging areas and must either be suspended from the ceiling grid or wall mounted. Identify the Mail Handling space from the platform or other adjacent postal operation spaces by room identification signs, if applicable.

3-5.7 Materials and Finishes

The materials and finishes in the Mail Handling space must conform to the finishes of the adjacent facility Workroom/platform areas. Metal stud and gypsum board walls must have ¼" fiberglass panel wainscot (4' high). The wainscot color should match the wall color.

4 General Requirements

4-1 Security Requirements

4-1.1 Introduction *(Also refer to Module 2A)*

The upgrading of an existing facility or the development of a new BMEU must follow the requirements of Module 2A. This will include site, building interior design, employee and customer areas, and access to mail processing and dock areas.

Module 2A

Customer access must be separated from Postal truck traffic. The customer parking and loading/offloading must be separate from USPS mail handling and

distribution docks. Customer building entry must be separate from USPS employee or mail handling plant access.

4-1.2 Criminal Investigative System (CIS) *(Also refer to Module 2A)*

Incorporate a Criminal Investigative System if it is within the rest of the facility. If a Criminal Investigative System is to be provided, design camera placement, quantity, and locations in accordance with Module 2A, Section 5-7.

Module 2A

4-1.3 Security CCTV System *(Also refer to Module 2A)*

Incorparate a Security and Access Control System if it is within the rest of the facility. If such a system is to be provided, design camera placement, quantity, and locations in accordance with Module 2A, Section 5-7.

Module 2A

4-1.4 Intrusion Detection System

The use of an Intrusion Detection System will depend on the needs of the entire postal facility in which the BMEU is located. Coordinate requirements with the local Inspector.

4-1.5 Security Construction *(Also refer to Module 2A)*

Doors and frames must resist unauthorized entry to the BMEU from the exterior. Glazing, materials, and types of doors and frames must meet the requirements of Module 2A and Mail Processing Facilities Specification.

Module 2A

The Storage Room is the only room which may require “security walls” (walls extending to the underside of the structure). If official postal records are to be stored in this room then use security walls. Alternatively, a gypsum wallboard ceiling may be used as security barrier in lieu of extending the walls to the underside of the structure.

Security containers (floor safes) may be used and located in a secure storage room. All accountable paper must be secured in security containers.

Module 4C – Exterior Signage

1 Introduction

2 General

2-1 Retail Signs - Components
2-2 Corporate Signs - Components
2-3 Selection Procedures
2-4 Placement
2-5 Installation Requirements

3 Standard Applications

3-1 Mail Processing Facilities Retail Signs
3-2 Mail Processing Facilities Corporate Signs
3-3 Customer Service Facilities Medium Retail Signs
3-4 Customer Service Facilities Medium Corporate Signs
3-5 Customer Service Facilities Small Retail Signs
3-6 Customer Service Facilities Small Corporate Signs
3-7 Compact Post Office Retail Signs
3-8 Alternate Quarters Retail Signs (StorCAD/D)
3-9 Signs for Non-Standard Buildings

Exterior Signage

1 Introduction

Facility signage is an important aspect of facility design standards. The Postal Service has established a Direct Vendor source for exterior signs in the following two categories:

- Retail Signs, used for facilities that have public retail space.
- Corporate Signs, used for non-Retail facilities.

Retail Signs provide customers with an aggressive and dynamic sign signal, that clearly differentiates USPS retail outlets from competition. This sign system is generally internally illuminated in all facility applications and features a fully lighted flexible sign face, which creates strong customer appeal in both day and nighttime viewing conditions. Retail Signs call for aggressive placement, size, and quantities of signs to be displayed at our Post Office locations.

Retail Signs must incorporate the use of a unique Retail Graphic referred to as the Retail Identifier. The Retail Identifier differs from the Corporate United States Postal Service Signature. It features a modified eagle and special typography for the words “United States Post Office” surrounded by a thin blue border (see Exhibit 1a). This Retail Identifier must be used only on exterior retail signs; no other use of this graphic is permitted.

Exhibit 1a
Retail Identifier

Corporate Signs must be used only for Postal Service locations that do not have Retail services (see Exhibit 1b), such as free-standing Carrier Annexes, free-standing or separate passport acceptance offices, Bulk Mail Acceptance Units, Remote Encoding Offices, Vehicle Maintenance Facilities, and Administrative Offices. Corporate Signs must be used at Corporate (non-retail) entrances and facilities only. Corporate Signs utilize the Corporate Brand Signature, which includes the words “United States Postal Service.” The primary sign faces are fabricated using routed aluminum. Graphics are rear illuminated on a non-illuminated painted metal background.

Exhibit 1b
Corporate Brand Signature for Non-Retail Signage

The proper use of the two exterior sign types will increase the awareness of USPS products, services, and locations, allowing facilities to be easily located and accessed by customers. Together Retail and Corporate Signs communicate quality and professionalism, effectively competing for customer business.

The following guidelines provide information for the proper use and selection of signs for both sign types:

- Standard Detail Library for illustrations and dimensional information regarding each sign component;
- Master Specification for general contractor responsibilities.
- Direct Vendor Folder for pricing forms and Direct Vendor Signage Catalog.

G2-7-5a-m1
G5-3-2b→c

Additional information on sizing, application and ordering may be found in the resources listed below.

2 General

2-1 Retail Signs - Components

G2-7-5a→b2

2-1.1 Pylon and Monument Signs

Locate freestanding pylon or monument signs at most retail facilities (see Exhibit 2-1.1a). Various sizes of pylon and monument signs are provided to address differing site layouts, architectural footprints, viewing conditions, square footage requirements, and city ordinances. Pylon signs are preferred over monument signs in larger facilities (CSF Medium and some of the larger CSF Small) when either will work because pylon signs provide additional desired visibility. The monument sign may be appropriate to use when a property is heavily landscaped with trees and the lower profile monument sign would be more visible under a tree canopy. The horizontal monument format is preferred over the vertical (square) monument format. (See Exhibit 2-4b.) Note that pylon signs must be installed with the vertical post nearest to the building and "flag" pointing toward the street.

Freestanding retail signs do not incorporate community identification as a standard policy. For special circumstances or requirements, community identification may be obtained on monument signs only. This is done by an approved deviation through Headquarters Field Operations.

Exhibit 2-1.1a
Pylon and Vertical (Square) Monument Signs

2-1.2 Wall Attached Cabinet Signs

G2-7-5c→c3

A cabinet sign (see Exhibit 2-1.2a) displays the Retail Identifier, and the presentation of the cabinet sign is called the 'Retail Signature'. If site conditions do not allow for the use of the full signature components, approval of the Headquarters signage Program Manager is required.

Exhibit 2-1.2a
Horizontal and Vertical (Square) Cabinets (Retail Signature)

2-1.3 Tenant Signs

When tenant sign panels are required for landlord provided signs, contact the Headquarters signage consultant. These signs require custom layout and sizing of the Retail Identifier to fit the landlord's sign face opening and sign illumination requirements.

G2-7-5d→d4

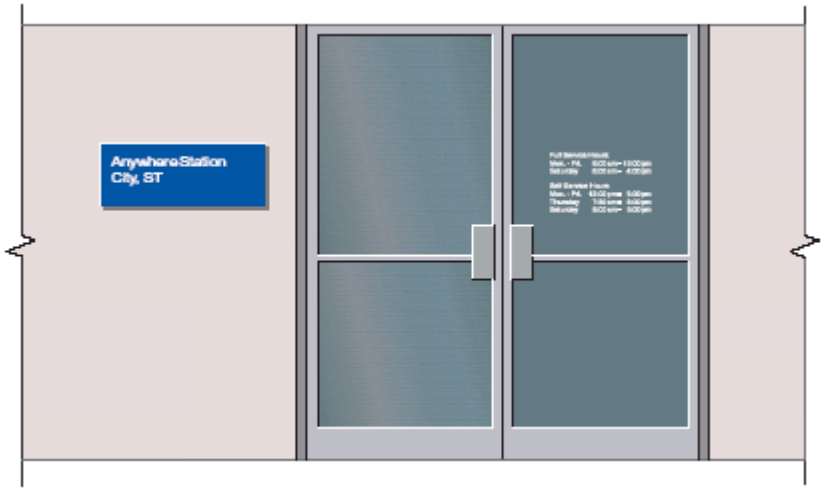
2-1.4 Entrance Signage

Every facility must display the facility name, city, and state in a predominant position at the main entrance. This information appears on a facility/station identification plaque (preferred option). If a wall surface is not available, this information must be displayed as white vinyl letters applied to the glass

window next to the front entry doors. Display of the facility identification information must be positioned on the left hand glass panel if there is glass on both sides of the entrance door. If a glass sidelight is not available next to the front entry doors, this information must be applied above the hours of operation information positioned on the main entrance. No Zip codes are to be used on facility/identification plaques or vinyls. (See Exhibits 2-1.4a through 2-1.4c.)

Three sizes of identification plaques are available to meet varying viewing distance conditions. Select an identification plaque size that is visible from the nearest curbside viewing point to the front entrance area where the plaque will be positioned. Select the size that is appropriate to each particular facility situation by using a formula of 32 feet of viewing distance per inch of capital letter height. The smallest identification plaque has a 2" capital letter height and is readable from 64'-0".

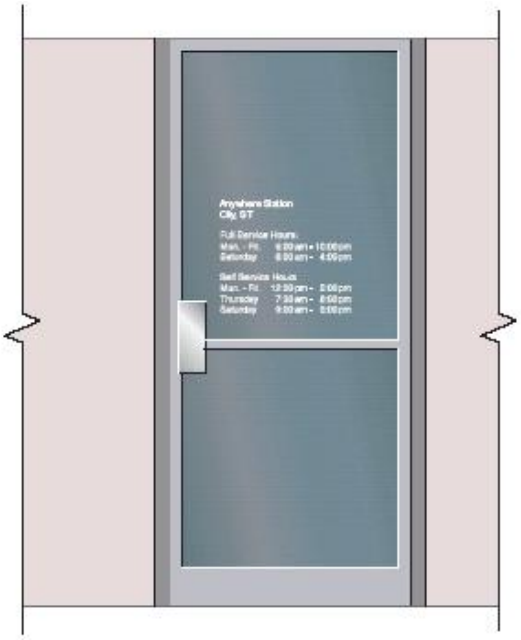
Exhibit 2-1.4a
Identification Plaque and Hours Vinyl



Hours of operation must be displayed on glass entry doors using white vinyl lettering, and indicate both Retail and Box Lobby hours. Hours vinyls must always be positioned on the left hand door, typically the exit door. Vinyl applied copy must always be first surface applied to the outside of the glass List hours information on the Signage Pricing Forms in or the Direct Vendor Folder.

Exhibit 2-1.4b
Facility/Station Identification and Hours Vinyls

Exhibit 2-1.4c
Facility/Station Identification and Hours Vinyls Combined



2-1.5 Directional Signs

Directional signs lead customers to important service areas at Postal Service facilities. Directional signs used for Retail facilities and Non-Retail facilities are identical. (See Exhibit 2-1.5a.)

G2-7-5e→f3

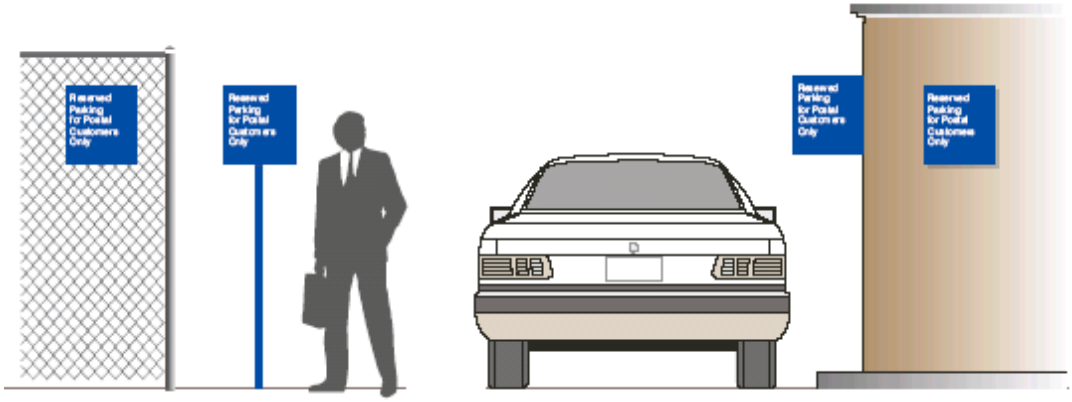
Exhibit 2-1.5a
Directional Signs

Directional signs are used at the primary entry points to a facility and at critical decision points on the property. Directional signs guide customers to and provide important information such as Mail Drops, Parking, Additional Parking, Exit, BMEU, or other important services. Use the approved messages supplied on the signage pricing forms in the Direct Vendor Folder when appropriate.

2-1.6 Regulatory Signs

Regulatory signs (see Exhibit 2-1.6a) are used for displaying regulatory parking information. These signs must never be used as traffic control signs. These are available as free-standing pole signs, wall or fence attached signs. Three sizes are available for each sign application. Regulatory signs for the Corporate and Retail programs are identical. Use the approved messages found on the signage pricing forms.

Exhibit 2-1.6a
Regulatory Signs (flag, pole, fence and wall mounted)



2-1.7 Traffic Control Signs

See Module 1, Chapter 1, 1-2.4.3, regarding DOT traffic signs such as Stop, Yield, No Left Turn, One Way, etc.

2-2 Corporate Signs - Components

2-2.1 Monument Signs

G2-7-5h→h1

Corporate monument signs must be located at a non-retail facility whenever possible. This sign reinforces the USPS corporate identity. Various sizes of monument signs address the need of differing site layouts, architectural footprints, viewing conditions, square footage requirements, and city ordinances. (See Exhibit 2-2.1a.)

Exhibit 2-2.1a
Monument Sign

2-2.2 Wall-Attached Cabinet Signs

Wall attached cabinet signs (see Exhibit 2-2.2a) may be used as primary signs when zoning or property size restrict the use of a monument. Wall signs may also be used when visibility would be improved by the use of this type of sign.

G2-7-5i→k

Exhibit 2-2.2a
Horizontal Stacked, Vertical (Square) and Horizontal Cabinet Signs

Both horizontal and vertical cabinet signs are available for use on facility walls. The horizontal stacked cabinet is preferred over the horizontal or square format cabinets.

2-2.3 Entrance Signage

G2-7-5m→m1

Every facility must have the facility name, city and state displayed in a predominant position at the main entrance. This information can either appear on a facility identification plaque (preferred option) or appear as vinyls, either on the doors or on a glass sidelight. (See Exhibits 2-2.3a through 2-2.3b.)

Exhibit 2-2.3a
Facility Identification Plaque and Hours Vinyls

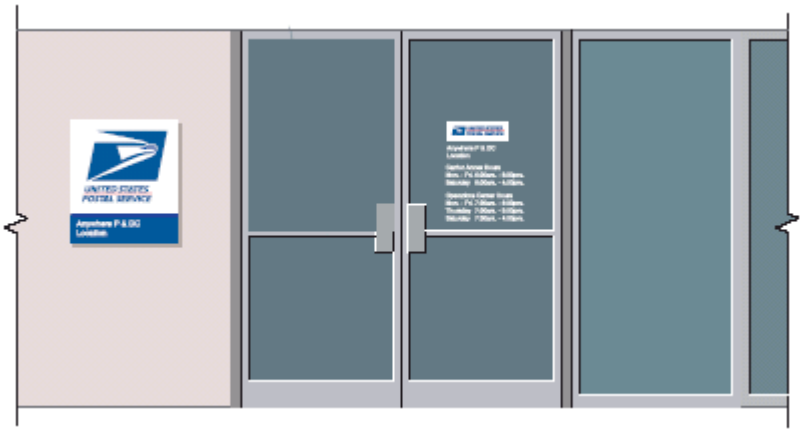
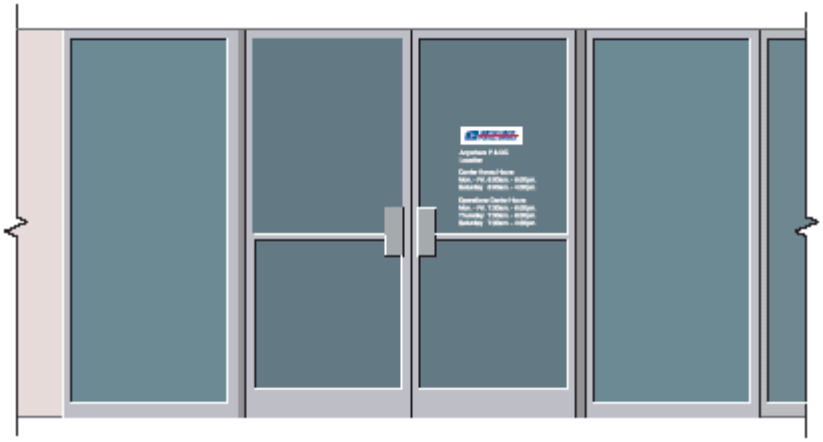


Exhibit 2-2.3b
Facility Identification and Hours Vinyls



G2-7-5e

2-2.4 Directional Signs

Directional signs lead customers to important service areas at our facilities. Directional signs used for Retail facilities and Non-Retail facilities are identical. (See Exhibit 2-1.5a.)

Directional signs are used at the primary entry points to a facility and at critical decision points on the property. Directional signs guide customers to and provide important information such as Mail Drops, Parking, Additional Parking, Exit, BMEU, or other important services. Use the approved messages supplied on the sign pricing forms in the Direct Vendor Folder when appropriate.

2-2.5 Regulatory Signs

Regulatory signs are used for displaying regulatory parking information. These signs shall never be used as traffic control signs. These are available as free-standing pole signs, wall or fence attached signs. Three sizes are available for each sign application. Regulatory signs for the Corporate and Retail programs are identical. Use only the approved messages found on the pricing forms in the Master Specification.

2-2.6 Traffic Control Signs

See Module 1, Chapter 1, 1-2.4.3, regarding DOT traffic signs such as Stop, Yield, No Left Turn, One Way, etc.

2-3 Selection Procedures

2-3.1 Sign Selection and Support Services

Refer to information in other SDC Modules for standard sign selection and placement for CSF Small, CSF Medium, Alternate Quarters and Compact Post Offices.

Only projects requiring nonstandard signs and/or custom signs (including unusual architectural conditions or historic sites, and alternate quarters that do not conform to Section 3.8) must be sent to the Manager, Facilities Program Management, for coordination during the design process. In addition, all Mail Processing Facilities (MPF) require the involvement of the Manager, Facilities Program Management.

Architects and USPS project managers must use the Facility Signage/Site Survey Package for all non-standard facilities, whether existing or new; if an AQ project can accommodate the standard signage per section 3-8, that project is exempt from the site survey requirement. The Site Survey package is found in Appendix M4-B.

Refer to Signage Pricing Forms in the Direct Vendor Folder for Retail and Corporate (Non-Retail) Exterior Signage.

2-3.2 Reserved

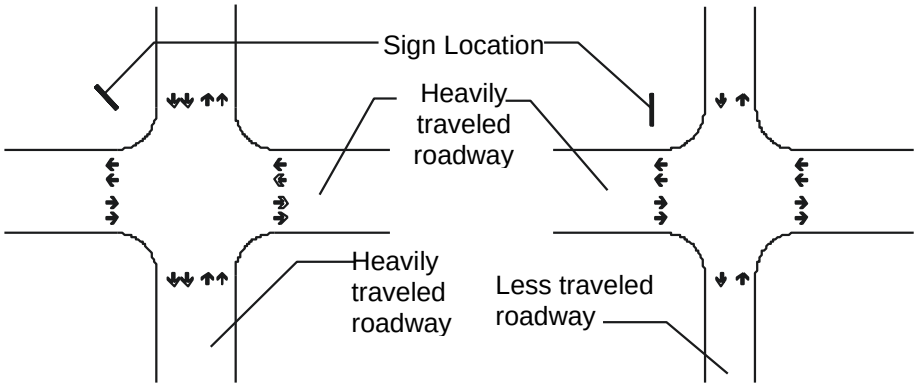
2-3.3 Codes and Standards

It is the USPS policy to comply with all state and local codes and ordinances in leased and owned buildings. However, if sign regulations seem overly restrictive, the Facilities Contracting Officer may elect to pursue a sign variance.

2-4 Placement

Primary freestanding signs are either pylon or monument style signs. Primary signs must be placed so that they are visible from the street to receive the most exposure by passing viewers. Pylon and monument signs (see Exhibit 2-4a) must always be placed perpendicular to the street, except that when signs are best located on corners, a placement at a 45-degree angle to the street is preferred. However, in some cases it may be desirable to position a freestanding sign at a corner perpendicular to a more highly traveled roadway. This is an allowable option. Pylon signs must always be oriented so that the pole is toward the building (see Exhibit 2-1a).

Exhibit 2-4a
Pylon or Monument placement relative to traffic flow



In some cases the use of a monument sign may provide better visibility than a taller pylon sign. If a large tree canopy exists, a lower level monument sign, visible below the tree canopy, may be a better sign choice (see Exhibit 2-4b).

Exhibit 2-4b
Monument placement relative to tree canopy

A primary freestanding sign must be placed as close to the front property line as allowable by code. Care must be given to place the sign toward the most appropriate entrance. Even though more visibility might be gained by having a primary sign located toward one end of a property, placement in that location might be confusing and could cause customers to use a secondary entrance that was intended to be used by USPS service vehicles or employees.

2-4.1 Landscaping at Signs

Position new landscaping so that mature trees and shrubs do not interfere with the viewing lines to signs. Do not plant trees near pylon or monument signs (see Exhibit 2-4.1a). Low level landscaping may be positioned around the base of pylon signs. (See Exhibit 2-4d.) Do not put landscaping materials that, when mature, will interfere with the servicing or viewing lines to graphic information on low level monument signs.

Exhibit 2-4.1a
Improper Placement of New Landscaping - Restricted Sight line

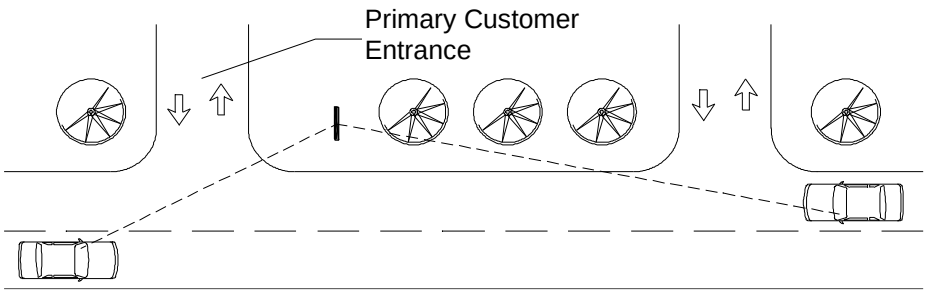
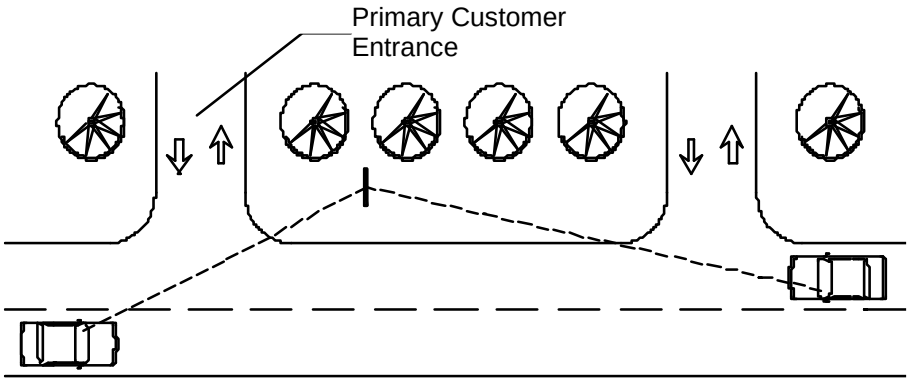


Exhibit 2-4.1b
Proper Placement of New Landscaping - Open Sight Line



2-5 Installation Requirements

Prior to the installation of signs at USPS facilities, certain structural and electrical requirements must be met for each specific sign location.

2-5.1 Electrical

Signs requiring illumination must have power supplied to the sign location as specified in the standard detail library. All circuits for standard retail illuminated sign types must be 120 volts. The required amperage for all standard retail illuminated signs are listed in the matrices at the end of this section.

2-5.2 Structural

When selecting a sign for wall attached applications, certain requirements must be met in the design of the wall materials and structure. These requirements are to accommodate the weight load distribution of the standard sign types. Sign weights for the primary retail identification signs are provided in Exhibits 2-5.2a, 2-5.2b, and 2-5.2c.

Exhibit 2-5.2a
Retail Pylon and Monument Information Guide

Retail Sign Information Guide – Pylon and Monument Signs				
Sign Type	**Sign Description**	**Volts**	**Amps**	**Weight in lbs.**
RA18	18'-0" Illuminated Pylon	120	4.4	1175
RA20	20'-0" Illuminated Pylon	120	6.0	1540
RA25	25'-0" Illuminated Pylon	120	6.6	2400
RB6	6'-0" illuminated vertical (square) monument	120	2.2	360
RB8	8'-0" illuminated vertical (square) monument	120	4.1	640
RB10	10'-0" illuminated vertical (square) monument	120	5.4	990

Exhibit 2-5.2b
Retail Wall Sign Information Guide

Retail Sign Information Guide – Wall Signs				
Sign Type	**Sign Description**	**Volts**	**Amps**	**Weight in lbs.**
RC-3	2'-1" Illuminated Horizontal Cabinet	120	0.24	110
RC-4	2'-10" Illuminated Horizontal Cabinet	120	0.43	196
RC-5	3'-7" illuminated Horizontal Cabinet	120	0.67	310
RC-7	5'-0" Illuminated Horizontal Cabinet	120	1.31	600
RC-3NI	2'-1" Non-Illuminated Horizontal Cabinet	-	-	90
RC-4NI	2'-10" Non-Illuminated Horizontal Cabinet	-	-	140
RC-5NI	3'-7" Non- illuminated Horizontal Cabinet	-	-	195
RC-7NI	5'-0" Non-Illuminated Horizontal Cabinet	-	-	335

Exhibit 2-5.2c
Retail Sign Information Guide

Retail Sign Information Guide – Vertical (Square) Wall Signs				
Sign Type	**Sign Description**	**Volts**	**Amps**	**Weight in lbs.**
RD-5	4'-3 7/8" Illuminated Vertical (Square) Cabinet	120	0.27	130
RD-6	5'-1 5//8" Illuminated Vertical (Square) Cabinet	120	0.38	185
RD-7	5'-11 3/8" Illuminated Vertical (Square) Cabinet	120	0.51	250
RD-8	6'-9 ¼" Illuminated Vertical (Square) Cabinet	120	0.65	320
RD-10	8'-4 ¾" Illuminated Vertical (Square) Cabinet	120	1.01	490
RD-5NI	4'-3 7/8" Non-Illuminated Vertical (Square) Cabinet	-	-	85
RD-6NI	5'-1 5/8" Non-Illuminated Vertical (Square) Cabinet	-	-	110
RD-7NI	5'-11 3/8" Non-Illuminated Vertical (Square) Cabinet	-	-	140
RD-8NI	6'-9 ¼" Non-Illuminated Vertical (Square) Cabinet	-	-	175
RD-10NI	8'-4 ¾" Non-Illuminated Vertical (Square) Cabinet	-	-	245

3 Standard Applications

Examples shown in this document show sample positioning for all sign types. These sign selection examples may not always be appropriate, so use care and good judgment if a more appropriate sign position would improve the visibility and functionality of the site. (See 2-3.1 for sign selection and support services).

3-1 Mail Processing Facilities (MPF) Retail Signs

For assistance in sign selection and placement for Mail Processing Facilities, contact the USPS Headquarters signage program manager (see section 2-3).

3-2 Mail Processing Facilities (MPF) Corporate Signs

For assistance in sign selection and placement for Mail Processing Facilities, contact the Manager, Facilities Program Management (see section 2-3).

3-3 CSF Medium Retail Signs

3-3.1 Primary Signs

The following examples show the application of the retail sign program to CSF Medium Facilities. A pylon sign is the required freestanding primary sign. A monument sign may be used only if local sign regulations forbid the pylon.

3-3.2 Exterior Wall Attached Signs

Use a cabinet sign to fit comfortably with the architecture, as shown in the sample elevations (Exhibit 3-3.5c). Two sets of the cabinet signs may be used if additional visibility would be gained, such as when a site has frontage on two streets (see Exhibit 3-3.5b).

3-3.3 Entrance Signs

Each facility must be identified with a Facility/Station ID Plaque as shown on the following examples. The plaque must be placed on the outward face of the facility, facing towards the main parking as shown. (See Exhibit 3-3.5d.)

The entrance vestibule must be identified at each main entry location with the facility name, city, and state in white vinyls placed on the outbound side light next to the entry door. Do not include ZIP codes, as those may change. The hours of operation shall be placed on the door in white vinyl letters. (See Exhibit 3-3.5d.)

No vinyls are to be placed on secondary or box lobby entrances.

If the facility contains a BMEU, a corporate sign must be provided at the entrance to the BMEU. The facility descriptor copy must be modified so that “Business Mail Entry Unit” is inserted at “Facility Name”, and the city and state are deleted.

3-3.4 Directional and Regulatory Signs

Follow Exhibit 3-3.5a for selecting the directional and regulatory signs, using only approved messages. Approved messages are listed on the Pricing Forms located in the Direct Vendor Folder.

3-3.5 Sign Selection

Exhibit 3-3.5a
Retail Sign Selection for CSF Medium Plans

Retail Exterior Sign Selection Guide – CSF Medium Plans R1, R2, & R3				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Pylon Sign (20'-0" min.)	RA20	1	Size may increase depending on scale of site
Req.	Horizontal Cabinet Sign	RC7	1	Preferred size; Provide one per elevation on major street

Req.	2'-6" Wall Plaque	RS1	1	Size may increase for better visibility
Req.	Door vinyls (hrs)	RN1	1	1 per main entrance door
Req.	Business Mail Entry	J-X	1	Size may vary for better visibility
As Req.	Directional Signs	K-6		Varies by project
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Exhibit 3-3.5b

Typical Site Plan Showing Sign Placement for CSF Medium Plans

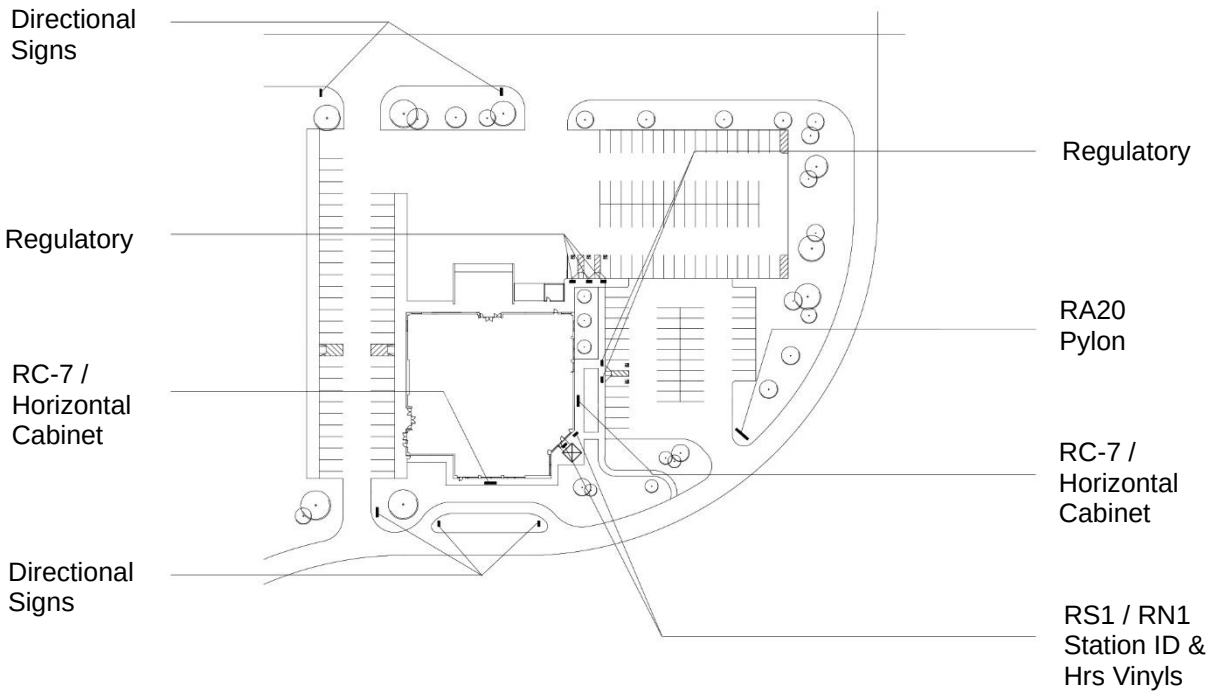
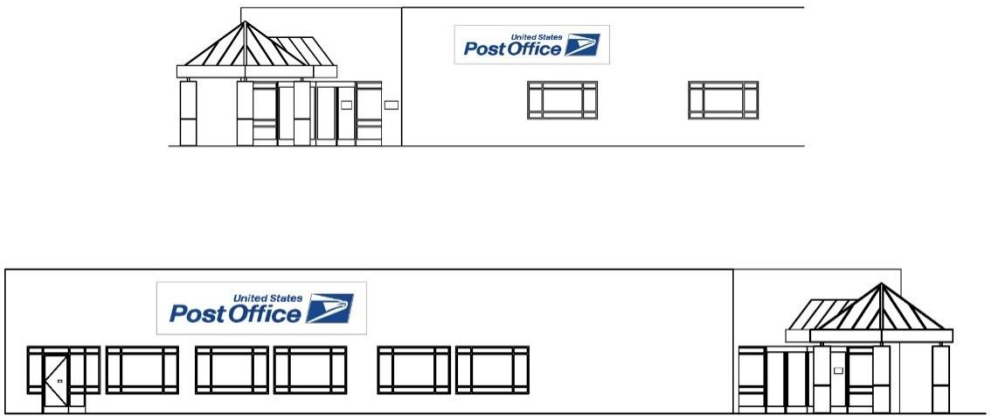
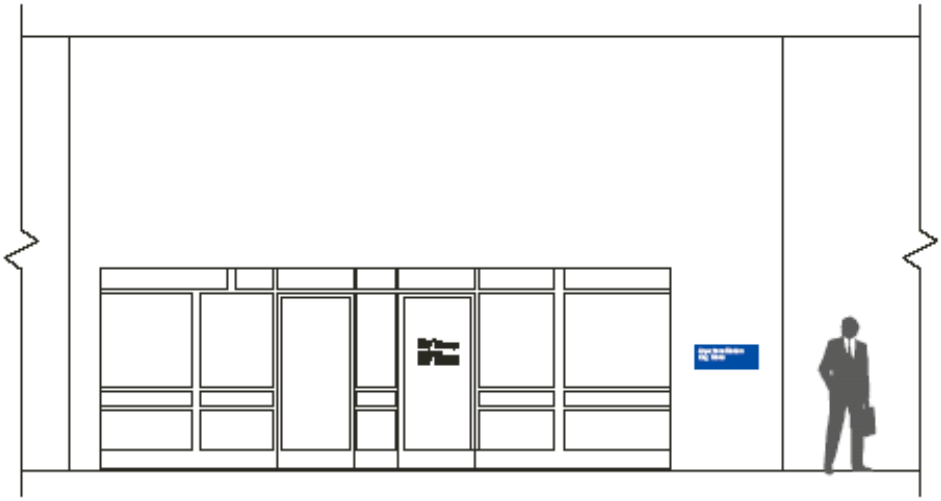


Exhibit 3-3.5c
Typical Elevations Showing Primary Signage Locations for CSF Medium Plans



Note: Placement of wall attached signs is dictated by actual street frontage. If a building has frontage on only one street, only one cabinet is necessary.

Exhibit 3-3.5d
Typical Elevation of Entrance Showing Facility/Station ID Plaque and Vinyl on CSF Medium Plans



3-4 CSF Medium Corporate Signs

3-4.1 Primary Signs

A monument sign is the only freestanding sign style approved for non-retail CSF Medium facilities. The size of the monument sign shall be scaled appropriately to the facility and property configuration. Select the position of the sign elements based on the program guidelines described in Section 2-4.

3-4.2 Exterior Wall Attached Signs

A wall attached cabinet sign may be used in combination with a monument sign or as an option to a monument sign when appropriate. However, do not

over sign a facility with Corporate (Non-Retail) Signage. These facilities are not intended to draw Retail customers.

The preferred format for wall attached signage is a horizontal stacked cabinet sign. Signs shall be placed to align with the architectural features of the building.

3-4.3 Entrance Signs

A wall plaque and hours vinyls must be used at the main entry point to the facility. Position the plaque so that it is oriented in the most visible position to users entering the facility or viewing the facility from the primary parking area. In some cases, the plaque may be next to the entry doors; in other cases it may be best positioned on an adjacent wall.

If the facility contains a BMEU, a corporate plaque must be provided at the entrance to the BMEU. The corporate plaque text must be modified so that "Business Mail Entry Unit" is inserted at "Facility Name" and the city and state are deleted.

3-4.4 Directional and Regulatory Signs

Follow Exhibit 3-4.5a for selecting the directional and regulatory signs, using only approved messages. All approved messages are listed on the Pricing Forms located in the Direct Vendor Folder.

3-4.5 Sign Selection

Exhibit 3-4.5a
Corporate Sign Selection for CSF Medium plans

Corporate Exterior Sign Selection – CSF Medium Plans				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Monument	B-8	1	Size may vary depending on scale of site
As Req.	Business Mail Entry	J-X	1	Size may vary for better visibility
Option	Horizontal Stacked Cabinet	C-3	1	Use C-3 if monument will not work
As Req.	Door vinyls (hrs)	N-1	1	1 per main entrance door
As Req.	Directional Signs	K-6		Varies by project
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

3-5 CSF Small Retail Signs

3-5.1 Primary Signs

The following examples show the application of the Retail Sign Program to Customer Service Facilities Small facilities (CSF Small). Because these facilities are generally small in scale, a monument sign is used in smaller plan sizes and a small 18'-0" high Retail Pylon sign is used for some of the

larger facilities, see Exhibits 3-5.5a through 3-5.5k. When a pylon sign is not permitted by local ordinance or site restrictions, a small Retail Monument sign may be used. The sign must be selected and sized to fit the site and viewing conditions encountered at each facility.

Refer to the Sign Selection Exhibits 3-5.5a, 3-5.5e, and 3-5.5i for the sign requirements used at various building plan sizes.

3-5.2 Exterior Wall Attached Signs

A cabinet sign is applied to the gabled front of the larger CSF Small buildings (see Exhibit 3-5.5g and 3.5.5m).

3-5.3 Entrance Signage

Each facility must be identified with a Facility / Station ID Plaque. The plaque shall be placed on the outward face of the facility, facing towards the main parking as shown. (See Exhibit 3-5.5k)

The entrance vestibule shall be identified at each main entry location with the facility name, city and state in white vinyls placed on the left side light next to the entry door. The hours of operation shall be placed on the door in white vinyl letters. (See Exhibit 3-5.5d, 3-5.5h and 3-5.5l)

No vinyls are to be placed on secondary or box lobby entrance doors.

3-5.4 Directional and Regulatory Signs

Follow Exhibits 3-5.5a, 3-5.5e and 3-5.5i for selecting the directional and regulatory signs, using only approved messages. All approved messages are listed on the Pricing Forms located in the Direct Vendor Folder.

3-5.5 Selection

Exhibit 3-5.5a
Retail Sign Selection for CSF Small 15, 20

Retail Exterior Sign Selection – CSF Small Plan 15, 20				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Square Monument	RB-6	1	
Req.	2’-6” Wall Plaque (facility ID)	RS1	1	1 per facility
Req.	Door vinyls (hours)	RN1	1	1 per main entrance door
Option	Window vinyls (facility ID)	RN3	1	Use RN3 only where RS1 will not work
As Req.	Regulatory Signs	L-X		Varies by project
Req.	Rectangular Cabinet	RC3	1	

Exhibit 3-5.5b
Typical site plan showing sign placement for CSF Small plan 15, 20

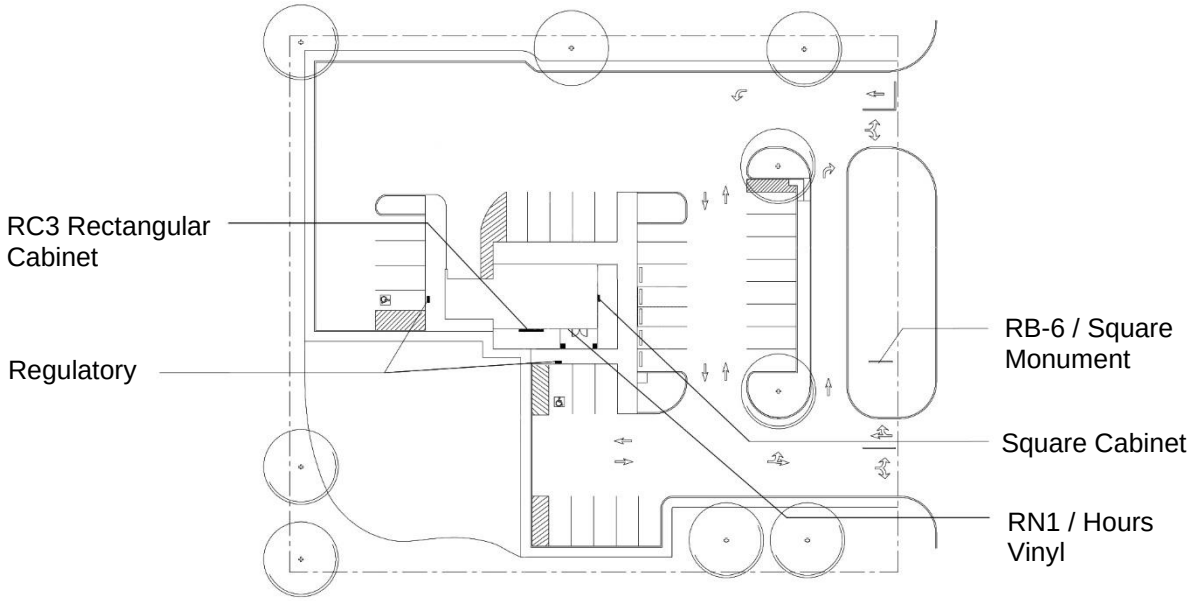


Exhibit 3-5.5c
Typical elevation showing placement of Square Cabinet sign (if provided) and Facility / Station ID Plaque for CSF Small plan 15

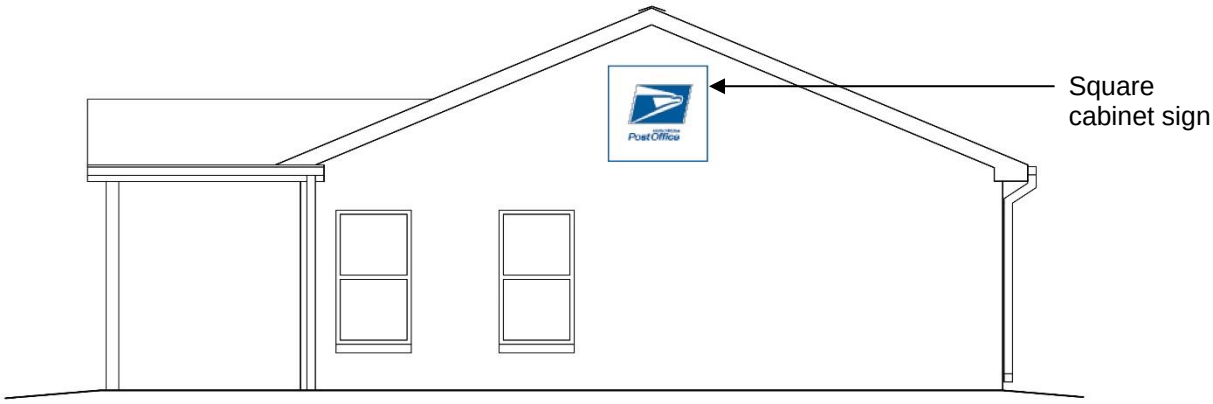


Exhibit 3-5.5d

Typical elevation of entrance with vinyl placement for CSF Small plan 15

Exhibit 3-5.5e

Retail Sign Selection for CSF Small plans 25, 30, & 30M

Retail Exterior Sign Selection – CSF Small Plans 25, 30 & 30M				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Square Monument	RB-6	1	See notes below
Req.	2'-6" Wall Plaque (facility ID)	RS1	1	1 per facility
Req.	Door vinyls (hours)	RN1	1	1 per main entrance door
Opt.	Window vinyls (facility ID)	RN3	1	1 per main entrance door
As Req.	Regulatory Signs	L-X		Varies by project
Req.	Square Cabinet	RD5	1	At entrance gable for CSF 25 & 30
Req.	Rectangular Cabinet	RC3	1	For CSF 20 only

Exhibit 3-5.5f

Typical site plan showing sign placement for CSF Small plans 25, 30 & 30M

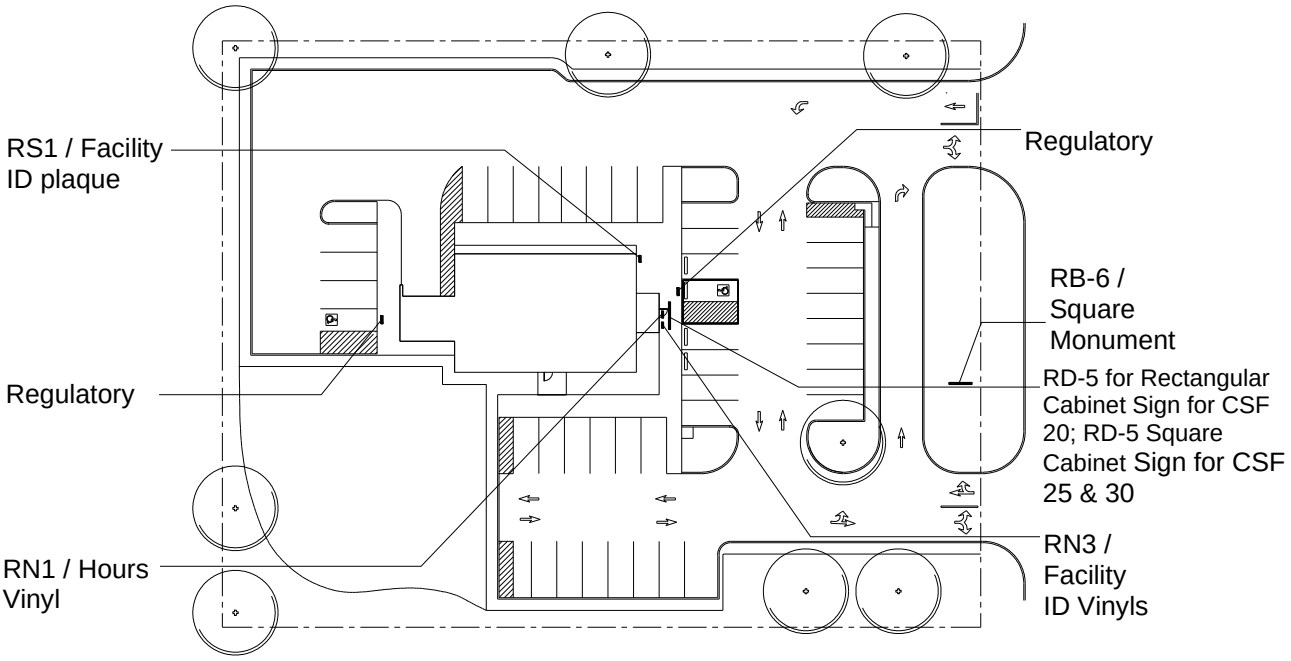


Exhibit 3-5.5g

Typical elevation showing placement of Square Cabinet Sign (if provided) and Facility / Station ID Plaque for CSF Small plans 25, 30 & 30M

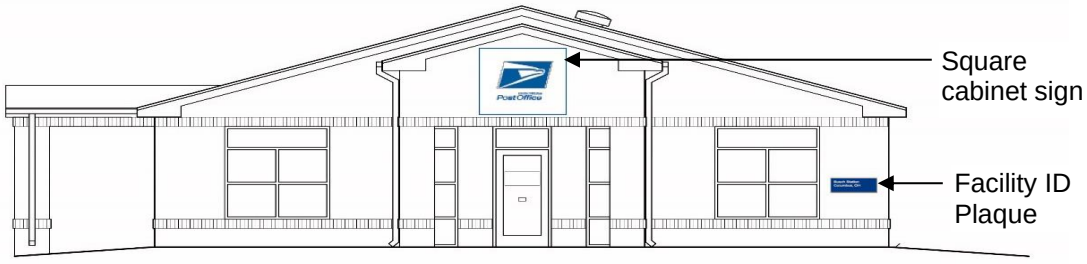


Exhibit 3-5.5h

Typical elevation of entrance with vinyl placement for CSF Small plans 25, 30 & 30M

Exhibit 3-5.5i

Retail Sign Selection for CSF Small plans 40, 50, and 65A

Retail Exterior Sign Selection – CSF Small Plans 40, 50, and 65A				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Monument	RB-8	1	RA18 is an approved option
Req.	Square Wall Cabinet	RD-6	1	
Req.	2'-6" Wall Plaque (facility ID)	RS1	1	1 per facility
Req.	Door vinyls (hrs)	RN1	1	1 per main entrance door
Opt.	Window vinyls (facility ID)	RN3	1	1 per main entrance door
As Req.	Directional Signs	K-6		Varies by project
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Exhibit 3-5.5j

Retail Sign Selection for CSF Small plans 65M, 80A, and 100A

Retail Exterior Sign Selection – CSF Small Plans 65M, 80A, and 100A				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Pylon Sign	RA18	1	RB-8 is an approved option only if restricted by local codes or landlord requirements
Req.	Square Wall Cabinet	RD-6	1	
Req.	2'-6" Wall Plaque (facility ID)	RS1	1	1 per facility
Req.	Door vinyls (hrs)	RN1	1	1 per main entrance door
Opt.	Window vinyls (facility ID)	RN3	1	1 per main entrance door
As Req.	Directional Signs	K-6		Varies by project
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Exhibit 3-5.5k

Typical site plan showing sign placement for CSF Small plans 40, 50, 65A, 80A, and 100A

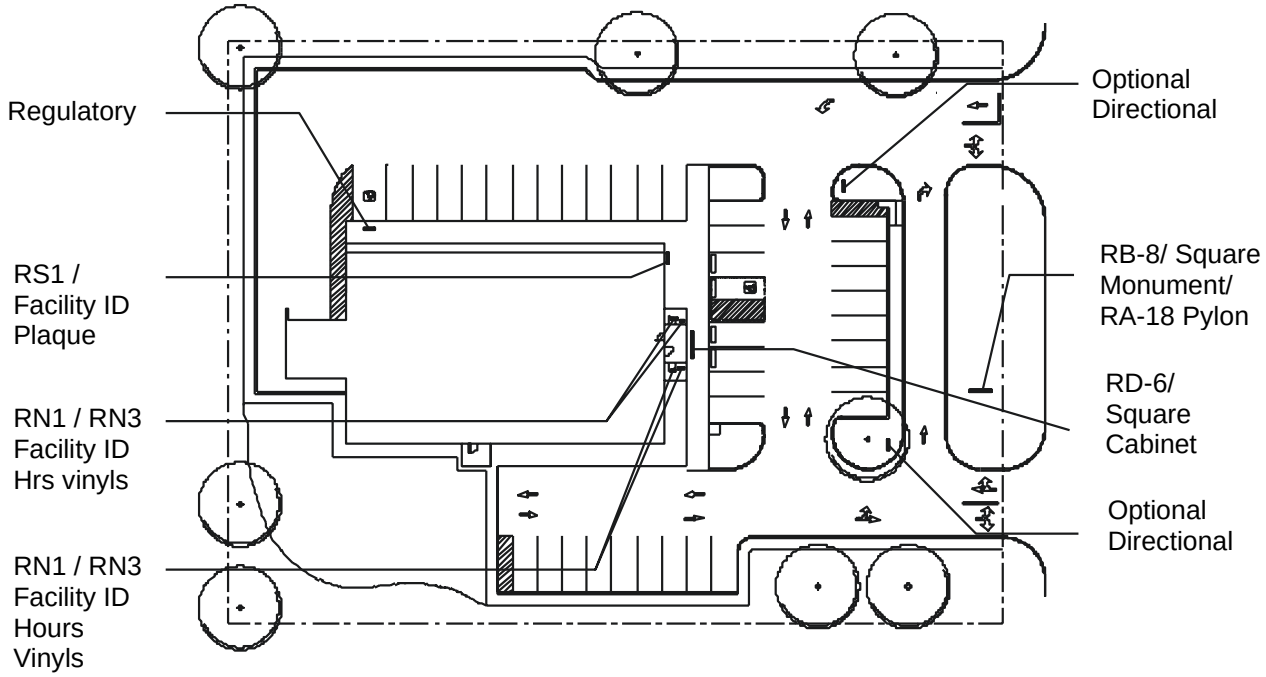


Exhibit 3-5.5m

Typical elevation showing placement of Primary Signage and Facility / Station ID Plaque for CSF Small plans 40, 50, 65A, 80A, and 100A

Exhibit 3-5.5n

Typical elevation of entrance with vinyl placement for CSF Small plans 40, 50, 65A, 80A, and 100A

3-6 CSF Small Corporate Signs

Corporate Signs are used on CSF Small Carrier Annexes.

3-6.1 Selection

Exhibit 3-6.1a

CSF Small Corporate Sign Selection

Corporate Exterior Sign Selection – CSF Small Plan 15 & 20				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Option	Monument	B-6	1	B-6 is an approved option
Req.	Horizontal Stacked Cabinet	C-3NI	1	
As Req.	Door vinyls (hours)	N-1	1	1 per main entrance door
Not Used	Directional Signs	K-6	0	Not Used
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Corporate Exterior Sign Selection – CSF Small Plans 25 &30				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Monument	B-6	1	
Option	Horizontal Stacked Cabinet	C-4	1	C-4 is an approved option
As Req.	Door vinyls (hours)	N-1	1	1 per main entrance door
Not Used	Directional Signs	K-6		Not Used
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Corporate Exterior Sign Selection – CSF Plans 40, 50, 65, 80 & 100				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Monument	B-6	1	
Option	Horizontal Stacked Cabinet	C-4	1	C-4 is an approved option
As Req.	Door vinyls (hours)	N-1	1	1 per main entrance door
Not Used	Directional Signs	K-6		Not Used
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

3-7 Compact Post Office Retail Signs

3-7.1 Monument Sign

A non-illuminated or illuminated monument sign may be used in lieu of a building-mounted cabinet sign, if it is determined to offer better visibility.

3-7.2 Exterior Wall Attached Signs

Building attached non-illuminated horizontal cabinet signs are used on all Compact Buildings. If required, an illuminated cabinet sign can be used as an approved option. Locate the wall sign on the primary building side viewed by the customers entering the facility or viewing the facility from the main parking area. In most cases, this will place the cabinet sign on the long face of the facility. In some cases, the sign will have better visibility if located on the shorter end of the facility. A monument sign may be used in lieu of a cabinet sign if the monument sign will be more visible.

3-7.3 Entrance Signs

A Facility / Station Identification Plaque must be positioned adjacent to the entry doors so that it is oriented in the most visible location to customers entering or viewing the facility from the primary parking area.

The hours of operation information must be placed on the main glass entry doors using white vinyl lettering.

3-7.4 Directional and Regulatory Signs

Follow Exhibit 3-7a for selecting the directional and regulatory signs if required by site conditions, using only approved messages. Approved messages are listed on the Pricing Forms located in the Direct Vendor Folder.

3-7.5 Selection

Exhibit 3-7.5a
Retail Exterior Sign Selection Guide for Compact Buildings

Retail Exterior Sign Selection Guide – Compact Buildings				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Option	Monument	RB-8	1	
Req.	Horizontal Cabinet Sign	RC-3NI	1	Illuminated is an approved option if it offers better visibility.
Req.	2'-6" Wall Plaque (Facility ID)	RS1-WO	1	1 required per site
Req.	Door vinyls (hours)	RN1-WO	1	1 required per site
As Req.	Regulatory Signs	L-1A-WO		Varies by project
As Req.	DOT Signs	DOT		Varies by project

Exhibit 3-7.5b
Typical site plan of Compact Building with sign placement

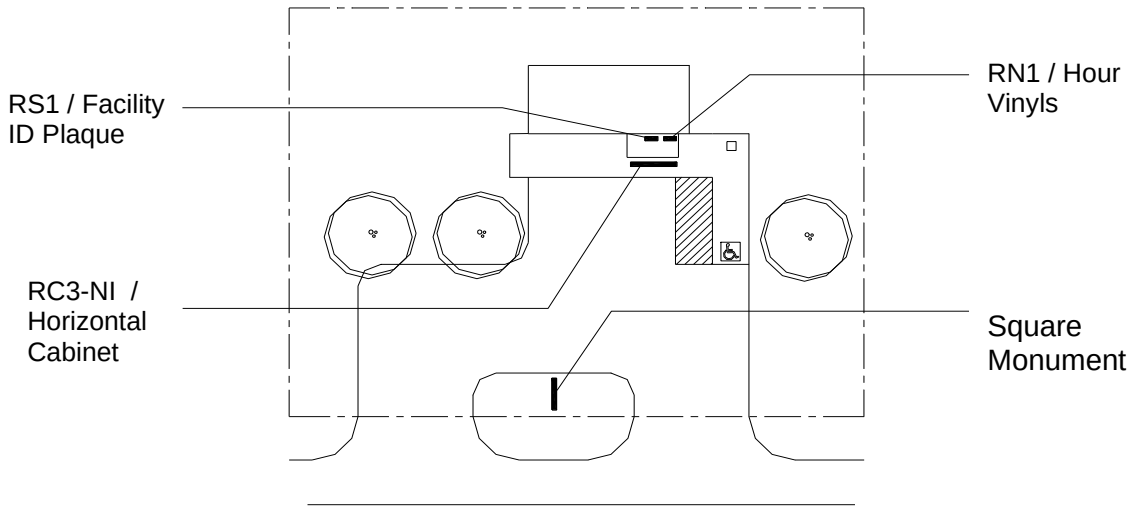
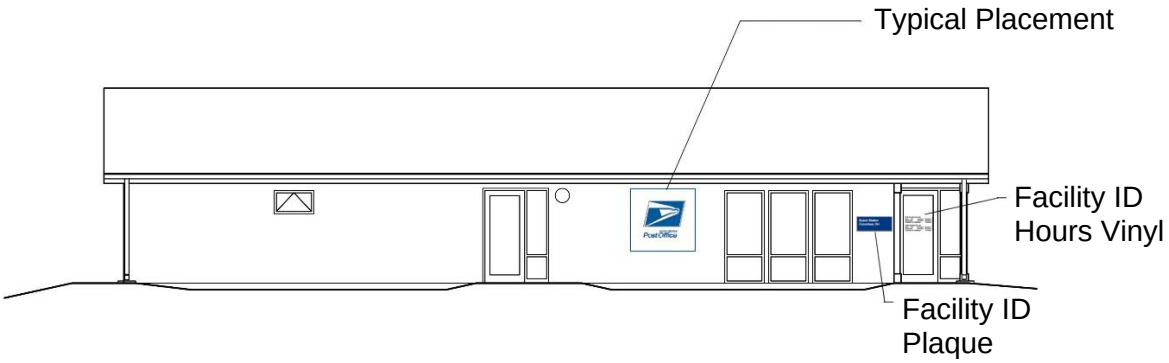


Exhibit 3-7.5c
Typical and Optional Compact Post Office sign placement



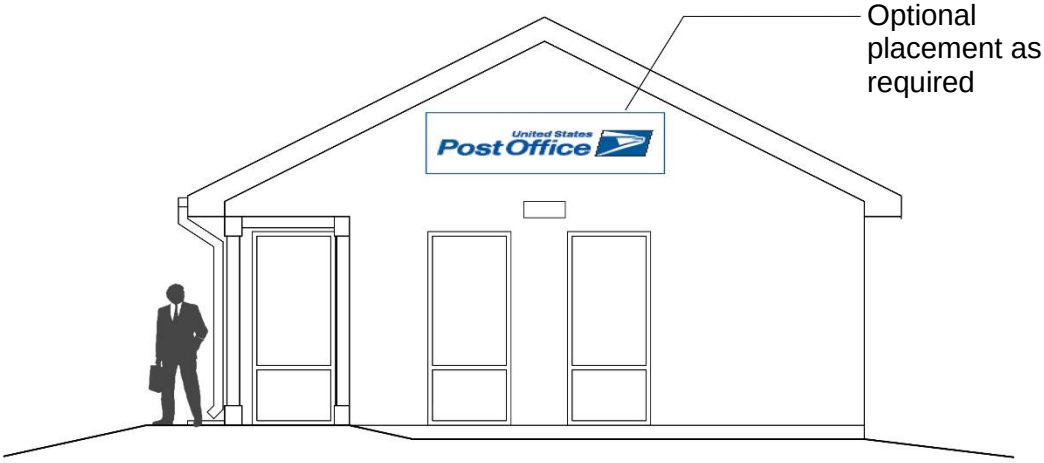


Exhibit 3-7.5d
Typical Facility/Station ID and Hours Vinyl Placement

3-8 Alternate Quarters Retail Signs (StorCAD/D)

The following examples show the application of the Retail Sign Program to typical Alternate Quarters facilities. If actual facility conditions are not similar contact Headquarters sign consultant for sign selection and placement (see section 2-3).

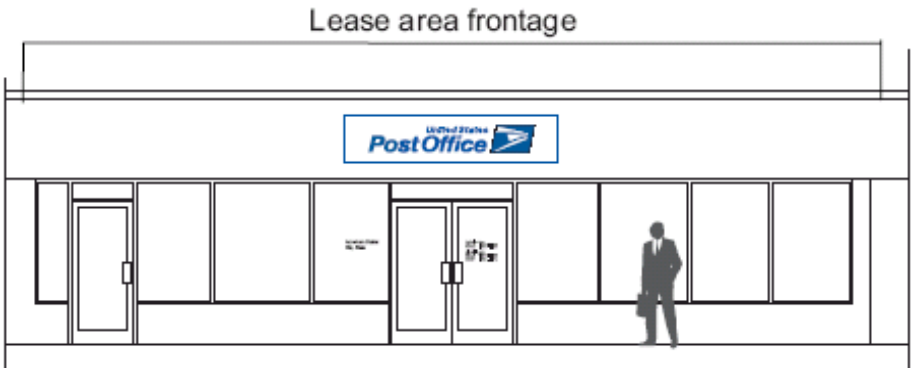
3-8.1 Primary Signs

Either the pylon or monument style signs are appropriate for use and will depend on the site conditions. The pylon is the preferred choice when either one can be used.

3-8.2 Exterior Wall Attached Signs

A cabinet sign must be used when space allows. When applying the cabinet to a wall surface, maximize the entire leased frontage whenever possible. (see Exhibit 3-8.2a).

Exhibit 3-8.2a
Elevation of sign placement for Alternate Quarters



3-8.3 Entrance Signs

When Alternate Quarters feature a single entry point with adequate wall space, a facility identification plaque must be used. Position the plaque so that it is oriented in the most visible position to customers entering the facility or viewing the facility from the primary parking area.

The hours of operation information and Facility/Station ID when appropriate, must be placed on the glass doors using white vinyl lettering

3-8.4 Directional and Regulatory Signs

Follow Exhibit 3-8b for selecting the directional and regulatory signs, using only approved messages. All approved messages are listed on the Pricing Forms located in the Direct Vendor Folder.

3-8.5 Selection

Exhibit 3-8.5a
Retail Sign Selection for Alternate Quarters

Retail Exterior Sign Selection - Alternate Quarters				
Usage	**Sign Description**	**Sign Type**	**Qty**	**Comments**
Req.	Pylon Sign (preferred)	RA20	1	Size may vary depending on scale of site
Req.	Horizontal Cabinet Sign	RC-3	1	Size may vary depending on site scale
Req.	2'-6" Wall Plaque (Facility ID)	RS1	1	1 per facility if architecture will allow
Req.	Door Vinyls (hrs)	RN1	1	1 one per main entrance door
Option	Window Vinyls (Facility ID)	RN3	1	Optional ID format if RS1 sign does not fit
As Req.	Directional Signs	K-6		Varies by project
As Req.	Regulatory Signs	L-X		Varies by project
As Req.	DOT Signs	DOT		Varies by project

3-9 Signs for Non-Standard Buildings

Contact Facilities Program Management for assistance in selecting Retail signs for any *non-standard* building design including: all Retail sign projects that are not specifically addressed in sections 3-1 through 3-8 (MPF, CSF Medium, CSF Small, Compact Post Offices and Alternate Quarters); historic buildings; and other unusual architectural conditions.

Exhibit 3-9a illustrates approved Corporate sign options for non-standard building designs.

Exhibit 3-9a

Exterior Corporate Sign Application Matrix for Non-Standard Buildings

Sign Type	Carrier Annex	Carrier Annex with Mail Pick-Up Lobby	Passport acceptance center	Business Mail Entry Unit	Remote Encoding Office	MPF (Custom, R&A)	Postal Business Center	General Office, Free-standing	
								Sole Occupant	Multiple Occupant
Freestanding Signs									
Corporate Monument	■	■	□			■		■	
Exterior Wall Attached I.D.s									
Corporate Horizontal Stacked Cabinet (preferred)	□	■	■			□		□	■
Entrance Signage									
I.D. Plaque		■	■	■		□		□	●
Door Decal & Hours Vinyls	■	■	■	■	■	■	■	■	■
Support Signage									
Directional		■	□			■			
Regulatory	■	■	□			■			
DOT	■	■	□			■			

■ Standard Facility Signage. Support signage may vary with site conditions.

□ Approved sign option.

◆ A deviation request required for the use of these sign types.

● Mounted to interior wall only.

Module 4D – Vehicle Maintenance Facilities

1 General

2 Site and Building Requirements

2-1 Site
2-2 Building
2-3 Administrative Office Area
2-4 Employee Facilities
2-5 Vehicle Service Bays
2-6 (Deleted 2016-1)
2-7 (Deleted 2016-1)
2-8 Stockroom
2-9 Equipment Storage
2-10 Lube Drum Storage
2-11 Tire Repair Shop
2-12 Battery Charging Area
2-13 Body Shop
2-14 (Deleted 2016-1)
2-15 (Combined with Pressure Cleaning Bay 2016-1)
2-16 Pressure Cleaning/Vehicle Wash Bay
2-17 Miscellaneous Support Areas
2-18 Trailer Bay

3 System Requirements

3-1 Storage Tanks
3-2 Oil Storage
3-3 Lubrication
3-4 Compressed Air
3-5 Communications
3-6 Security

4 Equipment Requirements

4-1 Motor Vehicle Lifts
4-2 Reclamation System
4-3 Monorail Hoist and Trolley

1 General

Vehicle Maintenance Facilities (VMFs) are used for servicing postal vehicles. The exterior design and building construction must reflect the VMF's utilitarian function and its appearance must be consistent with the USPS image.

Design all VMFs in accordance with the requirements set forth by the applicable state and/or local codes, as well as applicable federal, state, and local environmental regulations. In addition, comply with the following design criteria. Where two or more codes, standards or USPS criteria are in conflict, the more stringent must apply.

Any architectural or engineering aspect of VMF design not specifically prescribed in this module shall be specified by other modules or documents in the Building Design Standards such as those listed below.

- Standard Design Criteria, Modules 1 and 2A.
  - Structured cabling.
  - Interior finishes and colors.
  - Exterior lighting.
- Exterior Signage, Module 4C. *(Also refer to Module 4C)*
- Refer to Module 4E, Storage Tank Standards, for Fuel Islands (aka Motor Vehicle Fueling Facilities) and other hazardous material bulk storage.
- Mail Processing Facility Specification.
  - Interior finishes and colors.
  - Lighting.
  - Vehicle lifts.
  - Security systems
  - Oil-Water Separators
- Standard Detail Library.
- RE-4. *(Also refer to USPS Handbook RE-4)*

Module 4C

USPS Handbook RE-4

VMFs must be separate from other buildings. All building systems, such as IT, fire safety, EMCS, power distribution, etc. must be independent.

2 Site and Building Requirements

2-1 Site

2-1.1 Maneuvering Area

Provide an 80 ft. (min.) maneuvering area perpendicular to the drive-in doors. On all other sides of the building, provide a 50 ft. (min.) maneuvering area perpendicular to the building wall.

2-1.2 Storage Tanks/Fuel Islands/Canopies *(Also refer to Module 4E)*

Refer to Module 4E, Storage Tank Standards, for all requirements related to underground storage tanks, fuel islands, and canopies, if called for in Form PS-4551.

Module 4E

2-1.3 Concrete Aprons

Provide a 25 ft.-wide concrete apron in front of all overhead doors and a concrete apron at the fuel dispensing area.

2-1.4 Outside Storage

Provide areas for general garbage, recyclables, large metal body parts and debris, and if called for in Form PS-4551, an exterior scrap tire storage area. In order to avoid the regulatory burdens of a storm water permit, storage areas for metal body parts, scrap metal and tires, must be covered.

2-1.5 Environmental Issues

- If the VMF is associated with an MPF, provide an adequately elevated high point of grade between the two buildings to effectively isolate and separate each facility's respective drainage area storm water flows.
- If the VMF is associated with an MPF, ensure that plumbing does not allow any commingling of MPF and VMF drainage area discharges.
- If the site is large enough, design for placement of a vegetated retention pond to collect, filter, and bio-remediate VMF drainage area discharges. The goal is to keep VMF drainage area storm water discharges as benign as possible, so as to avoid the need for NPDES storm water permitting. Parking lot filter strips or permeable paving are also options.
- VMF Aboveground Storage Tanks must have overhead cover.
- Be aware that some local environmental regulatory authorities may require overhead cover for any vehicles awaiting service at the VMF. In such cases a financial analysis is required to determine the local viability of covering the parked vehicles versus providing the means to prevent vehicle contaminated storm water runoff into the drainage area discharge.

2-2 Building

Refer to SDC Appendix M1-D, for standard USPS finishes and colors. *(Also refer to Module 1)*

Module 1

2-2.1 Floors

Quality is essential, in service bay floors, only random hairline cracks will be accepted in up to a maximum of 3% of slab panels; all other hairline cracks as well as all larger than hairline will be cause for replacement of panels.

Slabs must be placed in alternating strips using a vibrating screed, with a minimum wait of three days before placing any slab adjacent to previously placed slab.

Finish concrete floor slabs in the vehicle service, maintenance, and pressure cleaning bays with an oil-, grease-, water-, and slip-resistant coating as specified in MPF Specifications Section 099100 Painting. Floors must have no slope unless otherwise indicated.

2-2.2 Walls

Design all walls to withstand the normal wear and tear associated with vehicle repair type buildings, and utilizing impact resistant materials, such as fiberglass reinforced plastic (FRP) panels, to at least 6 feet above finished floor.

2-2.3 Windows

Projected windows, when used, must not interfere with vehicles or pedestrian traffic flow inside or outside the building. Operable windows may be used for natural ventilation.

2-2.4 Ceilings

Provide suspended acoustical ceilings with recessed light fixtures in the employee facilities and the administrative office area. Ceilings are not required in vehicle work bays and support areas. Exposed structure must be factory primed.

2-2.5 Doors

Provide pedestrian doors in the service bays, body shops, vehicle wash bay, and other service and support areas to meet exit requirements and to provide indoor connections between all areas. Provide vision panels in doors wherever applicable. Provide exit signs and panic hardware to meet code requirements.

Provide overhead doors for vehicle service bays, body shop, and pressure cleaning/vehicle wash bay. Typical overhead doors must have a 14 ft. high by 12 ft. wide minimum clear opening, while Trailer Bay door height must be 16 ft. Sectional overhead doors must be used unless they jeopardize the functionality of the bay. In that case, an overhead roll-up door may be substituted. Doors must have automatic operators, eye-level vision panels, and be designed for heavy commercial use. They must have heavy duty, 2 ½ in. rollers on a 3 in. track and be equipped with a spring rated for 100,000 cycles. Provide insulated doors where dictated to meet energy criteria.

Equip doors with emergency stopping devices and automatic reverse as required. Furnish door operators with interior push-button controls. Equip doors in the vehicle wash bay with weatherproof motors.

Provide bollards or protective guards outside at overhead doors. Door locks must be master keyed in accordance with local requirements. Provide commercial grade hardware as specified in the MPF Specifications.

Exterior stockroom service door, and other similar service doors, must be standard USPS manually operated sectional overhead door. See Mail Processing Facility Specification for criteria.

2-2.6 Lighting

Design the lighting systems within the VMF to achieve the required light levels and lighting power densities shown within Module 1, Exhibit 5.3.1.6a. Refer to Module 1, Exhibit 5-3.7.1a for cross-reference to the standard postal luminaire types contained in the postal specifications.

All luminaires must be automatically controlled by ceiling or luminaire mounted occupancy sensors. The occupancy sensors selected shall be dual-technology type and must be appropriate for the ceiling height or luminaire mounting height. Ceiling mounted sensors shall be located to overlap their coverages and provide a seamless transition from one sensor zone to the next.

2-2.6.1 Bi-Level Lighting Criteria

Individual luminaires, groups of luminaires or every other luminaire must be controlled as zones to achieve the required illumination levels under different lighting conditions. Control solutions such as turning off every other luminaire or row of luminaires are acceptable. LED dimming systems, if found to be economically feasible are an acceptable control strategy.

Limit lighting in the vehicle service bays, stock room and work area to an Average Maintained level of 25 footcandles and use bi-level control. Average maintained high output level illumination is limited to 25 footcandles, low output level illumination to 12.5 footcandles.

Wire each high output level illumination zone to a digital countdown timer located downstream of the occupancy sensors. When the override countdown

timer is activated, high output level illumination must come on for a period of no more than four (4) hours.

a. “High output level illumination” condition. This condition must provide 25 fc for normal activities and must be both automatically and countdown timer controlled using countdown timers fed downstream of the occupancy sensors. The high output level illumination must only be energized upon detection of presence by the occupancy sensor(s) and activation of the countdown timer(s). The maximum to minimum uniformity for this illumination condition must not exceed 3:1

b. “Low output level illumination” condition. This condition must provide 12.5 fc for the areas when less visual activity is needed and must be automatically controlled using occupancy sensors. The maximum to minimum uniformity for this illumination condition shall not exceed 8:1.

Manual Override Countdown Timers. Each manual countdown timer must be digital type mounted at 48” AFF to allow the lighting for the high output level illumination zone to be energized for up to four (4) hours (assuming the occupancy sensor(s) have detected activity). Mount this countdown timer adjacent to the zone on the wall and label for easy identification.

2-2.7 Fire Protection

Provide an automatic sprinkler system, fire alarm system, portable fire extinguishers, fire hydrants, and emergency lights as required by code. Install backflow prevention for sprinkler system as required by local codes.

2-2.8 Miscellaneous

Miscellaneous items are as follows:

- Provide only the following spaces with space conditioning identified:
  - Air conditioning and heat:
    - Administrative Office Area.
    - Employee Facilities.
    - Stockroom and Stockroom Office.
    - Other areas where heat sensitive electronic equipment is located.
  - Heat only:
    - Compressor Room.
    - Custodial Closet.
    - Other areas where equipment requires temperature or freeze protection.
    - Provide heat in all spaces in Climate Zones 6 & 7. In all other Zones, heat may be provided in additional spaces with the approval of the Facilities Product Line Manager.

- Ventilate all spaces in accordance with applicable standards, codes and regulations.
- Facilities that service or store vehicles with lighter-than-air fuels, such as natural gas, must meet additional requirements as required by code.
- Provide clock system in accordance with the Mail Processing Facility Design Criteria. *(Also refer to Module 2A)*
- Provide time clock stations.
- Provide Time and Attendance Control System (TACS), per USPS direction. Locate in a recessed alcove near the administrative office area.

2-2.9 Plumbing

Provide back flow prevention per SDC requirements and applicable codes, for all hose bibbs throughout the interior and exterior of the VMF.

Provide at least one (1) water hose bibb on each exterior side of the facility. These are to be freeze proof if required by appropriate codes or the facility is in Climate Zones 4, 5, 6, or 7 as indicated in the Standard Design Criteria, Module 1, Chapter 2. (Also refer to Module 1)

Module 1

Throughout the entire VMF, trench drain covers must have screens to prevent metals from passing onto the oil/water separator.

2-3 Administrative Office Area

Ensure that the administrative office area is sufficiently soundproofed (minimum 42 STC rating).

Orient the general office area adjacent to the main entrance into the building and with visual access to the fuel island, if one is provided. Designate one part of the general office area for Vehicle Management Accounting System (VMAS) equipment providing two dedicated 120-volt, 20A circuits, each with two quadruplex outlets equipped with spike and low-voltage protection. Within or adjacent to the general office area, provide space for mail, copy/print and general supplies.

Locate the Manager's office adjacent to the general office area.

If the facility is larger than 10,000 square feet, provide a separate LAN/Telecom Room, sized to accommodate the incoming, and distributing IT, communication, and facility security equipment.

Locate the Maintenance Supervisor and Operations Supervisor offices so that they have visual access to the vehicle service bays. Avoid locating heavy-duty service bays adjacent to these offices. In addition, at the Maintenance Supervisor office, provide a window with a 30" wide sliding section and a 42" high x 30" deep countertop on the office side.

Connected to the Maintenance Supervisor office, provide a small private room for supervisor/employee consultations.

Adjacent to the Operations Supervisor office, provide Work Order area open to the vehicle service bays for job files, vehicle service manuals, etc.

2-4 Employee Facilities

2-4.1 Lockers, Toilets, and Showers

Provide the following:

- Toilets, showers, and locker areas for male and female employees, as required, in separate rooms adjacent to the administrative office area. Because of the need for VMF employees to wear uniforms, which must be changed into and out of at the start and end of each tour, separate male and female locker rooms are required for privacy. Include space in each for uniform collection hampers.
- Showers and handicapped accessible fixtures in both male and female areas.
- A single occupancy unisex toilet, equipped with a water closet, lavatory, and accessories, in the vehicle maintenance area.

2-4.2 Break and Vending Room

Provide the following:

- Wall-mounted 120-volt, 20A outlets; water connections; and drains for food and beverage vending machines, as required. Provide an outlet for a refrigerator.
- A kitchen sink and shelving for a microwave oven and a wall-mounted electric water cooler. Include a dedicated outlet for the microwave oven.
- Sound insulation (min. 42 STC rating).

2-4.3 Electric Water Coolers *(Also refer to USPS Handbook RE-4)*

USPS Handbook RE-4

Provide electric water coolers throughout the facility: adjacent to toilets, in Break and Vending Rooms, and otherwise within 100 feet of any workstation. Provide dual height electric water coolers. See RE-4 for accessibility requirements.

2-4.4 Training Room

Provide a training room adjacent to the administrative area with 120-volt, 20A wall-mounted duplex receptacles on each wall.

2-5 Vehicle Service Bays

Provide a 19-ft. clear height in the vehicle service bays. This clearance must not be obstructed by light fixtures, overhead exhausts, heaters, overhead doors, conduit, or piping. Locate lights between service bays and overhead doors to minimize reduction in illumination level when doors are raised or vehicles are on lifts.

Do not locate structural columns at the sides of bays or between interior driveways and bays.

Heavy duty bays service cargo vans and tractors. Trailer bays service trailers, and may also be used as an overflow location for servicing other vehicles. Light duty bays service all other vehicles. See Form PS 4551 for required bay dimensions.

Provide a 5-ft.-wide walkway along the center of the service bay area.

Vehicle service bays must not be air conditioned.

2-5.1 Ventilation/Exhaust System

Provide each vehicle service bay with a vehicle exhaust system. For light duty bays, provide a 4 in. exhaust hose located near the overhead doors. For the heavy duty bays, provide an exhaust system capable of attaching a 6 in. exhaust hose to either the either right- or left-hand stack located near the end of the bay, opposite the overhead doors.

Provide a carbon monoxide monitoring system for the service bay area.

If natural gas vehicles are to be serviced, provide a natural gas monitoring system in each service bay. Mount the systems near the floor in accordance with codes, regulations, and manufacturer's recommendations.

Provide fresh air ventilation at rate of the greater of four air changes per hour or 1.5 cfm/sf in maintenance areas, to prevent buildup of fumes and dust.

2-5.2 Used Oil Storage and Drainage

Provide continuous trench-type floor drains at the overhead doors and connect to a sedimentation pit and separate oil-water separator. Refer to MPF Specification 334000 Storm Drainage Utilities 2.2.D. for separator

334000 MPF

requirements. Locate the centerline of the trench drains approximately 1 ft. from the inside face of the overhead doors.

Provide removable covers and minimize the width of drain cover slots to keep out small objects.

In alternating service bays, provide quick-connect used oil drains. Provide switch (or valve) to activate a diaphragm pump.

Construct double-walled above ground piping to a double-walled metal aboveground used oil tank located in the building. Tank must have an overfill alarm and secondary containment. Locate tank near exterior of building to facilitate pumping out by a used oil contractor. If centralized dispensing of fluids is utilized, locate used oil storage tank within lube/oil storage room (refer to Section 2-10). Refer to Module 4E, Storage Tank Standards, for all requirements related to storage tanks.

Module 4E

If used oil caddies are used, provide used oil suction hoses at each bay. The hoses and suction system must be capable of extracting the used oil from the caddies and depositing it in the used oil tank.

Provide, in alternating service bays, a sheet metal used oil sink with expanded metal grills at the rear for used oil filters. Minimum dimensions are 3' x 2'. Install switch at each sink to activate a diaphragm pump. Connect sinks to used oil tank by double walled above ground piping.

All used oil piping must either be aboveground or, if underground, comprise less than 10 percent of the total volume of the used oil aboveground storage tank system. This is to ensure that the system is not classified as an underground storage tank.

2-5.3 Fluid Dispensing

If a centralize fluid dispensing system is required, provide lube reel banks with heavy-duty reels, each reel with a 40 ft. hose and dispenser. Provide one reel bank for every two bays. Locate reels banks approximately 15 ft. from the end of the bay opposite the overhead doors. Each reel bank will provide the following reels: one reel each for dispensing ATF (automatic transmission fluid) and Antifreeze fluid, and two reels for various engine oils. Refer to Section 2-10 for Lube/Oil Storage requirements.

2-5.4 Electrical

Provide each bay with a reel with a heavy-duty, 100-watt safety light.

Provide a pendant-type duplex outlet, 120-volt, 20A, 7 ft. AFF for each service bay served by a reel bank.

Provide 120-volt, 20A duplex outlets on walls, columns, and between each overhead door, 36 in. AFF.

Provide ground fault interrupter circuit breakers for service bay receptacle circuits.

2-5.5 Plumbing

Provide one ¾ in. water hose bibb with a standard recessed water faucet for each two bays on the wall between overhead doors, 24 in. AFF.

Provide a plumbed emergency shower and eyewash unit at each end of the Service Bay area, adjacent to the utility sink areas.

If floor drains are provided, the drain line must lead to an oil-water separator.

2-5.6 Compressed Air

Provide each bay with a reel for lubricated air for power tools. Provide one additional ¾ in. compressed air line with cutoff valve, regulator, gauge, and

quick disconnect for each two work bays on the wall between overhead doors 48 in. AFF.

The Solicitation A/E must determine compressed air load and size of the air compressors.

The DBE must provide compressors.

2-6 (Deleted 2016-1)

2-7 (Deleted 2016-1)

2-8 Stockroom

Size the stockroom in accordance with Form PS 4551. Since the dimensions for these bins vary, coordinate the arrangement with local vehicle services management. Do not locate any electrical panels, mechanical equipment, drain pipes, or other items in this space that will detract from its utility.

Construct walls of concrete masonry units up to 8'–8" with drywall up to structure for security. Wire mesh partitions are not acceptable. Provide sound privacy.

Keep glazing to a minimum. Provide windows with heavy metal frames and mullions spaced to prevent the passage of an 8-inch sphere.

Within the stockroom, provide a 10 ft. x 12 ft. enclosed office, an open work area for administrative duties and a wire mesh enclosed secure parts/tool storage area. Provide conveniently located duplex receptacles as required.

Provide a 3-ft.-wide pedestrian stockroom door with a heavy-duty dead bolt lock. Provide a counter with a rollup shutter and a call buzzer. Provide a pair of 3 ft. 0 in. doors or an overhead service door between the stockroom and shop area to facilitate the issuance of large parts.

Locate luminaires over aisles. Mounting height must be sufficient to avoid interference with storage units if they are relocated.

Provide 120-volt, 20A duplex outlets on each wall surface 36 in. AFF.

Provide an 8 ft. wide by 8 ft. high overhead receiving door with a call buzzer at an exterior wall. Include a ramp if access is over a raised walkway. Provide personnel door adjacent to the overhead door, with a heavy duty dead bolt lock.

Provide air-conditioning to the Stockroom and Stockroom Office. The HVAC system must provide positive pressure to prevent migration of fumes from the service bay area.

2-9 Equipment Storage

Locate this area adjacent to the service bays. A physical separation should be provided between the Equipment Storage area and the adjacent service bay while maintaining full accessibility from the central service bay walkway. In large facilities, this space may be divided and located on each side of the service bay area. Provide sufficient space to locate tool chests and portable equipment.

2-10 Lube/Oil Storage

The lube/oil storage room is for the centralized storage of new and used oil, grease and other vehicle service fluids. Room must be located at or near an exterior wall and provided with double doors to facilitate the movement of heavy drums in and out of room. If large fixed storage tanks are used, provide

the capability for filling and emptying the tanks from the exterior with provisions for containment of possible exterior spills.

Chassis grease, gear oil and other low volume fluids will be stored in drums located in this room and will be manually dispensed. Large volume fluids like engine oils, ATF, antifreeze, along with used oil may be stored in large, fixed, above ground storage tanks. These bulk fluids may be transferred to the reel bank hoses in the service bays through a centralized fluid dispensing system (refer to section 2-5.3). For this system, provide a wall-mounted ¾ in. compressed air line with cutoff valves, regulator, gauge, and quick disconnect located 48 in. AFF for each type of fluid to be delivered.

It is preferred that bulk storage tanks are specified in lieu of multiple drum storage. If a multiple drum storage system is specified, provide a hoist beam above the drum storage with a 1,000 lb. capacity for lifting pumping equipment in/out of drums and the positioning of filled drums. Hoist equipment must be provided by the USPS.

Secondary containment must be provided within the room for all fluids at a capacity of one hundred ten percent (110%) of the largest container in the room that does not already have integral secondary containment. Be aware that in order to avoid arduous requirements imposed by Clean Water Act, it is recommended that the total volume of oil products, including used oil, stored in containers of 55 gallons or larger be limited to no more than 1,320 gallons. For all requirements related to storage tanks refer to Module 4E, Storage Tank Standards.

Provide a 120-volt, 20A duplex outlet on each wall 36 in. AFF. If floor drain is provided, drain line must lead to an oil-water separator.

2-11 Tire Storage and Repair Shop

If allowed by code, provide a secure, wire mesh caged area for tire repair and storage. For security the cage walls must be carried up to structure or to a secure lower ceiling. If located adjacent to occupied areas, such as stockroom and office, separating partition to be CMU up to 8' – 8" with drywall up to structure for security.

Provide space for a heavy-duty tire-changing machine, a computerized tire-balancing machine, and tire storage.

Provide a minimum of four ¾ in. wall-mounted compressed air outlets with cutoff valves, regulators, gauges, and quick disconnects 48 in. AFF.

Provide a 120-volt, 20A duplex outlet on each wall 36 in. AFF. Provide electric power and a compressed air line for a large tire changer.

2-12 Battery Storage and Charging Area

The following requirements are specific to automotive type batteries. For requirements pertaining to larger PIT type batteries, refer to Module 2A, Architectural 2-4.14.

If allowed by code, provide a battery charging area with a wire mesh cage wall, carried up to structure or to a secure lower ceiling and accessible from the service bays.

The Solicitation A/E must determine criteria for adequate ventilation in the battery charging area based on NFPA 70E and applicable building codes.

Coordinate all requirements with USPS and develop in accordance with OSHA, NFPA, ANSI and other applicable standards and codes. Provide a 120-volt, 30A, single phase, 3-wire outlet for a USPS-supplied battery charger. Provide 120-volt, 20A, duplex outlets on each wall 36 in. AFF.

Provide acid-resistant shelves for both storing and charging batteries.

Provide a plumbed emergency shower and eye wash unit. Provide a ¾ in. hose bib water connection 24 in. AFF.

2-13 Body Shop

Isolate the body shop and acoustically separate it from other areas by walls, doors, and dampers to prevent the migration of dirt and fumes. Provide special ventilation to remove fumes and to provide make-up air.

Clear height must be a minimum of 19 ft. in the body shop and 8 ft. in storage areas. Walls are not required between body stalls.

Provide a minimum of six compressed air lines per stall with cutoff valves, regulators, gauges, and quick-connects evenly spaced on the walls 48 in. AFF, or from overhead reels.

Provide a minimum of ten 120-volt, 20A duplex outlets evenly spaced on the walls 36 in. AFF, or from overhead reels. Provide a 208-volt, 50A outlet, 36 in. AFF at each end of the body shop.

Provide a ¾ in. hose bibb water connection 24 in. AFF between overhead doors. At every overhead door, provide a trench drain, connected to the sedimentation pit.

For body shops with paint spray operations, provide interlocks to de-energize hazardous electric outlets and equipment when spray equipment is in use.

2-14 (Deleted 2016-1)

2-15 (Combined with Pressure Cleaning Bay 2016-1)

2-16 Pressure Cleaning/Vehicle Wash Bay

Size bay to be compatible with the number and size of the vehicles to be washed per day and with provisions for the pressure cleaning of engine compartments and components.

Provide a minimum 16 ft. clearance AFF to the nearest obstruction.

- Along one side, provide a 4" high x 5'-0" deep x 12'-0" wide, raised concrete pad area for storing the pressure cleaning equipment. Paint edge of pad OSHA safety yellow.
- If applicable, provide access at both end of bay through 12 ft. wide by 14 ft. high overhead door.
- Provide a 6 in. by 10 ft. trench drain outside overhead door and slope floor to floor drain in the center of the space. Connect drain to the sediment pit and oil interceptor. Use filters for the drains to keep sediments out. All waste and drainage must go to separate oil/water separator. An 80 percent reclamation unit is required, except where local codes are more stringent. Refer to MPF Specification 334000 Storm Drainage Utilities 2.2.D. for oil/sediment separator requirements.

334000 MPF

- Provide same floor and wall finishes as Service Bays.
- Provide vapor-tight fixtures and install all controls and all other appropriate equipment in NEMA 6P enclosures.
- Provide mechanical exhaust system for removing vapor and moisture.
- Provide 120-volt, 20A GFCI duplex outlets on each side wall 36 in. AFF.
- Provide a combination emergency plumbed shower and eye wash unit.
- Provide ¾ in. compressed air lines equipped with cutoff valves, regulators, gauges, and quick disconnects on each side wall 48 in. AFF.

- Provide utility connections for USPS supplied steam cleaner.
- Provide a ventilation stack if a fuel-fired steam cleaner is used.

2-17 Miscellaneous Support Areas

2-17.1 Scrap Tire Equipment Storage

Provide interior or exterior storage space near the Stockroom or at the rear of the VMF, in accordance with Form PS 4551. The space must be accessible from the exterior through 8 ft. wide door/gate with a ramp as required for forklift access. If exterior, it will be on a raised pad, roofed over and with walls matching the VMF. Provide 25 foot-candles light level with weather-tight fixtures and a switch.

2-17.2 Utility Room

This space is for boilers, air-handling units, and other utility systems not required by code to be elsewhere. This is the preferred location for electric switchgear and main utility control panels. This could be a single space, or multiple spaces. Provide permanent and safe means of access to all mechanical equipment, including roof-mounted equipment.

Provide noise and vibration isolation to ensure that equipment noise is not transmitted to other areas.

Provide floor drains adjacent to air-handling units and boilers.

Provide wall-mounted 120-volt, 20A duplex outlets 36 in. AFF on each wall.

If water treatment is required, provide a utility sink in the vicinity of the chemical water treatment feeder. Provide noncorrosive storage shelves for the chemicals used with the feeder.

2-17.3 Compressor Room

Locate the compressors in a soundproofed room away from the administrative office areas and the Stockroom.

Provide this room with 120-volt, 20A wall-mounted duplex outlets, equipment utilities, and a floor drain.

Also refer to Section 3-4.

2-17.4 Custodial Closet

Locate one custodial closet convenient to the administrative office area and another in the vehicle maintenance area. Provide a floor type mop sink, complete with faucet, stainless steel edge trim, mop hanger and hose kit. The mop sink must be equipped with a backflow prevention device (e.g., vacuum breaker). Also provide a wall-mounted 120-volt, 20A duplex outlet.

2-18 Trailer Bay

- Provide access through a 16 ft. high by 12 ft. wide overhead door. Configuration must allow for drive-through of vehicle.
- Provide a minimum of four compressed air lines with cutoff valves, regulators, gauges, lubricators, and quick connects evenly spaced on the walls 48 in. AFF.
- Provide 120-volt, 20A wall-mounted duplex outlets 36 in. AFF, two on each side wall or from overhead reels, and two on each end wall.
- Provide a ¾ in. wall-mounted hose bibb water connection 24 in. AFF at both the front and back of the bay. Provide a trench drain connected to the sedimentation pit at the overhead doors.

- Provide an overhead roof supported monorail hoist system with a 3,000 lb. capacity near the end, and running across the width of the bay.
- Provide anchor pods for vehicle straightening (aka pull-pots), only when it is anticipated that vehicle straightening will be accomplished on-site rather than being subcontracted out. When required, coordinate quantity and positioning with the Facility Manager or local Fleet Operations Manager to accommodate the largest vehicles anticipated. A minimum design must consist of a 17 in. long threaded steel U bolt embedded in 12 in. of reinforced concrete and secured by four nuts and washers to a 24 in. square, ½ in. thick anchor plate under the structural slab. Provide 10 in. square by 4 in. deep floor pits for anchors; the 3/8 in. thick metal cover must be flush with the floor.
- Provide services to Trailer Bays to allow for the of other sized vehicles, for maintenance not requiring a lift.

3 System Requirements

3-1 Storage Tanks

Module 4E

Refer to Module 4E, Storage Tank Standards, for all requirements related to storage tanks.

3-2 Oil Storage

Module 4E

Refer to Module 4E, Storage Tank Standards, for all requirements related to storage tanks.

3-3 Lubrication

Furnish hose reels, metering regulators, and piping as required. Provide required overhead piping as follows:

- Chassis Lube - 5/8 in. O.D. annealed steel tube with 0.083 in. wall thickness.
- Gear Oil and ATF - 5/8 in. O.D. annealed steel tube with 0.035 in. wall thickness.
- Engine Oil - 7/8 in. O.D. annealed steel tube with 0.035 in. wall thickness.

Provide compressed air regulators with gauges, line strainers, valves, piping, and fittings as required. Provide cut off valves prior to each reel to facilitate reel replacement or repair.

Provide compressed air-powered product pumps with sufficient delivery rates to supply the quantity of reel banks required.

3-4 Compressed Air

The Solicitation A/E must prescribe a complete compressed air system to supply sufficient capacities and pressure for the inflation of tires, operation of the lubrication system, air motors, and other air-actuated equipment. Provision must be made for the type required by the application. Where breathing apparatus is required locally for paint spraying operations, provide a separate air compressor and appropriate equipment.

Provide duplex, two-stage, air-cooled, belt-driven, electric compressors with a horizontal-type receiver and refrigerated dryer. The compressors and receivers must meet current applicable ASME codes.

Size piping for the required cubic ft. per minute deliveries and terminal pressures. Pitch the piping and provide automatic traps for moisture elimination.

3-5 Communications

3-5.1 Telecommunications – Structured Cabling System

Telecommunication Outlets (T/O's) must be located to provide full telecommunication coverage throughout the VMF. Refer to Modules 1 and 2A, exhibit 5-4.3.2a for telecommunication outlet requirements.

3-5.2 IP Zone Paging System

An IP zone paging system must be provided within the VMF in accordance with Module 1, 5-4.8.1 and MPF specification section 275116. Provide IP zone paging speakers within the following areas:

Service Bays
Stockroom
Break Room
Training Room
Locker Room
Restrooms
All Offices and Corridor areas

3-6 Security

A VMF's security requirements will depend on whether the facility warrants IDS, CCTV, and ePACS, and whether it is co-located with a Mail Processing Facility or is located on a totally independent site.

3-6.1 All VMFs

- Provide ePACS for the VMF, only if the VRAT (Vulnerability and Risk Assessment Tool) CAP score is greater than 500 in the Overall, Crimes against Persons, or Crimes against Property categories, or if the CAP score is greater than 400 in the Overall, Crimes against Persons, or Crimes against Property categories AND any TWO of the following statements apply:
  - A security incident has occurred within the past 12 months (vandalism, robbery, or burglary).
  - VMF is easily accessed from a major highway.
  - VMF is near a bar, liquor store, or adult oriented store.
- Provide standard perimeter security fence, regardless of size. Refer to Standard Design Criteria, Module 1, 1-2.7 for applicable requirements.
- Provide Intrusion Detection System (IDS) if VMF or associated MPF does not operate 24/7. Refer to Standard Design Criteria, Module 1, section 5-7.3
- At all truck gates, provide roadway with a minimum 12 feet clearance between bollards, and any other devices or obstructions
- Provided fixed building-mounted security cameras to adequately monitor the exterior of the service bay doors.
- Exit door security cameras must be installed for facial recognition and to view the exterior door opening and surrounding area.

3-6.2 VMFs Co-Located with a MPF

- Determine whether the facility warrants ePACS. If it does, it must be tied into the same ePACS as the associated MPF.
- All exterior security CCTV to be tie into MPF's system. Refer to Standard Design Criteria, Module 2A, section 5-7.2 for applicable requirements.
- For entry gate and site security requirements, utilize the associated MPF criteria.
- Refer to Exhibit 3-6.3a for building security requirements

3-6.3 Independent VMFs, Not Co-Located with a MPF

- Determine whether the facility warrants ePACS
- Refer to Exhibit 3-6.3a for facility security requirements
- Security, ePACS and CCTV head end equipment should be located in the Telecommunications Room or in the secure Stockroom if there is no Telecommunications Room. Locate monitoring station in the Operations Office.

Exhibit 3-6.3a
VMF Security Requirements

Entry Locations	Baseline Security Level	High Security Level (ePACS)
Personnel Gate [1]	N/A	N/A
Vehicle Gate [2]	Manual sliding or swinging gate that is lockable after hours 2 FC, KB	Manual sliding or swinging gate that is lockable after hours, plus barrier arm gate 2 LRCR, 2 IC, 2 FC, 3 VSL, KB
Site Fencing	Per SDC Mod. 1, 1-2.7	Per SDC Mod. 1, 1-2.7
Site Security [3]	No requirements	FC
Exterior Storage	FC	FC
Main Entrance	E/M, DC, REX CB, FC, EXA	2 CR in/out, ES, DC, EXA, REX IC, FC,
LAN/Telecom Room	E/M, DC	CR, RX, ES, DC
Electrical Equipment Room	E/M, DC	CR, RX, ES, DC
Lunchroom [6]	N/A	2 FC
Breakroom [6]	N/A	2 FC
Service Bays to Stockroom (personnel)	CB, E/M, DC	CR, RX, ES, DC
Service Bays to Stockroom (service/personnel)	DC, EX	DC, EX
Exterior to Stockroom (personnel)	CB, DC, EXA, FC, E/M	2 CR (in/out), ES, DC, EXA, REX, IC, FC
Exterior to Stockroom (service)	DC	DC, FC
Exterior to Service Bays (service)		FC [7]
Exterior to Service Bays (Personnel)	E/M, DC, EXA, FC	2 CR (in/out), ES, DC, EXA, REX, FC

Exterior to service areas [4] (service/personnel)	DC	DC, FC
Emergency Exits [5]	EX, EXA, REX, DC, FC	DC, EX, EXA, REX, FC
Every VMF that does not operate 24/7 also requires an IDS		

Equipment Key:

CB	Call Bell System	EX	Exit Only [6]	LRCR	Long Range Card Reader
CR	Card Reader	EXA	Exit Door Alarm	PTZ	Pan/Tilt/Zoom
DC	Door Contact for IDS and/or ePACS	FC	Fixed security camera	RX	Request to Exit (motion sensor)
		IC	Video/Intercom Call Station	REX	Request to Exit Device (panic device)
ES	Electric strike	IDS	Intrusion Detection System		
E/M	Electromechanical Cipher Lock	KB	Knox Box	VSL	Vehicle Sensor Loop

Keyed Notes:

1 Pedestrian Gate: Due to pedestrian accessibility into the site via the vehicle entrance, the functionality of a separate personnel gate is limited.

2 Vehicle Gate:

a. Two fixed security cameras: one in front and one in the rear, covering both inbound and outbound vehicles

b. The lift arm gate provides vehicle entry access control. Upon sensing an exiting vehicle, the lift arm will automatically open.

c. Provide dual height, long range card readers and video intercom stations shall be pedestal mounted as shown on standard detail P5-7-4a2.

d. The intended function of the video intercom system is to provide driver recognition along with permitting a driver who does not have a valid entry badge to call a supervisory location in the VMF and gain access through the vehicle gate.

e. Three (3) or more vehicle sensor loops shall be located and wired to:

- Prevent closing of gates until vehicles have completely passed the barrier arm gate.
- Prevent closing of both gates until cars have completely passed both the barrier arm gate and sliding/swinging gate.

f. "Knox Box" to be installed for Fire Department entry at manual vehicle gates only and at non-24/7 facilities, upon request by the local Fire Marshal (AHJ). Knox Box when required to be furnished by USPS.

3 Provide fixed cameras to monitor employee and USPS vehicle parking. Cameras shall be designated as "Investigative" if a Criminal Investigative CCTV System is provided.

4 "Service areas" refers to spaces such as the sprinkler room, tire storage, oil/lube, etc., that occasionally require service and/or stocking of deliveries.

5 EX – Exit Only doors must have no operational hardware on the exterior side.

6 Provide (1) PTZ camera centered in room and designated "Investigative" if a Criminal Investigative CCTV System is provided.

7 The exterior service bay doors must be monitored by security cameras. Provide (1) fixed camera oriented to view across the service bay doors. Additional cameras may be necessary depending on the configurations of the shop bays. Individual fixed cameras at each service bay door are not required.

4 Equipment Requirements

4-1 Motor Vehicle Lifts

Provide vehicle lifts complying with specification section 144500

Lift type, quantity, and location, as indicated on Form PS 4551 and as recommended by local VMF Staff.

Center each lift in the service bay and position it so that the centerline of the rear post on a light-duty lift is approximately 8 ft. 6 in. from the face of the overhead door; the centerline of the rear post on each heavy-duty lift must be located 13 ft. 6 in. from the face of the overhead door.

Provide electrical power and one power unit for each.

4-2 Reclamation System

Provide trench drains, one in the wash bay connected to the reclamation sump pits and one at the wash bay door, connected to a sediment and oil interceptor. Drains must have removable covers and clean out pits. Floor must be sloped to the drains.

Water reclamation piping and tanks must be above ground and designed and specified to be compatible with the proposed system to be supplied by USPS and in conformance with all applicable codes. A system of settlement tanks and other equipment as required for the system or by code must be included in the drainage system.

Water heaters must only be specified in those areas where long periods of freezing temperatures are normally experienced and where tempered water is recommended for removal of road dirt, ice, and salt.

Coordinate all connections and electrical requirements with the equipment manufacturer(s).

4-3 Monorail Hoist and Trolley

Provide an electrically operated monorail hoist and trolley at a location determined by local VMF staff. Unless otherwise specified, the hoist must have a 2000 pound (min.) capacity and will be supported by the roof structure. Verify the weight of the equipment to be hoisted with USPS.

Conform to applicable ANSI Standards, including 830.11-80, Monorail and Underhung Cranes; and B30.17-85, Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings.

Module 4E – Storage Tank Standards

1 Overview

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7 Technical Requirements of the USPS National Centralized Bulk Storage Tank Monitoring & Notification System

1 Overview

1-1 Purpose

These Storage Tank Standards establish United States Postal Service (USPS) policy and procedures for designing, installing, and removing storage tanks used by the Postal Service for the accumulation of petroleum, oils, lubricants, and other substances. The standards apply to underground storage tanks (USTs), aboveground storage tanks (ASTs), and the piping and equipment associated with their operation. These standards also include facility design guidelines to ensure the safety and compliance of USPS sites where such tanks are used. Refer to Addenda provided by Project Manager for supplemental and detailed design specifications for storage tank systems.

1-2 Key Terms

Aboveground Storage Tank (AST): A storage tank placed above the surface of the ground. Any stationary tank system that is not covered with earth or other material or any tank located entirely within a structure that can be visually inspected, such as a building or basement, is generally considered an AST.

Underground Storage Tank (UST): A storage tank located underground or otherwise buried that is used to contain an accumulation of petroleum products or other hazardous material. Underground means that 10 percent or more of the total tank volume (storage tanks and piping) is buried in the ground.

1-3 Applicability

1-3.1 Applicability of Standards

These standards apply to all permanent storage tank systems owned or operated by the Postal Service, including USTs, and ASTs.

1-3.2 Responsibility for Third Party Owned Tanks and USPS-leased Tanks

Because the Postal Service may share liability associated with third-party owned or operated tanks on USPS sites, or for tanks leased by the USPS, the Facilities Department must ensure that:

- Third-party owners and/or operators of USTs or ASTs on USPS property comply with all applicable federal, state, and local environmental laws and regulations and specified Postal Service policies as stated in third party contracts.
- Tanks leased by the USPS undergo a targeted tank system inspection according to industry standards before signing any lease agreements. As a result of the targeted inspections, subsequent negotiations may result in tank removal, replacement, system repairs or modifications, or facility modifications. For guidance on conducting such an inspection, contact the USPS Office of Sustainability.

1-4 Compliance with Applicable Federal, State, and Local Laws and Regulations

USPS tank systems must be designed, installed, operated, maintained, and closed in accordance with all applicable federal, state, and local regulations and consistent with its environmental policies.

The US Environmental Protection Agency (EPA) has established federal regulations for managing USTs with capacities of more than 110 gallons used to store certain regulated substances, including gasoline, diesel fuel, new and used/waste oil, and new and used ethylene glycol antifreeze, and other substances. USTs containing these regulated substances are considered “federally regulated” and must adhere to specific design and operating requirements, described further below. Additionally, federally regulated USTs at USPS sites must comply with state and local regulations, even if those regulations are more stringent than federal regulations. USTs not subject to federal regulation, such as heating oil tanks, are exempt from state and local regulations, but may be subject to requirements associated with reporting and responding to certain releases and USPS may be liable for resulting contamination.

EPA has established federal regulations that require sites to prepare and implement spill prevention control and countermeasure (SPCC) plans if the total aboveground oil storage capacity, including ASTs and containers, exceeds 1,320 gallons. EPA also established requirements for reporting of spills of oil and other hazardous materials from ASTs. Regardless of whether the site is subject to SPCC regulation, all Postal Service ASTs must meet minimum design and operational requirements to prevent and control spills, described further below. In most cases, USPS sites are not subject to state and local regulations for ASTs. However, there may be certain states where the USPS is subject to AST regulations. Check with the USPS Office of Sustainability for the most current state regulations.

2 Environmental Site Controls for Tank Installation and Removal Projects

2-1 Overview

2-1.1 New and Replacement Tank Systems

The USPS Office of Sustainability and Facilities will coordinate the specific tank sizes, numbers, and fuel types prior to any new storage tank installations.

Office of Sustainability will develop the new tank criteria, which will include, but not be limited to:

- Anticipated fuel usage and throughput
- Aboveground or belowground consideration based on site characterization
- Climate Change Adaptation Plan – This process will include assessments for climate factors such as coastal zones, floodplains, geological and hydrogeological considerations, non-attainment areas, and related factors.

- Long-term facility usage/lease terms
- Adaptability for future USPS delivery network, fuel types, vehicle fleet, and related factors.

ASTs are generally preferred over USTs for liquid hazardous material storage to minimize USPS liability and compliance responsibilities. This is a case-by-case decision based on a number of factors, including site conditions, state and local requirements, and the material being stored. Consult the Office of Sustainability and other stakeholders (e.g., Facilities, Legal) when making this decision.

USPS tank systems must be designed and installed in accordance with all applicable federal, state, and local regulations and consistent with Postal Service environmental policies.

2-1.2 Repair of Existing Systems

All repairs to USPS tank systems must be performed in accordance with applicable federal, state, and local regulations and consistent with Postal Service environmental policies. States may require notification and permitting prior to undertaking certain tank system repairs.

When planning repairs or upgrades to an existing tank system, USPS sites must assess risk and ownership costs of repairing the systems versus installing a new system. In addition, consideration will be given to the future use of the facility.

2-2 Preparation of Project Documents

In order to insure compliance with all applicable federal, state, and local environmental regulations, it is essential that USPS Specification Section 013543, Environmental Procedures, be included in the project documents of every storage tank project, and that it be thoroughly reviewed at the preconstruction conferences for all such projects.

2-3 Site Management

USPS sites must ensure that contractors performing tank installations, repairs, or removals, manage site conditions in a manner that is protective of human health and the environment.

2-3.1 Disposal of Tanks and Associated Wastes

Handle, label, store, and dispose of all pumped product, sludge, tanks, piping, equipment, and contaminated soil and other media in accordance with applicable requirements. Retain manifests and other disposal records as described below.

2-3.2 Location of Hazardous Materials

The location of the Contractor's temporary storage of any hazardous materials and/or wastes must be appropriately marked and controlled. All materials remaining after the site implementation must be removed. The contractor must not dispose of any materials at the USPS site.

2-3.3 Historical and Archeological Protection

Monuments, markers, and works of art must be protected. Items discovered that have potential historical or archeological interest must be preserved. The Contractor must leave the archeological find undisturbed and must immediately report the find to the COR so that the proper authority may be notified.

2-3.4 Dust Control

The Contractor must keep the site free from dust in accordance with applicable federal, state, and/or local regulations.

2-3.5 Noise Minimization

The Contractor must perform demolition and construction operations to minimize noise including conducting work during less sensitive hours of the day in accordance with applicable noise control regulations.

2-4 Health and Safety

Prior to contractors commencing work, USPS sites must obtain from the contractor the necessary health and safety plans. During the project, the contractor must provide adequate measures to comply with applicable requirements and USPS policies and protect the safety if its workers, Postal Service employees and visitors, and the general public.

2-5 Recordkeeping

USPS sites must maintain the following tank-related records for the life of the site or as otherwise noted:

- As built specifications, installation records, operation and maintenance instructions, and performance claims for tanks, piping, leak detection equipment, and other equipment (life of site).
- Permits/Registrations (life of site or until superseded).
- Official communications, including notification of new UST, UST closure, release, and other related documents (life of site).
- Site assessment results and other closure reports (life of site).
- Corrective action reports, soil and groundwater investigations, and other cleanup and disposal records (life of site).
- Hazardous waste manifests and non-hazardous bills of lading for tank-related waste generated (7 years).

NOTE: Additional operation and maintenance records must be maintained, consistent with USPS policy on records retention. Per USPS policy, certain records are required to be uploaded to or updated in the Environmental Tool Kit (ETK). Contact the USPS Office of Sustainability to obtain the most current records management and ETK upload requirements.

3 Removal of Existing Storage Tanks

3-1 Underground Storage Tanks

The proper removal and closure of underground storage tanks (USTs) is a critical aspect of a compliant tank management program. The physical removal of tanks is an inherently hazardous procedure requiring the management of flammable liquids and hazardous atmospheres. Additionally, adhering to proper closure procedures and regulations ensures that the life cycle impact of the tank is assessed and the long-term liability of the USPS is minimized.

The following guidelines relate to the proper temporary and permanent closure of UST systems at USPS facilities. These guidelines have only been developed to describe the appropriate procedures for *planned* closures associated with capital improvement projects. Realizing that emergency tank removals become necessary from time to time, in these cases, site-specific procedures must be developed and implemented, as many of the requirements of these guidelines, e.g., notification procedures, would have to be adapted.

Please note that in addition to the tank itself, the UST system includes associated underground piping, underground ancillary equipment, and containment, if any. Unless otherwise noted, the requirements outlined in this section apply to all portions of the UST system. In cases where the UST system being removed will not be replaced, proper removal and disposal of aboveground structures associated with the UST system (e.g., canopies, dispensers, fueling islands, etc.) must be considered part of the closure project unless otherwise noted in the scope of work.

A note on project personnel: The Contracting Officer's Representative (COR) will typically be the single point of contact for the Contractor. The Designer must be the appropriately qualified consulting design professional for the project.

3-1.1 Overview of Closure Categories

3-1.1.1 Temporary Closure

A UST is considered to be temporarily closed if it is out of service but 1) will be returned to service; 2) is awaiting closure in place; or 3) is awaiting removal. In order to minimize risk, temporary closure of USTs must be avoided and in no case should temporary closure exceed the lesser of the governing local regulations or 12 months, or shorter. If temporary closure is required due to emergency environmental issues, appropriate notification to the governing environmental regulator must be made and applicable Federal, state, and local requirements for temporary closure must be observed.

Minimum federal requirements include removing stored product from the tank and tank lines, capping and securing all openings against tampering, capping and securing the product lines, disconnecting or locking out power to the pumps, and leaving the vent lines open. Even if the tank is empty, the site must continue to operate tank and piping release detection systems and corrosion protection systems, if applicable. State and local jurisdictions may have additional, more stringent requirements for temporary closure.

3-1.1.2 Permanent Closure

Based on changes in operations, a cost benefit analysis, or the results of a risk assessment, USPS may elect to permanently close a UST system. Typical risk evaluation factors include: the presence of sensitive receptors, material of construction, level of containment, tank location, age of tank, and tank integrity. Although all USTs are required to meet Federal standards, some USTs that are currently in operation may pose a greater risk. High risk USTs must be evaluated and prioritized for removal and/or replacement. If the determination is made that a tank is to be removed permanently from service, it must be properly closed in accordance with the guidelines below.

3-1.1.3 Closure in-place and Tank Abandonment

USPS USTs must be physically removed during the closure process. Closure in-place may be approved by the COR in cases of significant structural or other interference, in cases where removal would create a safety or other hazard, or in other similarly justified situations. Closure in-place must only be accomplished when approved by the environmental regulatory authority and in strict accordance with that authority's regulations and guidelines.

3-1.1.4 Changes in Service

A change in service occurs when an owner or operator decides to use a formerly regulated UST system to store a non-regulated substance. USPS policy does not permit changes in service. All USTs no longer intended for storage of petroleum and other regulated substances must be permanently closed and removed in accordance with the closure guideline provided below.

3-1.2 Closure Guidelines

3-1.2.1 Codes, Standards, and Recommended Practices

These closure guidelines have been developed to outline common interpretations of the following codes, standards, and recommended practices:

a. 40 CFR 280, *Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*,;
b. API RP 1604*, Closure of Underground Petroleum Storage Tanks*
c. API STD 2015*, Safe Entry and Cleaning of Petroleum Storage Tanks*
d. API RP 2016*, Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks*
e. API RP 2003, *Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*
f. National Fire Protection Association (NFPA) 1, *Uniform Fire Code*;
g. NFPA 30, *Flammable and Combustible Liquids Code*;
h. NFPA 70, *National Electric Code*;
i. NFPA 70E, *Standard for Electrical Safety in the Workplace*; *and*
j. 29 CFR 1910*, Occupational Safety and Health Standards*
k. 29 CFR 1926*, Safety and Health Regulations for Construction.*

Although these closure guidelines may call particular attention to specific portions of the above-referenced documents, the contractor should note that all requirements of these codes, standards, and recommendations should be addressed. The listing above is not intended to be all inclusive. In certain situations other codes and standards may apply and should be observed, as applicable. Furthermore, the closure guidelines outlined herein represent

minimum Federal requirements and typical industry standards. Additional, more stringent regulations and guidance related to the closure of UST systems may have been developed at the state and/or local level. Therefore, it is important to confirm and adhere to the requirements of any and all state or local agencies with jurisdiction. These agencies may include, but are not limited to, state environmental agencies, offices of the state fire marshal, local fire departments, local building departments, and/or local health agencies.

3-1.2.2 Training and Certification

Because there are safety and environmental hazards associated with removal and handling of USTs and associated waste products, workers involved in UST decommissioning activities must be appropriately trained. At a minimum, all personnel must have the appropriate safety and health training as required by the Occupational Safety and Health Administration (OSHA).

State and/or local agencies may require that UST closures are completed under the direction of certified or licensed contractors or professionals. All state and/or local requirements for certification or licensure must be met. In cases where there are no state or local requirements for certification or licensure, the UST closure should be completed under the direction of a nationally certified (e.g., International Code Council) UST Decommissioner. Appropriately certified personnel must be identified in advance of UST closure activities and reported on the Pre-Removal Checklist (see Appendix M4-C).

Additionally, state and/or local agencies may require that the UST Closure Assessment (see Section 3-1.2.7) be completed under the direction of certified or licensed environmental professional. All state and/or local requirements for certification or licensure must be met. Even if a certified or licensed environmental professional is not required to oversee the UST Closure Assessment, a qualified professional must be consulted in the event that contamination is encountered during UST closure activities. In order to prepare for this contingency, a qualified environmental professional must be identified in advance of UST closure activities and reported on the Pre-Removal Checklist.

3-1.2.3 Pre-Closure Notifications, Permits, and Planning

Making appropriate notifications and acquiring applicable permits shall be considered part of the UST closure project. Advance submission of an updated tank notification/registration or pre-closure acquisition of permits may be required in advance of UST system removal. Additional description of pre-closure notifications, permits, and planning are described below. Note that this section is intended to describe permits acquired and notifications made in advance of tank removal. Notifications and updates made during or after tank removal are discussed elsewhere in this guideline.

a. Regulatory Notification—Multiple agencies may have jurisdiction over tank closure activities and should be notified accordingly. In advance of initiating UST closure, the appropriate regulatory agencies must be identified and notified. Federal standards indicate the regulatory agencies must be notified at least 30 days before beginning closure or within another reasonable timeframe specified by the applicable agency. Consult state/local guidance, and conform to all notification

requirements. Documentation of appropriate notification must be submitted to USPS as described in Section 3-1.2.10.

b. Permits and Registrations—As previously noted, multiple agencies may have jurisdiction over portions of tank closure activities and, as a result, multiple permits may be required. For example, UST removal permits may be required by state environmental agencies and/or state or local fire agencies, while canopy removal may require a demolition permit issued by the local building/inspections department. If excavation dewatering is anticipated, a permit for dewatering discharge may be needed. Prior to initiating UST closure, all necessary permits must be acquired and permit fees must be paid. During closure activities, applicable permit conditions must be followed. Copies of permits must be submitted to USPS as described in Section 3-1.2.10.

c. USPS Notification and Planning—The COR should be included in communications related to the closure schedule. In advance of UST closure operations, the site-specific Pre-Removal Checklist presented in Appendix M4-C must be completed and submitted to the COR.

3-1.2.4 Site-Specific Evaluation

In advance of tank removal activities, a site-specific evaluation must be undertaken and documented on the Pre-Removal Checklist included in this guideline. The completed Pre-Removal Checklist shall be provided to and approved by the COR prior to the initiation of field work. The following items shall be included as part of the evaluation:

a. Conduct a Site Visit—The contractor shall visit the site to observe site conditions and complete those items on this site-specific evaluation that are appropriately conducted on site. The site visit shall be pre-arranged with the COR and USPS Facility Installation Head (FIH), and shall include a site walk and meeting with the FIH or appropriate designee.

b. Scope of Removal—Confirm the project scope with the COR and FIH. Consider the following in the discussion of scope. Refer to Section 3-1.2.5, “Closure Activities” for a more detailed description:

   1) Determine the number, size, material, and contents of USTs to be removed. Consult historical records, including state regulatory UST databases to determine if deadmen, excavation liners, or hold-down pads were installed.

   2) Determine if the USTs are being removed without replacement, or if they are part of a larger replacement project.

   3) On projects with tanks being removed without replacement, determine if there are other tanks with other products not identified for removal that have to be removed because they are physically located adjacent to tanks being removed such that leaving them in place would not be possible. If so, the contractor shall be responsible for developing a plan, including as necessary, the design and installation of a new aboveground storage tank (AST) system, to provide continuity with these affected tanks. For example, a site may have gasoline and diesel USTs that are identified for permanent removal without replacement. Within the same tank excavation, there may be other tanks, including motor or waste oil, which provide storage capacity that will continue to be necessary at the site moving

forward. To the extent that the ancillary tanks are physically located such that they have to be removed with the gasoline and diesel tanks, an AST system should be designed and installed for the motor and waste oil to replace that capacity lost as a collateral activity to the primary removal.

4) Determine the extent of underground piping, containment sumps, dispensers, vent piping, siphon or manifold piping or other product containing structures to be removed.

5) Determine the extent of electrical and communications equipment to be removed. Assess if the tank monitoring system is monitoring tanks in addition to those being removed, such that it will have to remain and be re-programmed. Assess if there is any other interconnecting electrical equipment between tanks to be removed and tanks to remain that will need to be appropriately reconfigured.

6) Determine the extent of structural removals, including canopies, dispenser enclosures or other system related buildings. Determine the age of structures to be removed, and consult local requirements, to determine the extent of demolition permitting required, and if a lead paint or asbestos survey is be required prior to removal.

7) Identify whether the COR or FIH is intending to retain or reuse equipment. If identified in the solicitation, confirm with the COR and FIH. As described in more detail below, the contractor is responsible for removal and disposal of all equipment and materials removed from the site, except that the USPS retains the right to retain any equipment (e.g., security cameras, dispensers, and tank monitoring consoles) for spares or other purposes.

8) Determine whether there is a need for the collection of non-traditional samples or data for purposes other than closure assessment (i.e., for research purposes).

9) The scope of work may include the removal of one UST at a site where additional tanks will remain. It is important to specifically define the scope of removal services and confirm the scope during the site-specific evaluation. At this point, confirmation as to the UST(s) planned for closure shall be made. Additionally, if there is equipment that is planned for re-use (e.g., cameras, canopy, tank monitoring system, dispensers, etc.) on site or at another USPS facility, the plan for reuse should be described within the scope of work and confirmed on the Pre-Removal Checklist.

c. Utility Clearances—Notification to the appropriate local utility clearance hotline must be made. Additionally, any available as-built plans should be reviewed to determine the location of the tank and system components with respect to utilities. Since utility companies may not mark lines on private property and the accuracy of as-built plans is not guaranteed, a qualified private utility locator should be engaged to confirm the locations of utilities and other below-ground structures. Additionally, the presence of above-ground utilities should be evaluated for potential equipment access/usability issues.

The results of the utility clearance may indicate that removal of the tank and associated components cannot be safely accomplished with the existing utility configuration or that the removal would compromise existing utilities. If there are utility conflicts, the contractor should work with the COR to ensure that utilities are secured, rerouted, removed, or de-energized prior to the start of subsurface work.

d. Additional Clearances—The likely excavation footprint and work area should be reviewed in conjunction with available as-built plans to determine if tank removal activities are likely to compromise existing structures including, but not limited to, buildings, sidewalks, canopies, retaining walls, light poles, other USTs, and ASTs. If so, determine whether the use of shoring and/or trench boxes could adequately mitigate the risks and plan accordingly. If the risks could not be mitigated through control of the excavation, the Designer shall develop and submit to the COR a plan and costs estimate for removal and replacement of the compromised structures, for consideration by the COR. The Designer shall be an appropriately qualified professional.

e. Work Area—Review the site layout and determine the likely work area for excavation activities. The proximity of wetlands or surface water bodies should be considered as part of the review. Any special permits or plans (e.g., wetland permit, storm water pollution prevention plan) required should be obtained or submitted in advance of tank removal activities. The contractor shall submit a site plan that depicts planned areas for staging of equipment and materials, equipment operation, stockpiling of soil and backfill, temporary storage of the UST system, and worker parking. The plan shall also depict planned storm water and erosion controls.

   Evaluate the potential impact of UST removal on vehicular and pedestrian traffic. If the location of the work area will cause traffic conflicts, develop and submit a traffic control plan in conjunction with the Designer and the FIH. The traffic evaluation and traffic control plan should address both on-site and off-site traffic impacts. In addition to maintaining functional traffic flow, the plan should seek to limit access to the work area by employees, patrons, neighbors, and passers-by through appropriate use of controls (e.g., flaggers, police details, signage, fencing, barricades, etc.).

   If the work area will cause interference to the operations of the facility (e.g., block an entrance, limit access to a loading dock, etc.), a plan to minimize the disturbance to operations should be developed. The plan may include adjustments to the work hours or work day and should be developed with input from the FIH.

   Additionally, the work area should be evaluated to determine if tank removal operations are likely to cause a nuisance (e.g., noise, odor) to employees, patrons, neighbors, or passers-by. To the extent possible, the work area should be configured to minimize these concerns. Although health and safety monitoring (see Section 3-1.2.5.1) should ensure that people are not placed at risk, care should be taken to avoid the perception that tank removal activities are putting employees, patrons, or neighbors, passers-by at risk.

f. Tank Status and Stop Delivery—Determine the current tank status and liquid level, and collaborate with the COR to ensure that delivery of product to the UST planned for closure is stopped. Determine the likely

timeframe that the existing product within the UST will be used to the maximum extent possible and plan the removal for after that date. Every effort shall be made to coordinate the consumption of all useable, clean fuel prior to the removal activities commencing, so as to minimize the amount of fuel that must be removed as waste.

g. Known Contamination and Land Use Restrictions—Perform a review to determine whether environmental contamination is known to exist at the site. Additionally, determine whether the site is subject to any land use restrictions. Note that this inquiry is intended to be a desktop review limited to file reviews or interviews and will not include soil and groundwater sampling. Based on this review, determine whether there are any special procedures that must be followed for the tank removal. Available information on known impacts at the site should be integrated into the health and safety plan prepared for the site (See Section 3-1.2.5.1).

   If the site is actively being managed for known contamination, it may be necessary to submit a plan to and/or receive approval from an environmental agency with jurisdiction before proceeding with the tank removal. Additionally, communication with the environmental professional overseeing investigation and/or cleanup activities should be maintained to ensure that removal operations do not have a negative impact on on-going environmental cleanup or monitoring.

   If the site is subject to a land use restriction, all conditions of the restriction should be adhered to. Relevant provisions may include soil and groundwater management, dust monitoring, and special requirements for restoration (e.g., impermeable cap).

h. Likelihood of Dewatering—Perform a review of available information to determine whether dewatering will likely be necessary during removal activities. The review may include information on soil types, depth to groundwater, the size and depth of the tank, and the likely duration of removal activities. If the review indicates that dewatering is likely to be required, develop a dewatering plan that describes the proposed disposal options for dewatering discharge. If a permit for dewatering discharge to either surface or groundwater is necessary, it should be obtained in advance of tank removal activities.

i. Hazardous Waste Generator Status—Determine whether the site is listed as a generator of hazardous waste and if so, the generator status, i.e., Small Quantity Generator or Large Quantity Generator. If the site is a generator, determine the generator identification (ID) number. Based on this information and applicable Federal and state and local regulations, develop a waste disposal plan that is advantageous to USPS by seeking to minimize any change in generator status. For example, if the site is not currently a generator and state regulations allow for waste disposal under a temporary ID, this approach should be followed. Similarly, if the site is a Small Quantity Generator, and the waste disposal can be characterized as “one-time” or disposed of under a temporary ID number, one of these approaches shall be followed to avoid the site being re-classified as a Large Quantity Generator. The contractor should activate or obtain a generator ID in advance of tank removal activities to minimize the need for waste storage onsite.

j. Seasonal Considerations—Seasonal considerations may play a role in the ability to efficiently conduct the UST removal and restoration. For

example, if the tank is located in an area where shallow groundwater is anticipated, it may be prudent to conduct the removal during low water conditions. Additionally, completing restoration (e.g., paving, concrete, seeding, etc.) may not be possible during certain times of the year. If seasonal concerns are identified for a particular site, the tank removal should be scheduled accordingly to avoid the concerns.

k. Specialized Restoration—The Designer will determine whether the ground surface in the area of the UST removal will require specialized restoration due to its location and/or use and include this information in the design drawings. Special restoration considerations might include the need for reinforced concrete, heavy duty pavement, a retaining wall, or specialized plantings. Specialized restoration requirements must be reviewed and approved by the COR during the site-specific evaluation.

l. Operational Continuity—In some cases, the product being stored in the tank slated for removal may be critical to the daily operations of the facility. In these situations, the tank removal should be planned to ensure operational continuity. For example, the tank may be removed following installation of a replacement tank. If this is not possible, a temporary tank or an alternate source may be required. A plan for operational continuity shall be developed by the Designer prior to removal. The plan should be reviewed and approved by the COR during the site-specific evaluation.

m. Environmental and Other Permit Modifications—As a result of the UST removals, a variety of environmental permits may need to be updated. As part of the site specific evaluations, survey all of the site environmental permits and determine which will need to be updated or modified, and which will involve regulatory submittals or notifications. Examples of permits and registrations that may need modification include, but are not limited to:

1) UST Registration: The UST registration with the governing regulatory authority shall be updated to reflect the UST removals and closures. In some jurisdictions, local fire and emergency response agencies also have registrations or tank inventories; if applicable, notification shall be made to these officials as well.

2) SPCC Plan: Realizing that Federally regulated USTs are not required to be included in Spill Prevention, Control, and Countermeasure (SPCC) Plans, 40 CFR does require that the presence of USTs be noted on the facility diagram. If an SPCC Plan exists for the site, it shall be updated to reflect the final configuration.

3) Air Permits: Many state air regulatory programs require the registration of Stage I and Stage II vapor recovery systems. If these systems are present, and they are registered, closure notification shall be made to the appropriate agency.

4) Storm Water Permits and Plans: Many sites may have a National Pollutant Discharge Elimination System (NPDES) Permit and/or Storm Water Pollution Prevention Plan (SWPPP). Of those, some may be required as a result of the presence of the fueling facility. If a SWPPP does exist on the site, it shall be updated to reflect the new condition. Additionally, the requirement for the SWPPP should be evaluated in lieu of the new site conditions,

and a determination made if SWPPP is still required, or if a No Exposure Certification (NEC) is sufficient. If the site has a National Pollutant Discharge Elimination System (NPDES) permit, it shall be modified accordingly.

5) Tier II Report: The removal of flammable liquid storage capacity may change the requirements for annual Tier II reporting under the Emergency Planning and Community Right to Know Act (EPCRA). Realizing that Tier II reporting is an annual occurrence, the need to revise the reported quantities should be assessed and the entity responsible for completing the report notified.

6) Safety Data Sheets: If removal of the UST results in no potential exposure to those products by employees, assess whether the site's Safety Data Sheet (SDS) library should be updated.

7) Other permits: Complete a review of other site specific, locally unique program permits that exist on the site including those that may need to be revised or updated as a result of the UST removals.

3-1.2.5 UST Removal/Closure Activities

a. Health & Safety—Removing USTs is an inherently dangerous operation. The contractor shall comply will all Federal, state, and local health and safety requirements, as well as the minimum requirements outlined in this guideline. To the extent there is a conflict between the guidance provided here and governing regulations, the stricter or more extensive requirement shall apply.

1) Training and certifications: All contractor personnel involved on site with UST removal or follow on environmental activities shall have a current OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certification. Additionally, all contractor personnel involved on-site during UST removal or follow on construction activities shall have an OSHA 10-hour General Construction Safety Certification.

2) Program: The contractor shall have an OSHA and state compliant company-wide health and safety program that shall be submitted to the COR for approval prior to beginning work. At a minimum, the program shall address new employee and recertification training, sub-contractor selection and health and safety policy, safe work practices (SWP) appropriate to the work conducted, site-specific health and safety plan requirements, daily on-site health and safety meetings and requirements, personal protective equipment (PPE) and incident reporting. The contractor shall supply Total Recordable Incident Rates (TRIR) and Experience Modification Rates (EMR) to the COR for the previous three years prior to beginning work.

3) Planning: A site-specific Health and Safety Plan (HASP) shall be prepared for each tank removal project. The HASP shall meet OSHA requirements, and address the contractor's intended procedures for dealing with the hazardous atmosphere within the tanks, including purging and inerting procedures. In addition, a documented last minute risk assessment or "tail gate" meeting shall be conducted on site by the contractor at the

commencement of each day's activities in accordance with OSHA requirements and the contractor's health and safety program. At a minimum the contractor's SWP for UST removal activities shall be reviewed with on-site personnel daily.

4) On-Site Practices: General construction safety practices, including but not limited to the maintenance of safe slopes, fall protection, PPE, heavy lifting, overhead objects, and heavy equipment shall be followed at all times. Additionally, strict adherence to the requirements of API Recommended Practices 1604 and 2015 shall be strictly followed. The contractor shall make each tank atmosphere safe in accordance with these procedures, and monitor the atmosphere throughout the evolution using properly calibrated equipment. Extreme caution shall also be taken, including hand excavation to ensure the tank top is not punctured or struck by the excavator bucket or other heavy equipment. Do not allow any equipment to produce sparks during the operation, particularly between steel tanks and steel excavation equipment. Prohibit smoking and remove all spark or heat producing equipment from the removal area. Secure the work area with fencing, cones, and caution tape as required and appropriate for the site. Never leave an open excavation without completely surrounding it with a secure fence.

Note that the procedures and requirements listed above are intended only as a general summary of requirements. It is the contractor's responsibility to provide for the health and safety of all employees, subcontractors, and others on or about the site during the UST removal projects, and it is imperative that the contractor review and strictly follow the safety procedures outlined in the reference material above, and comply with all applicable Federal, state, and local health and safety regulations.

b. Field Environmental Considerations—Install erosion controls to prevent soils from entering wetlands, surface water, drainage structures, or swales. Do not spill product during removal activities. Product spilled into soils, groundwater, or surface water shall be considered a release, the mitigation of which shall be at the contractor's sole expense. Determine in advance where soils (both clean and impacted) will be stockpiled and segregated.

c. Product (Tank Contents) Removal—The contactor shall remove, store, and prepare for disposal or recycle, all remaining fuel in each tank, prior to beginning cleaning. Realizing that the intent of these standards are for the contractor to coordinate with the COR to avoid usable fuel remaining at the time of removal, if any tank has a substantial quantity of clean usable product at the time of the removal, consult the COR immediately for instructions on disposition of the useable fuel. Explosion-proof or air driven pumps shall be used when removing product and residues from the UST. If a vacuum truck is used, the truck should be located outside the vapor hazard area and shall be properly grounded. Plastic (PVC) pick-up tubes shall NOT be used on the stripping lines of vacuum trucks, as they are prone to accumulating static charges. Use a hand pump to remove the bottom few inches of liquid, if necessary, while observing appropriate grounding and bonding procedures. All interstitial fluids shall be removed from double-walled tanks.

d. Tank Preparation— Prior to tank removal, all piping and wiring shall be disconnected from the tank and made safe, the electrical circuits having been disconnected from the source prior to beginning. The contractor shall avoid spillage when disconnecting and draining product piping. All exposed piping ends shall be capped after draining. Take caution not to allow any product to spill. Any soil impacted by spillage shall be excavated immediately and properly disposed at a certified disposal facility at the contractor's expense. Identify where the tank will be lifted to, and how it will be removed from the site.

e. Tank Removal— Remove the topping slab, then excavate down to the tank slab, using extreme caution and hand tools as necessary not to produce sparks or puncture the tank. Leave the vent piping in place initially to assist with purging and inerting procedures. Complete purging and inerting as outlined above, and confirm that the tank atmospheres are safe before proceeding using the appropriate calibrated equipment. Test at multiple locations at each the top, bottom, and ends of the tank. Remove the tank and all associated underground appurtenances, including hold-down straps, anchoring deadmen, anchoring slabs, excavation liners, manways, vent piping and risers, spill buckets, and other tank top equipment. Load the tank directly onto the truck, or to a suitable staging area. Complete cleaning of the tank prior to it leaving the site. Follow all appropriate confined space entry requirements if entering the tank (including OSHSA requirements and API Recommended Practice 2015), and avoid all hotwork or spark-producing cutting activities. Continue to strictly adhere to all applicable health and safety requirements.

   In order to complete the tank removal, it will be necessary to remove some volume of soil from the area surrounding the tank. If observations indicate that excavated soil is impacted (e.g., staining, petroleum odor, elevated photoionization detector (PID) readings), it must be segregated from non-impacted soil. Refer to Section 3-1.2.8 for additional discussion of soil segregation. Excavation should be completed in a way that minimizes cross contamination. For example, soil from above the tank should be excavated and screened separately than soils located beside or below the tank. Complete soil and water sampling immediately upon removing the tank. Refer to additional details on sampling in Section 3-1.2.7.

f. Piping Removal—All underground product, vent, and vapor recovery piping shall be removed and closed as part of the UST removal process. In cases where removal would cause a structural hazard, or the piping cannot be removed due to a structural or significant interference, abandonment in place may be authorized by the COR. Abandonment in place can only be accomplished when approved by the governing environmental regulator and only in strict accordance with their guidelines and procedures for flushing, testing, grouting, etc.

   Drain and cap prior to removal, taking care to avoid spillage. Remove all aboveground vent piping, caps, supports, and components.

g. Removal of Additional Appurtenances—In general, remove all equipment and materials associated with the UST system. The contractor is responsible for the disposal of all equipment and materials in accordance with all Federal, state and local regulations. All equipment and materials removed from USPS sites shall not be reused or sold for reuse, but rather shall be destroyed and disposed or

recycled. However, the USPS reserves the right to retain any equipment for its sole future use, at its discretion.

1) Dispensers: Remove pumps and dispensers, including the associated containment devices. Note that many state closure guidelines require the sampling of soil under each removed dispenser.

2) Electrical and Communications: Remove all electrical and communications equipment associated with the facility. Remove all wiring serving the facility from the existing circuit breaker to the equipment. Re-label the electrical panel, and leave the existing breaker as a spare if serviceable. Remove all aboveground conduits. Underground conduit may be abandoned in place, after wiring is removed and ends are painted red. Remove enough conduits at each end to remove all trip hazards. Consider removal of underground conduits if the site is otherwise excavated, or if at a larger site with many utilities where the abandonment of utilities in place is generally avoided.

   Remove all security systems and cameras, as well as other communications systems as determined by the COR.

3) Tank Monitoring and Fuel Management Systems: If the environmental or fuel management systems serve only the tanks to be removed, remove the systems in their entirety. If either of these systems serves other tanks, dispensers, or systems that will remain, remove only the sensors, probes, and wiring associated with the existing systems, and re-program the systems to accommodate the removal of the systems removed. Ensure no alarms remain on the monitoring system when the project is complete.

4) Emergency Stop and Other Control Devices: Remove all control devices and emergency stop systems, if all tanks associated with those systems are being removed. If tanks or systems are to remain on the site that are associated with control devices, ensure that the systems are rewired so that they work as intended on all remaining systems.

5) Remove all lighting associated with the UST system or canopy. If the area is served by site lighting, remove general site lighting only as directed by the COR during the initial site survey.

6) Remove all canopies and associated structures. Remove foundations if practical or if new development of UST systems are planned for the area. Secure demolition permits as required, and ascertain the age of the canopy to determine the need for lead or asbestos assessment or testing prior to removal. Complete all testing, assessment, and removal as required by Federal, state and local regulation, and in accordance with the demolition permit, if any.

h. Equipment and Material Disposal: Refer to Section 3-1.2.6 for guidelines on the disposal of equipment and materials.

3-1.2.6 Waste Disposal

a. Minimizing Product within the Tank—Minimization of waste fuels and sludges should be a priority for all tank removals. As mentioned in Section 3-1.2.4, all efforts should be made to minimize the amount of fuel in the tank prior to removal. Determine the current tank status and work with the COR to ensure that delivery of product to the UST planned for closure is stopped. Determine the likely timeframe that the existing product will be used to the maximum extent possible and plan the removal for after that date.

b. Proper Disposal of Waste Fuels, Sludge and Tank Cleaning Waste—The contractor should be responsible for removing all waste fuels, sludges and tank cleaning wastes from the site. All efforts should be made to dispose of tank wastes under the lowest possible regime for documentation as possible. Work with COR to determine if the waste generated can be classified as non-hazardous and removed from the site under a bill of lading or non-hazardous waste manifest or if it is considered hazardous and must be removed from the site and tracked under a uniform hazardous waste manifest. Review state hazardous waste regulations to ensure a proper waste determination is completed and for definitions of hazardous versus non-hazardous waste.

   If it is determined the waste is hazardous and must go off site under a hazardous waste manifest, as mentioned in Section 3-1.2.4, determine whether the site is currently listed as a generator of hazardous waste and what the current generator status is. Based on this information and applicable Federal, state, and local regulations, develop a waste disposal plan that is be advantageous to USPS by seeking to minimize any change in generator status. For example, if the site is not currently a generator and state regulations allow for waste disposal under a temporary ID, this approach should be followed or if the site is currently listed as a small quantity generator and state regulations allow for a one time waste removal notification to avoid possibly having to change the site to large quantity generator status, this approach should be followed. The contractor should activate or obtain a generator ID and make all necessary notifications in advance of tank removal activities to minimize the need for waste storage onsite.

   Coordinate the hazardous waste removal schedule with the COR to be present or arrange for another designated representative to be present to sign and assist the transporter in the proper distribution of the hazardous waste manifest(s) when the hazardous waste is transported off site. Hazardous waste manifests should only be signed by individuals trained in the proper handling of hazardous waste for transportation. If the contractor has the proper training and state regulations allow, the USPS may elect to have the contractor sign as “agent for” the USPS. The individual designated to sign the hazardous waste manifest should ensure that all information provided on the manifest by the transporter is correct to include:

   - The generator’s name and mailing address;
   - The generator’s site address;
   - The generator ID number (if a temporary number, does it follow the proper temporary ID format utilized by the state?);

- The transporter's name and United States Environmental Protection Agency (EPA)/state ID number and the designated (receiving) facility's address and EPA/state ID number (ensure only properly permitted hazardous waste transporters and disposal facilities are utilized); and
- The waste description, quantity, and waste codes.

The COR or his/her designated representative will sign the manifest and ensure they receive the "generator copy" (copy #6) signed by the transporter. If a designated representative is signing the manifest, he or she must ensure the generator copy of the manifest is provided back to the COR or the appropriate USPS personnel for proper distribution, tracking, and filing. Depending on state requirements, copies of the manifest may need to be submitted to the state where the waste was generated and the state where the waste is being disposed. Consult each state's hazardous waste regulations to confirm manifest distribution requirements.

Once the waste is received at the receiving facility, the generator (USPS) will receive a manifest copy back from that facility (copy #3). This manifest should be signed by the receiving facility, stating the waste was actually received by that facility. Federal, state, and local requirements typically require that copies #3 and #6 of the manifest be retained for three years from the ship date. If a signed copy of the manifest is not received from the receiving facility within the specified time required by Federal, state, and local regulations (typically 30-45 days), the generator must notify the appropriate Federal, state, or local agency. Consult the appropriate Federal, state, or local regulations for the proper notifications to be made.

c. Disposal of Construction Materials and Removed Equipment—The contractor shall remove all materials and equipment included in the scope of work in accordance with all applicable Federal, state, and local regulations. Whenever possible, materials shall be disposed of for recycling. Once the USPS has determined that it will not be retaining a particular piece of equipment for its use, the contractor shall destroy and dispose of all equipment. The contractor shall not reuse (in its original intended form), sell or barter for reuse, or give away for reuse, any equipment removed from USPS properties. Recycling where the material is destroyed, processed, or transformed into a state where it cannot be reused in its original form is not considered "reuse."

The following additional requirements apply:

1) Tanks: Prior to leaving the site, the tank should be cleaned to remove all petroleum residues, and brought to a condition that allows for the disposal for recycle. All tanks shall be destroyed or rendered unusable by the contractor, to prevent unauthorized reuse in the future. Secure photos or documentation of destruction and provide with the post-removal documents. Steel tanks should be disposed of for recycle.

2) Concrete and Pavement: The contractor shall remove all unsuitable pavements, concrete, and clean fills, and other site materials. When possible, all concrete and asphalt removed from the site shall be disposed of for recycle. Clean concrete and asphalt materials may be reused on-site, but only four (4) or

more feet below finished grade, and only when properly broken up and processed such that large pieces are not re-buried.

3) Structural Steel: The contractor shall remove all structural steel after any necessary assessment, testing and/or abatement of hazardous materials, e.g., lead and asbestos abatement has been completed. Structural steel should be removed for recycle.

4) Piping: The contractor shall clean and dispose of all removed piping. When possible, piping shall be disposed of for recycling.

5) Electronics: The contractor shall dispose of all removed electronic equipment. When possible, electronic equipment shall be disposed of for recycling.

6) Lamps and Light Bulbs: LED and other similar lamps shall be disposed of as universal waste when required. Other lamps shall be disposed of for recycle when possible.

3-1.2.7 Closure Assessment

a. Regulatory Basis—Prior to the completion of tank closure activities, a tank closure assessment must be completed to determine whether a release of petroleum from the tank system has occurred. Federal regulations indicate that the assessment must include measurement for contamination in areas where contamination is most likely to be present at the UST site. Although the Federal regulations leave flexibility as to the sample types, sample locations, and test methods, most state-level jurisdictions have developed their own requirements for tank closure assessments. The guidelines below provide basic, minimum requirements for the tank closure assessment, but they are not intended to supersede applicable rules or guidance developed by agencies with jurisdiction. The contractor must complete a closure assessment that meets applicable state and/or local requirements.

Note that information indicative of a release collected during the closure assessment may trigger the need for reporting to state/local agencies. Soil screening results in excess of certain threshold values, laboratory analytical results in excess of standards, the presence of free product, and/or other observations indicating a release are all possible notification triggers. The contractor must comply with applicable notification requirements. Please refer to Section 3-1.2.8 for a discussion of contamination and reporting.

b. Soil Sampling

1) Screening Samples—In order to measure for the presence of contamination during the UST system excavation, soil samples should be collected for field screening. Soil samples should be screened using a properly calibrated Photoionization Detector (PID), or other equivalent device. The specific locations and frequency of screening samples should be determined by applicable rules or guidance, but, at a minimum, samples from the excavation sidewalls, the excavation base, beneath piping runs, and beneath dispensers should be screened. Certain jurisdictions have specific protocols for calibration and screening (e.g., jar-headspace method, aluminized bag headspace method). These protocols must be adhered to.

Field screening sample locations and measurements must be recorded for inclusion in the Closure Assessment Report (See 3-1.2.7 h).

2) Analytical Samples—Most jurisdictions require the collection of soil samples for laboratory analysis as a means to verify field screening results. The number of samples, the location of samples, the collection method (e.g., grab, composite), and the laboratory analytical parameters shall be determined by applicable rules or guidance and may be dependent on soil screening results. For example, if screening does not indicate elevated PID readings, composite samples may be appropriate. However, if elevated PID readings are observed, collection of discrete samples from areas exhibiting the greatest evidence of impacts may be required. Again, it is important to understand and comply with state/local rules for sampling. A description of soil analytical sample locations, collection methodology, and results must be included in the Closure Assessment Report (See 3-1.2.7 h).

   In limited circumstances, laboratory analytical samples may not be required if field observations do not indicate the presence of a release. If applicable state/local guidance specifically indicates that analytical samples are not required for a given situation, they need not be collected.

c. Groundwater Sampling—In order to determine whether groundwater impacts are present, it may be appropriate to conduct groundwater sampling. Many jurisdictions require collection of a groundwater sample if groundwater is observed within the excavation. Follow state/local guidance to determine whether groundwater sampling is required and what the appropriate laboratory analytical parameters should be. A description of groundwater analytical sample locations, collection methodology, and results must be included in the Closure Assessment Report (See 3-1.2.7 h).

d. Visual Assessment—In addition to the sampling described above, a visual assessment of the tank system is an important part of the closure assessment. During and immediately following the removal, the tank and piping should be visually inspected for the presence of staining, corrosion, holes, cracks, and loose fittings or joints. Observations should be documented with photographs, which shall be included in the Closure Assessment Report (see 3-1.2.7 h). The tank and piping are often damaged during the removal process. Therefore, to the extent possible, it is important to observe and document their condition prior to removal so that damage caused by removal activities can be distinguished from pre-existing staining, cracks or holes.

e. Additional Observations—Additional observations including petroleum staining or odor, sheen or product on the groundwater, depth to groundwater, and native soil types should also be recorded and reported in the Closure Assessment Report (see 3-1.2.7 h).

f. Inspections—Note that some jurisdictions may require visual inspection of the tank and/or excavation by environmental agency personnel, fire department personnel, a qualified environmental professional, or others. Inspection requirements should be determined in advance of closure activities and appropriate notifications must be made to allow for the required inspections.

g. Jurisdiction-Specific Requirements—Agencies with jurisdiction may require the collection of additional information during the tank closure assessment. For example, information related to on-site oil and hazardous material storage, nearby receptors, property boundaries, property ownership, and site history may be required. In order to maximize efficiency, the contractor shall be familiar with all applicable closure assessment requirements in advance of the commencement of field activities so that the acquisition of the required information can be coordinated.

h. Closure Assessment Report—A Closure Assessment Report documenting the results of the closure assessment shall be completed for every UST closure. In certain circumstances (e.g., a closure where no evidence of a release is observed), a given jurisdiction may not require preparation and submittal of a Closure Assessment Report. Regardless of whether it is required by the jurisdiction, a Closure Assessment Report must be prepared and submitted to the COR.

   Minimum Report Requirements: In addition to any applicable jurisdictional report requirements, the following information must be included within the report:

   1) Site Name and Address
   2) UST Facility ID
   3) Name and Contact Information for COR
   4) Name and Contact Information for Contractor/Environmental Professional
   5) Site Location Map
   6) Site Plan drawn to scale showing the UST area relative to recognizable site features (e.g., buildings, property boundaries), piping runs, the approximate excavation boundaries, screening sample locations, and analytical sample locations.
   7) Soil Descriptions and Screening Results
   8) Laboratory Analytical Results including a tabular presentation and discussion of the results and comparison to applicable standards
   9) UST System Observations
   10) Labeled Photographs of the tank system components (tank, piping, ancillary equipment, etc.) and excavation
   11) Waste Disposal Documentation
   12) Recommendations for Additional Work (if applicable)

i. Submittal Requirements: Jurisdictional requirements for the Closure Assessment Report submittal including applicable regulatory timeframes must be met. The deadline for report submittal is often based on the date of closure or receipt of analytical results. If there is no regulatory deadline for report submittal, or if report submittal is not required by regulations, the Closure Assessment Report must be submitted to the COR within 30 days of tank closure.

j. Prior to submittal of the report to jurisdictional agencies, a draft of the report must be submitted to the COR. After the COR has had the opportunity to review and comment, the report must be submitted to

the required agencies (e.g., state environmental agency, fire department, etc.) as necessary. A final copy of the report should be issued to the COR along with a cover letter or documentation describing any transmittal to other agencies.

k. Jurisdictions may have additional requirements for submittal of tank closure documentation separate from the Closure Assessment Report. For example, an agency may require that a tank disposal receipt be submitted within a certain timeframe. All applicable requirements for tank closure documentation must be met and documented by submitting copies of transmittals to the COR.

3-1.2.8 Contingencies for Observed Releases

The purpose of the closure assessment described in Section 3-1.2.7 is to determine whether a release from the tank system has occurred. If contaminated soil, contaminated groundwater, and/or free product are discovered as part of the closure assessment, additional investigation and corrective action may be required. Although a closure assessment may not always indicate evidence of a release, the contractor should always be prepared to manage the initial actions of release response should contamination be discovered. As described in the sections below, knowledge of reporting thresholds, timelines and procedures for reporting, and rules related to completion of initial response actions is critical to properly handling a release observed during UST closure.

a. Threshold for Reporting—The threshold for release reporting/notification varies between jurisdictions. Many state environmental agencies have a threshold value for soil screening samples above which release notification must be made. Similarly, there are commonly notification values, reporting values, or standards to which soil and groundwater analytical results can be compared to determine whether a reportable release has occurred. Additionally, observations made during the tank pull (e.g., the presence of free product or a sheen on groundwater) may trigger reporting requirements. The applicable reporting thresholds must be determined in advance of tank closure.

b. Reporting Timeline—Once reporting requirements have been triggered, it is important to consider the regulatory timeframe for reporting. A jurisdiction may have different requirements for the reporting timeframe depending on the perceived severity of the release or the method by which the release was confirmed (e.g., observation of free product or an elevated PID reading may have to be reported within hours, while analytical results exceeding standards may have to be reported within days or weeks). Applicable reporting timelines must be determined in advance of closure so that they can be met in the event a release is observed.

c. Reporting Hierarchy—In the event that a release requiring reporting is observed, it must be reported to the COR as soon as practicable. If observations indicate that there may be an imminent threat arising from the release (e.g. fire, explosion, or vapor hazards), appropriate notifications to emergency response agencies should be made immediately. In all other situations, the COR must be notified of the release and then the appropriate regulatory notifications must be made in accordance with the regulatory timeframes for reporting (see item #2 above).

d. Completion of Initial Response Actions—If observations indicate the presence of a limited volume of impacted soil in the vicinity of the tank, it may be efficient to over-excavate in an attempt to remove impacted soil while equipment and personnel are on-site to complete the tank removal. Many jurisdictions allow for completion of such limited remediation in conjunction with tank removal activities. However, other jurisdictions may require additional characterization or approvals in advance of any remediation.

   Once a release is discovered, the goal should be to efficiently bring the release to regulatory closure while following any applicable rules related to immediate response actions. If the volume of impacted soil appears to be limited such that excavation of additional soil to "clean" points is practical within time and financial constraints, it may be appropriate to complete such excavation with the prior approval of the COR. If contamination is observed and investigation and/or corrective actions are required, these services will normally be contracted separately.

e. Soil Segregation—Regardless of whether excavation is planned for the purposes of remediation, it will be necessary to remove some volume of soil from the area surrounding the tank in order to complete the removal. If observations indicate that excavated soil is impacted (e.g., staining, petroleum odor, elevated PID readings), it must be segregated from non-impacted soil. The threshold for soil segregation should be developed in accordance with state/local guidance prior to the commencement of tank closure activities.

   Soil that is identified as impacted should be appropriately stockpiled. The soil must be stockpiled separately from non-impacted soil in a designated location that is acceptable to USPS. The location should previously have been determined during the site-specific evaluation. The impacted soil stockpile should be located on a double layer of 6 mil (minimum) polyethylene sheeting, and under polyethylene sheeting that is secured to prevent ponding of water and to reduce the possibility of the cover layer being blown off.

f. Impacted Soil Disposal—In the event that impacted soil is identified and stockpiled, the contractor shall be responsible for properly disposing of or recycling impacted soil at an appropriately licensed facility. In order to reduce risk and minimize disruption to on-site operations, the contractor should seek to appropriately dispose of the material as soon as possible, but in no case more than two weeks following the completion of excavation activities. To that end, a potential disposal facility should be identified in advance of tank closure activities and the waste characterization and acceptance criteria of the facility should be determined.

   Soil disposal shall be conducted in accordance with the procedures described in Section 3-1.2.6 (Item #2) above.

g. Release Preparation—In order to efficiently manage a release observed during closure, advance preparation is required. As described above, it is important to be familiar with reporting thresholds, procedures for reporting, and rules related to completion of initial response actions. Additionally, it is important to be physically prepared for the possibility of managing a release. The contractor must have equipment and materials on hand to allow the proper stockpiling of impacted soils. Sorbent pads or booms may be needed if free product

is observed on groundwater. The contractor must also be prepared to collect additional laboratory analytical samples that may be required for waste characterization or for the purposes of demonstrating that impacted soils have been successfully excavated.

3-1.2.9 Restoration

Following tank removal, appropriate site restoration shall be completed. The following restoration guidelines are intended to be applied generally to all sites. As described above in Section 3-1.2.4, any specialized restoration requirements shall be determined by the Designer and included in the design plans, if applicable. In the event that specialized restoration requirements conflict with the general restoration requirements described in this section, the specialized, site-specific requirements will apply.

a. Backfill and Compaction—Before backfilling is initiated, any required inspections should be completed as described in Section 3-1.2.7 above. Assuming that backfill and soil excavated during the tank removal are not impacted above any applicable threshold (see Section 3.1.2.8), they may be used as backfill within the excavation, up to a level of 3 feet below final grade level. Concrete and asphalt removed as part of tank closure activities shall not be used as backfill within the excavation. This material should be disposed of or recycled as described in Section 3-1.2.6.

   The last 3 feet below final grade level shall be filled with suitable structural fill consistent with the USPS architectural standards for the associated finish, i.e., if the area is to be restored as asphaltic pavement, the area under the pavement shall be the fill specified in the architectural standards for pavement.

   Backfill and compaction requirements shall be in accordance with USPS architectural standards. Compaction testing shall be required in accordance with the specification.

b. Surface Completion—Unless otherwise specified, the surface should be restored to match the surface completion of surrounding areas (e.g., pavement, asphalt, grass, etc.). Specific requirements for surface completion shall be in accordance with USPS Building Design Standards.

c. Additional Restoration—In addition to restoration in the areas of excavation and trenches, additional areas disturbed by UST removal activities shall be restored upon completion of tank removal activities. In general, the contractor shall restore the site to pre-existing conditions. Additional restoration activities may include, but are not limited to, the following:

   - Fill any holes or penetrations left in structures as a result of the removal of UST system components;
   - Reconnect and/or restore utility connections that were disrupted or rerouted;
   - If additional tanks remain, reconnect and reprogram the tank monitoring system; and
   - Remove and properly dispose of debris or refuse generated during the UST closure.

d. Final Inspection—In order to document that restoration has been completed to the satisfaction of the USPS, a final inspection shall be conducted and documented on the Post-Removal Checklist (see template in Appendix M4-C). Photographs documenting site restoration must be included with close-out documents. Restoration will not be considered complete until it is accepted by the COR.

3-1.2.10 Documentation and Recordkeeping

If the project is a removal only, contractor is to complete the Post-Removal Checklist (see template at Appendix M4-C) and submit it to the COR, together with all required supporting documents, which should include the following at a minimum:

a. Pre-Removal Checklist—The Pre-Removal Checklist provided in Appendix M4-C is intended to facilitate and document the completion of pre-field planning and the completion of a site-specific evaluation. A completed Pre-Removal Checklist must be submitted to the COR before initiation of tank closure activities.

b. Notification Documentation—Copies of any forms or other communications submitted to agencies with jurisdiction as notification of the planned removal in accordance with Section 3-1.2.3 must be submitted to the COR.

c. Permits—Copies of any permits obtained as part of the tank removal in accordance with Section 3-1.2.3 must be provided to the COR.

d. Updated Registration—Following removal of the UST, tank registrations must be updated to reflect the current conditions on site. Agencies with jurisdiction may have deadlines for submittal of updated registration forms. In advance of any regulatory deadline, a draft of the updated registration form must be submitted to the COR for review and signature. Once the updated registration form has been reviewed and signed, it must be submitted to the appropriate regulatory agency in accordance with applicable timeframes. A final copy of the registration along with documentation indicating transmittal of the registration to the appropriate agency or agencies must be submitted to the COR.

e. Closure Assessment Report—A final copy of the Closure Assessment Report and any other required tank closure documentation as described in Section 3-1.2.7 must be submitted to the COR along with documentation describing any transmittal to other agencies.

f. Additional Plan Updates—Certain plans and reports maintained for the facility may reference the product stored in the tank being removed. Plans and reports that may reference petroleum product storage may include, but are not limited to, the facility's SWPPP**,** SPCC Plan, and EPCRA Tier II Report. Any plan or report that makes reference to product storage must be updated to reflect current product storage following tank removal. In some instances the change in storage will trigger a regulatory timeframe for updates (e.g., an SPCC plan must amended within 6 months of a change) while in other cases it may be necessary to complete the update upon the next regular submittal.

g. Waste Disposal Documentation—Copies of manifests, bills of lading, and receipts documenting waste disposal must be submitted to the COR.

h. Final Site Inspection—Submit documentation that a final site inspection was conducted by the COR or designated representative.

i. As-Built plans noting the location of any abandoned utilities, tanks, or other underground structures.

j. Post-Removal Checklist—Complete the Post-Removal Checklist and submit to the COR with the completed post-removal documents.

3-1.2.11 Project Completion

The project shall be complete when the following specific items have been completed and accepted by the COR:

a. All tank removals within the scope of work completed.

b. All scope items identified in the site-specific evaluation completed.

c. Site restoration activities completed and a final inspection conducted and documented.

d. The closure report submitted to the appropriate regulatory authority, if required. If after project acceptance the governing regulatory determines that the report is incomplete by rejecting the report or asking for additional information such that a resubmission is required, the contractor shall respond and resubmit the report under warranty at the contractor's expense. If the closure report is not required to be submitted to the regulatory authority, submission of a complete Closure Assessment Report to the COR will meet the requirements of this item. If contamination is discovered during the closure process, it is not the intent for project completion to be delayed once the closure report is complete and submitted.

e. All submissions to regulatory authorities complete as required by the site-specific evaluation and all environmental plans and permits revised, recertified, submitted and implemented, as appropriate.

f. All post-removal documents submitted and accepted as complete, and the Post-Removal Checklist completed.

3-2 Aboveground Storage Tanks

3-2.1 Overview

Although ASTs are not federally regulated in the same manner as USTs and are not subject to closure requirements established by most states, USPS sites must ensure that ASTs are closed in manner that is protective of human health and the environment and that minimizes liability. Accordingly, all ASTs must perform the closure procedures described below.

3-2.2 Closure in-place and Tank Abandonment

Postal Service policy does not permit closure of ASTs in-place or abandonment of tanks. All ASTs permanently removed from service must be closed in accordance with the standards discussed below, to include removing the tank and associated piping and equipment and disposing all wastes at an authorized facility.

3-2.3 Changes-in-Service

USPS policy does not permit changes-in-service. All ASTs no longer intended for storage of petroleum and other regulated substances must be permanently closed and removed.

3-2.4 Closure Requirements

The closure requirements identified below represent the USPS minimum required standard for AST closure.

3-2.4.1 Notification

Notify appropriate agencies within 24 hours of discovery of contamination, or other time period specified by the state or tribal agency.

3-2.4.2 Closure

Remove all oil products (including liquids and accumulated sludge), purge the tank to remove vapors, disconnect all piping and other connections (and cap or plug lines as directed), and remove the tank and associated piping.

Monitor air emissions and observe guidelines for proper venting when purging or venting tanks.

Use approved connections, equipment, and practices to remove tanks.

3-2.4.3 Site Assessment

Perform a site assessment when closing an AST to verify that no contamination occurred.

3-2.4.4 Reporting and Responding to Releases

If contamination has been identified during the site assessment, Facilities Department or the designated USPS environmental contact must notify state and local agencies of the release within 24 hours and initiate response actions as directed by the regulatory agencies.

Perform sampling and monitoring of soil and groundwater as directed by the designated regulatory agency. Prepare and implement plans, as directed, to accomplish site remediation requirements.

4 Motor Vehicle Fueling Facilities

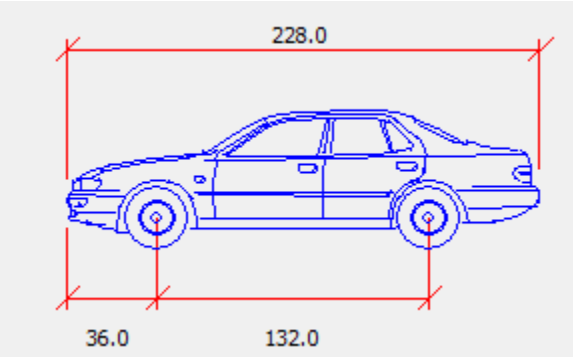
4-1 Site Design and Layout

The layout of a motor vehicle fueling facility must be developed with the following considerations:

4-1.1 Dispensing Area Siting

The overall siting of the dispensing area must consider a safe vehicle path in and out of each fueling position for the intended user vehicle type. When using vehicle path simulation software or turning templates, passenger cars and long life vehicles (LLVs) must be modeled with an AASHTO “P” Vehicle type (note: The ASSHTO “P” vehicle is the national standard for a “passenger” vehicle [Figure 1]). Other vehicles must be modeled with the

most appropriate standard vehicle type. Never position the dispensing area such that cars not engaged in fueling have to pass through the fueling positions to get to another area of the site. Consider pedestrian traffic and avoid conflicts between vehicle and pedestrian traffic flows.



Design Vehicle Width: 84 inches

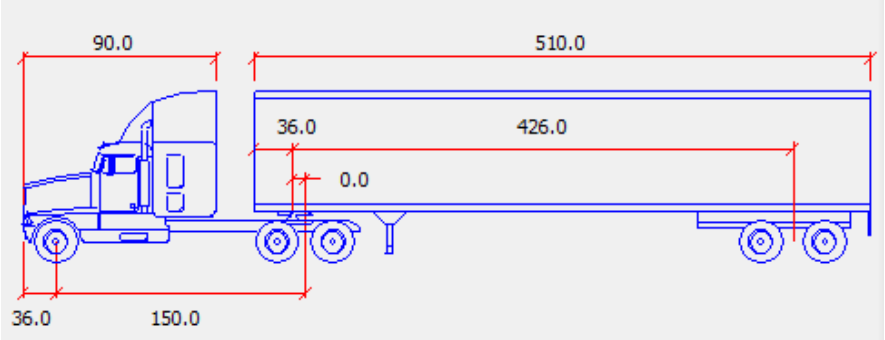
Figure 1 – ASSHTO “P” Vehicle (Dimensions in Inches)

4-1.2 UST Siting - Operations

Although the tank covering slab is designed to an ASSHTO HS-20 highway vehicle load standard (note: The American Association of State Highway Transportation Officials standard for loaded highway trucks is the HS-20 standard, which has axle loads of 32,000 lbs), the slab and associated tank access manholes must be located such that they are not in the primary user vehicle path. Tank manways tend to deteriorate and lose watertight integrity more quickly if they are subjected to continued and regular cycles of vehicles driving over them. The service life of these components is inversely proportional to the number of vehicle loading cycles they experience. Additionally, if the tank manways are located in the primary vehicle flow path, the core fueling operation is more likely to be interrupted during periods of routine operator compliance inspections, regular mechanical maintenance, and tank repairs.

4-1.3 UST Siting - Deliveries

The tank must be located so that fuel deliveries are easily facilitated. When using vehicle path simulation software or turning templates, the design delivery vehicle must be an ASSHTO “WB-50” (note: The WB-50 is a standard highway tractor trailer size with a 50 foot wheel base [Figure 2]). When the delivery vehicle is positioned at the tank, the center of the right (passenger) side of the trailer must be located 10 to 15 feet from the fill ports. Never position the center of the trailer more than 20 feet from the fill ports, as most fuel delivery trucks carry a single 25 foot delivery hose. Never position the vehicle to deliver from the left (driver) side of the vehicle, as most fuel delivery trucks do not have that capability, and will therefore not be able to deliver. Avoid making the delivery parking area such that the delivery vehicle blocks the core refueling operations. Whenever possible, avoid a vehicle path which requires the delivery vehicle to back up or cross into oncoming traffic lanes. Never locate the vehicle such that it has to park in (or extend into) an active right-of-way, street, or road in its delivery position. Always ensure that there is sufficient emergency vehicle access, including overhead access, to the fuel storage and dispensing area.



Design Tractor Width: 96 inches

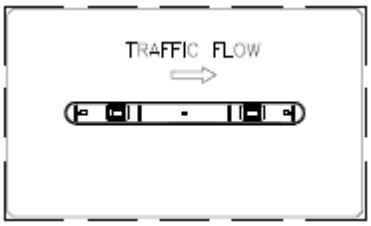
Design Trailer Width: 102 inches

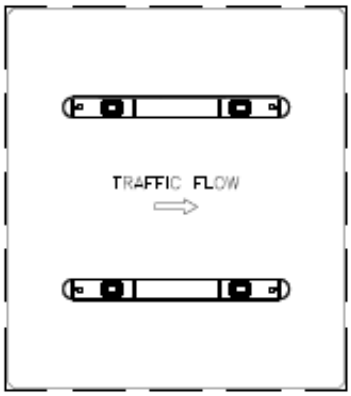
Figure 2 – ASSHTO “WB-50” Vehicle (Dimensions in Inches)

4-1.4 Dispenser Area Layout

Dispensers can be arranged in two basic configurations, namely “in-line” and “tandem”. In an in-line arrangement, the vehicle only passes one dispenser as it travels through the dispensing area. As such, when fueling, there is no chance of a vehicle blocking access to an unused fueling position. In a tandem arrangement, the vehicle passes two or more dispensers as it passes through the facility, such that when fueling, there can be another vehicle fueling either directly in front of or behind that vehicle. If island rows are too close together in a tandem arrangement, there is the possibility of blocking a vehicle from entering or leaving a fueling position. Figure 3 depicts these typical layouts.

Typical “In-Line” Layout





Typical "Tandem" Layouts

Figure 3 – Typical Dispenser Arrangements

Therefore, when in a "tandem" arrangement, dispensers in the same island row must be spaced a minimum of 20 feet, but ideally 24 feet apart on center. 24 feet allows enough room for four ASSHTO "P" vehicles to safely fuel from the four fueling positions of two, two-hose dispensers in the same island row.

Island rows must be spaced 24 feet apart, allowing for two 12 foot travel lanes. When in a tandem arrangement, i.e. there are two or more island rows, with two or more dispensers per island row (e.g., in a 2 x 2 dispenser arrangement), widening the island rows where possible will allow for a "pass-by land," whereby vehicles positioned in the second position will be able to exit without having to back out. Allowing for a pass-by lane, however, significantly increases canopy size, so the operational efficiency has to be weighed against the increased cost.

4-1.5 Grading and Environmental Controls

Fuel storage, transfer, and dispensing areas must be planned, designed, and built to minimize contamination of soil, groundwater, and surface waters, as well as off-site migration of petroleum and hazardous substances in the event of a leak or spill. Paved areas with an impervious surface such as asphalt with drainage are designed to minimize run-on and runoff from the site. The dispensing area must always be level, and graded like a plateau, so that storm flows never cross the dispensing area. This improves environmental performance by not continually washing away incidental drips, and preventing icing and associated safety hazards in winter weather. Identify storm drains with sufficient separation distance to prevent direct discharges to storm sewers in the event of a spill.

4-1.6 Canopies

Areas must be covered with a canopy to protect tanks and dispensing equipment from direct contact with precipitation. Canopies must be equipped with lights featuring automatic and manual controls. See 4-2.5 for more detailed requirements.

4-1.7 Security

Consider security provisions. When appropriate, include perimeter fencing and monitoring cameras.

4-2 Dispensing Area Details

The fuel dispensing area is the primary operating area of the fueling facility and must be designed with careful consideration of operational efficiency, environmental controls, occupational safety, and fire prevention.

4-2.1 Concrete Slab

The dispensing area must be defined by a concrete apron or slab on which vehicles park for fueling. The apron must be a rectangular shape, defined roughly by the maximum extents of the fuel nozzles. All concrete joints and sawcuts must be sealed with a self-leveling gasoline resistant caulk. In jurisdictions where a positive limiting barrier (PLB), or perimeter containment grooves and/or a fixed fire suppression system are required, the extents of that apron must be carefully coordinated with dispenser hose arcs, fire suppression coverage area, and the PLB. The dispensing apron must be graded as discussed in Section 6-2.5.

A PLB must be installed when specifically required by the local jurisdiction, when a fixed fire suppression system is installed or in jurisdictions that have especially high sensitivity for storm water control.

4-2.2 Portable Fire Extinguishers and Spill Kit

One portable fire extinguisher must be installed on the nearby canopy column for every fuel dispenser. Extinguishers must be installed in metal cabinets and well labeled such that labels are visible from each corner of the dispensing apron. All portable fire extinguishers at the facility must be a 10 lb, UL listed 4A 80B:C type. A spill kit must be specified and provided with each facility. The kit must be a drum type (30 gallons minimum), lockable/sealable with a breakaway device, and have a minimum absorbency capacity of 20 gallons. A sufficient number of rubber catch basin mats must be included in the spill kit to cover all site catch basins that serve the fuel storage and dispensing area.

4-2.3 Dispensers

Dispensers must be electronic, island oriented, so that each hose can serve either lane. The dispensers may be single or multi-product depending on the configuration of the facility. The cabinets must have stainless steel doors. Each dispenser must be mounted on a raised concrete island with a stainless steel island form, and must always be equipped with a monitor under the dispenser containment (a dispenser sump). The dispenser containment sump must be manufactured of FRP (not HDPE, which tends to lose its rigidity over time). Each dispenser must be equipped with a crash valve at the base and a breakaway device on each nozzle. It is critical that these important safety devices are shown on the design and installed in strict accordance with manufacturer instructions, as it is not uncommon for these devices to be improperly installed. All dispensers must be equipped with a 100:1 electronic dual pulse output, so that one pulse output can be used for a fuel management system and the second for connection to the environmental monitoring system for automatic inventory reconciliation. Dispensers must be protected by bollards. Gasoline dispensers must be designed for an 8 to 10 GPM normal flow rate. Diesel nozzles and hoses must reflect the fleet makeup. When two nozzles are provided, one must be a standard capacity (3/4 inch nozzle and hose – for passenger vehicles, light trucks) and one must be a high capacity (1 inch nozzle and hose – for larger trucks). When

more than two nozzles are provided, the mix of hoses must reflect the operational need and fleet mix. Regular capacity diesel nozzles must be designed for a 10 GPM minimum flow rate. High capacity diesel nozzles must be designed for a 20 GPM minimum flow rate. Hose retractors must be installed and reflect the vehicle and nozzle type. All nozzles must be the self-closing type.

Each dispensing area must be equipped with safety and product signage, including (as applicable) octane labels, ULSD notification, Stage II vapor recovery instructions, anti-static warning labels, and driver warnings.

4-2.4 Fuel Islands

All dispensers must be mounted on a raised concrete island in a stainless steel island form. The island must include at least 6 inches of concrete between the dispenser and island form on all sides. Islands must have at least 6 inches, but not more than 9 inches, of reveal above grade. Dispensers must be protected from vehicle impact with bollards.

4-2.5 Canopy, Lighting, and Drainage

The dispensing area must be covered by a rigid metal canopy. The canopy must be dimensioned such that the horizontal extents extend approximately 6 inches beyond the limits of the dispensing apron (such that edge drip drains away from the dispensing area and not into the PLB if installed). Columns must not be too close to the dispensers such that normal operation is awkward. Unlike in a retail setting, the canopy must be designed with the structure below the decking, such that all lighting conduits and other items can be installed without penetrating the deck and ultimately providing pathways for leakage over time.

The canopy must be equipped with LED lighting fixtures that are actuated by a photocell and can be overridden with a manual switch. Minimum clearance under the canopy, or any obstruction, such as lights, sprinkler heads, etc., must be 14 feet 6 inches. Facilities with 24-7 operations or with security needs may wish to consider LED fixtures which are normally dim but brighten to normal operating levels when motion is detected.

Canopy roof drainage must always be subsurface, i.e., roof drains must never drain onto the dispensing apron, but rather be routed into a storm drain system or basin. Roof drain risers must be located within the canopy column, and not mounted on the outside of the column.

The canopy must be designed by a pre-manufactured canopy supplier. The site-specific design professional must specify gross canopy dimensions, coatings, drainage details, in-column conduits, and column locations, then the canopy manufacturer must supply sealed design drawings for owner approval and permitting.

At locations with extreme snowfall, a custom canopy with a sloped roof, or other provisions for snow removal, may be desired. When specifying a sloped roof, however, always consider the landing zone of falling snow and ice, as a fuel system canopy seldom has an “unused” edge.

4-2.6 Emergency Stop Device

Provide at least one flush-mounted (non-mushroom type), momentary emergency stop devices between 20 feet and 100 feet of each dispensing

device. Provide clear signage for each device. Refer to Section 6.7, Electrical for more information.

4-2.7 Signage

Signage must be provided on all operating elements, and in the dispensing area for safety. Provide signage per NFPA 30A and NFPA 70, per local requirements, and in places that require operator instruction. Specifically, signs must be placed on dispensers (for safety and product identification), in the dispensing area (for safety), at the emergency stop device, at the overfill alarm, at the environmental monitoring system (in the form of a sensor legend), and on every valve or actuator the user is required to operate.

Signs must be rigid and permanently mounted (paper label, double sided tape) must not be used.

4-2.8 Fire Suppression

A fixed fire suppression system is not normally required at fleet fueling facilities that are for the use of employees only and not open to the public, i.e., it is not required for fleet facilities in NFPA 30A. It is required in a few jurisdictions, typically in large urban settings. Local fire codes must be consulted to confirm.

5 New Aboveground Storage Tank (AST) Systems

These AST standards provide AST and related system information when installing new or replacing existing ASTs. Some elements of downstream AST systems, including underground piping, fuel dispensers, fuel island layouts, and fuel system electrical components, are identical to those used with UST installations. As such, those elements are not repeated in this section. Refer to Section 6 of this document, as well as other UST standards documents for that information (Including the specifications and drawing library)

5-1 Codes, Standards, Certifications, and Permits

5-1.1 National Codes and Standards

These design guidelines have been developed to comply with common interpretations of the following codes. As with any project, the requirements of local jurisdictions must be confirmed with the site-specific design professional-of-record as many of the sections in each of these codes can be interpreted in various ways. Additionally, it is important to incorporate in the site-specific design additional requirements or amendments of local or other jurisdictions. Specifically:

- Oil Pollution Prevention, 40 CFR 112;
- Flammable and Combustible Liquids Code, NFPA 30 (2012);
- Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A (2012);
- National Electric Code, NFPA 70 (2014), paying particular attention to Articles 500, 501, 511, 514, and 515;

- Motor Fuel-Dispensing Facilities and Repair Garages, The International Fire Code (2012), Chapter 23;
- Standard for the Installation of Oil-Burning Equipment, NFPA 31 (2011); and
- Recommended Practice for the Installation of Aboveground Storage Systems, Petroleum Equipment Institute (PEI) RP-200 (2013).

5-1.2 Additional Nationally Incorporated Elements

Additionally, these guidelines incorporate a number of additional elements that are known to be required in some states or are being considered in other states. The intent is to provide the highest level of standardization possible, without making the application of unique requirements unreasonable, given the regional availability of equipment or the regional expertise of installers associated with unique local or regional requirements.

For example, some elements that are included in these guidelines and therefore must be considered minimum requirements, regardless of local requirement include: (note: this list is not all inclusive)

- Secondary containment (double-walled) tanks;
- Overfill alarm for each tank (Console with separate light or individual console, one per tank);
- Containment devices at all fill and vapor recovery ports; and
- Redundant overfill protection (including overfill protection valves and alarms for each tank).

5-1.3 Permits, Spill Plans, and Registrations

The securing of all required permits, and the completion of all required registrations and regulatory reports must be included as part of the AST construction project. Generally, each state, and in many cases counties and cities, have unique requirements for permits and registrations. Often, permits are required from multiple state agencies and local jurisdictions. For every project, the required permits, registrations, and reports need to be investigated and confirmed. It must also be noted for caution, that tank system are unique in that they often require environmental permits from state (or other jurisdictions) environmental, health, or fire agencies. This must be considered distinct from traditional building and trade permits. As a general minimum list, the following must be considered:

a. AST Registrations: While not a universal Federal requirement, many state or other jurisdictions require the registration of ASTs. There may be a concurrent registration requirement with a state or local jurisdiction, a local registration requirement that has been delegated by a state authority, or no registration requirement. When required, the registration authority can be the state or local environmental agency, state or local fire authority, state agriculture department, or other regulatory board or commission.

b. Vapor Recovery Registrations: In most jurisdictions where vapor recovery systems are required for gasoline systems, there is a registration process with the state or regional air quality regulator.

c. State AST Installation Permits: Many states and counties have a plan review and installation permit issued by a state agency (often the same as the registration authority). In some cases, this is delegated to

counties and municipalities, and in other cases, counties and municipalities may require a second permit. It is very common for local fire authorities, especially those in larger cities or counties, to have an AST permitting process.

d. Construction Notifications: Some of the state permit or registration authorities have a requirement to notify prior to beginning construction of an AST system, usually to facilitate inspection. In some cases, this notification is required in lieu of an installation permit, in others, it is in addition to. These permits are distinct from building permits and are often unique to storage tanks.

e. Building and Trade Permits: In many cases, local building and/or trade (mechanical, plumbing, electrical, fire, AST install) permits may be required by the local building and/or fire jurisdiction that are specific to tanks and often distinct from regular building permits.

f. Records of Tests and Inspections: Many registering or permitting authorities require that records of post-construction pipe, tank, monitoring system and/or vapor recovery be submitted immediately after construction. Additionally, most states require that all annual or other periodic tests be conducted on monitoring system sensors, overfill protection devices, and automatic line leak detectors. Post-construction testing of all of these devices must be documented, as part of the project, on the published annual or other state reporting forms, so that the site is in compliance from the time construction is completed until the time the first periodic inspection is completed.

g. Underground Piping: Some states regulate underground piping under their UST program. As such, it may be necessary to secure a separate permit, or register separately, underground piping associated with an AST.

5-1.4 Installer Certifications and Requirements

Some state and other jurisdictions have an AST installer certification or license. The contractor installing the AST must hold the proper certification if required. Additionally, many manufacturers of piping and monitoring systems hold various levels of installer certifications. In all cases, the contractor must hold the highest level of certification for each manufacturer by which it is required.

5-1.5 Spill Prevention, Control, and Countermeasure (SPCC) Plans

SPCC Plans are required at all sites with an aggregate oil (including petroleum bulk storage and other oil filled operational equipment) storage capacity of 1,320 gallons or greater. At sites where SPCC Plans are not required, the technical requirements for environmental protection and fire safety outlined in these standards apply regardless. It is important to consider the proposed AST within the context of the entire site storage capacity, as the addition, resizing, or removal of an AST may change the need for an SPCC Plan.

5-2 General Design Elements

5-2.1 Tank Rating and Materials

ASTs subject to these guidelines must be shop-fabricated, made of steel, and listed to UL 142 or UL 2085 (small heating oil tanks used only to supply oil burning equipment may also be listed to UL 80). UL 142 is the Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, and is the most common and universal listing for ASTs. UL 2085 is the Standard for ***Protected*** Aboveground Tanks for Flammable and Combustible Liquids, and is the required type of tank for storing and dispensing motor fuels, and can also be used for other products and installation where lesser setback requirements or higher levels of protection are desired. UL 2085 "protected" tanks have a fire rating, and can also come with a ballistic and vehicle impact rating.

There are two exceptions where tanks may be made from material other than steel: first, when storing products that can corrode steel, ASTs may have a stainless steel primary tank; second, very small (under 500 gallons) heating oil tanks may be non-metallic when double-walled and meeting SU-2258.

All tanks must be new and procured after the notice to proceed is given by Contracting Officer. This is to say that, used, revised or other available tanks "left over" from other projects must not be used unless otherwise specified in the Contract Documents.

5-2.2 Secondary Containment

All ASTs must have secondary containment, and with few exceptions this requirement must be met by employing a UL 142 secondary containment (double-walled) tank or a UL 2085 protected tank (which is double-walled by requirement of the listing).

For those facilities to which it applies, 40 CFR 112 also requires both general secondary containment for the AST facility and container specific secondary containment for bulk storage tanks. The USEPA, in Office of Solid Waste and Emergency Response (OSWER) Memorandum 9360.8-38, entitled *Use of Alternative Secondary Containment Measures at Facilities Regulated under the Oil Pollution Prevention Regulation*, indicates that the use of a shop-fabricated secondary containment tank meets the requirements of both general and container specific secondary containment for ASTs.

General secondary containment is also required for other aspects of the facility beyond the tank, including loading areas and piping. While the containment requirements for these components is not required to be tied to the tank or delivery truck volume, care must be taken during the design of AST facilities to ensure that a plan, which may include active measures, is considered in the design. This containment methodology must also ultimately be acceptable to the certifier of the facility's SPCC Plan, if required

Understanding that the EPAs position on the definition of overhead loading racks and the need for container-specific delivery vehicle containment at overhead loading racks has changed since the 2002 SPCC rule revision, it must be noted that the requirement for secondary containment sized for the largest container on the delivery vehicle is only required at such overhead loading racks, and is therefore not required at USPS facilities. Overhead loading racks are defined as installations where the delivery vehicle is loaded from overhead, and based on EPA clarifications, does not include areas

where delivery vehicles are off-loading to ASTs, as would be the case at USPS facilities.

5-2.3 Siting, Setbacks and Security

ASTs must be sited relative to buildings, property lines, rights-of-way, and other features, per NFPA 30 or the adopted edition of the International Fire Code. Note that additional siting requirements relative to dispensers and other features of motor vehicle fueling facilities are also listed in NFPA 30A.

Motor fuel ASTs and fueling areas must be located outdoors. Locating motor fuel tanks or dispensing areas in a building triggers significant additional requirements for building construction and systems and must be avoided except in very unique situations. When locating tanks or dispensing areas in a building, the above fire code requirements must be strictly followed.

Security and lighting is required for all ASTs. Tanks in a building that is normally manned or locked when not manned can be assumed to be sufficiently secure. Outdoor ASTs must be surrounded by a fence, or located within a larger facility perimeter fence. Outdoor lighting must be sufficient to allow for safe operations in the dark and provide a deterrence for vandalism. If outdoor lighting is being provided for security only, Illuminating Engineers Society (IES) standards for a parking lot must be followed. If night-time operations at the tank are expected, the operational area must be lit such that the maximum lighting level is analogous to an under-canopy fuel dispensing area, i.e. 20-30 foot-candles maximum. In any case, local lighting ordinances must be followed.

All fill ports, pump controllers, or other AST control equipment must be installed with provisions for locking.

All ASTs must have provisions for vehicle impact protection. Included in the protected elements must be all piping, pumps and other product carrying electrical equipment.

All ASTs must have a UL 4A 80 B:C fire extinguisher mounted within the travel distance required by NFPA 30A and NFPA 10.

5-2.4 Foundations and Grounding

All ASTs must be supported on a concrete slab or foundation, sufficient to support the weight of the tank filled to 100% with water. The tank shell must rest only on integrated, non-combustible, i.e. steel, tank manufacturer provided saddles or supports. The site-specific designer-of-record must design the slab or foundation to accommodate the site-specific conditions. ASTs located in a building may be placed on the existing concrete floor, however, when the properties of an indoor building slab are not known or if the slab is not level, a housekeeping pad must be designed to support ASTs in a building.

All ASTs must be anchored, grounded, and installed level. Ground the tank to a concrete encased electrode within the tank slab, or to a grounding rod installed in the tank vicinity. Run grounding cables and locate grounding rods so as not to create a trip hazard. If the tank has stairs, remote spill boxes, or other ancillary metal equipment, those elements must be bonded to the tank or connected in a way to prevent static buildup.

Consider additional lightning protection when locally required, or in areas known to be especially susceptible to lightning based on site specific conditions or geography.

If local seismic codes require, a site specific tank anchoring design must be completed that is compliant with those seismic requirements.

Anchor the tank using manufacturer provided anchor points, with anchors designed for the conditions. In seismic areas, design for those conditions appropriately and in hurricane areas, provide hold-down provisions suitable for the wind loading conditions. Within a flood plain or areas that could be subject to flooding, design for these buoyant conditions. In all other areas, provide general anchoring.

5-2.5 Piping, Fills, and Vents

Piping associated with ASTs must be designed to meet the requirements of NFPA 30. Because piping is product specific, more details are provided in the following sections.

When specifying aboveground piping, consider issues of secondary containment. Since aboveground piping is generally single-walled, in cases where containment is critical, the use of piping secondary containment, or the minimization of aboveground piping, must be considered.

Fills must be designed to be safely accessible by delivery personnel. Stairs (not ladders) are the preferred means of access. Side mounted fills may be used in areas where stairs are not practical. Fill connections must always have a containment box. Fills must be labeled with product type and color coded per API 1637. Side mounted fill boxes must be equipped with both a check valve and operating valve to prevent back-flow of product after delivery.

All ASTs must have a working vent on the primary tank, and emergency vents on both the primary tank and interstitial space. The primary tank working vent must be sized to be at least the diameter of the fill connection. Tanks in a building must be vented to the outdoors, except Class IIIB combustible liquids (motor oil, ATF) and non-combustible liquids (anti-freeze) which need not be vented outdoors.

All piping leading from the tank that drains the tank in the case of a piping failure must be equipped with an anti-siphon device.

5-2.6 Overfill Protection

ASTs must be equipped with two forms of overfill protection. ASTs must be equipped with an overfill prevention valve at the fill port. The valve must engage at 85% of the tank capacity. ASTs must also be equipped with an audible/visual high-level alarm. High level alarms may be routed through the environmental monitoring console or be equipped with a separate console and alarm in the tank area. High level alarms should also have a separate light for each tank if multiple tanks are located on site, i.e. when the high level alarm engages, the delivery driver should know which tank is in overfill.

High level alarms should be connected to the environmental monitoring console (if existing or being installed) where it is practical. High level alarms should be hard wired, battery alarms may be allowed if approved by the USPS Project Manager.

5-2.7 Coatings, Signage, and Labeling

ASTs must be supplied with a manufacturer supplied epoxy coating intended for outdoor use, which may not be the standard coating. Specify the coating with care accordingly. Steel piping and other uncoated steel components

must be appropriately prepared, primed, and coated with two coats of alkyd enamel.

All ASTs must be labeled with an appropriate NFPA 704 diamond, product type, tank capacity, the word “Flammable” or “Combustible” as appropriate, and a label with the tank’s “Safe Fill Height” indicating in feet and inches the 90% level. Piping must be labeled with flow arrows and product labels.

Overfill alarms, fire extinguishers, and fill ports must all be properly labeled.

5-2.8 Environmental Monitoring System

At sites where environmental monitoring consoles are existing or are to be installed, the ASTs should be connected and monitored by these consoles (where practical). If practical to connect the ASTs to the console, tank level gauges and high-level alarms should be connected to the console for monitoring.

5-2.9 Testing and Commissioning

All tanks must be tested in accordance with tank manufacturer requirements after installation, and in the absence of such requirements, in accordance with PEI-RP 200. All aboveground piping must be tested in accordance with NFPA 30. Tanks must also be tested in accordance with any local regulations that apply. Underground piping must be tested as described in the UST sections of these standards. All systems must be tested for continuity to ensure that there is no electrical potential between each of the system components. All leak detection, monitoring, and safety devices must be tested and documented prior to using the system.

5-2.10 Closeout Documents

Within 30 days of the completion of construction, a closeout document package must be assembled in electronic and binder format, and submitted to the USPS.

Closeout documents are a critical component of a successful fuel system project, because a complete set of closeout documents is necessary for the facility to meet life cycle environmental compliance requirements. In the specification, this section must be highly detailed and site specific, as experience has shown that contactors submit complete packages when specific forms are listed or provided.

The Storage Tank Project Closeout Document Checklist (see template in Appendix M4-C) must be customized for the jurisdiction in which the project is located and the equipment and scope of the project. Consult manufacturer Web sites and contact manufacturer representatives for examples of common installation checklists and test reports. Contact the AST regulatory program for the project jurisdiction, or visit the program Web site for state-specific forms and checklists.

Even though the state inspection forms and checklists may not be required by the agency to complete the project, many forms and checklists related to annual or other periodic tests must be specified and completed during the project. If documentation is completed, the operator has all of the routine testing information in place for the project to be compliant upon its completion. For example, if the state has a required process and form for annual testing of leak detection equipment, that regulatory form must be filled out after testing during the commissioning period, so that the facility has the annual requirement documented when operations begin. This prevents

having to engage a contractor to perform an additional inspection to achieve compliance during the first year.

For example, many states have a leak detection and overfill prevention testing form with an annual submission requirement. Since the specifications require the testing of leak detection and overfill prevention equipment during commissioning of USPS facilities, that initial testing must be documented on the specific, appropriate state form, so that the owner has the test properly documented from the first day of operation. Achieving this level of project compliance, however, requires the project A/E to develop specific, customized closeout document specifications. Also consider inserting blank copies of the actual forms into the construction documents.

The following is the generic list of required closeout documents. This checklist must be customized by the site specific/project A/E team:

a. A minimum of 96 high resolution digital (.jpeg format) photographs depicting the installation at each critical construction phase. Particular attention must be paid to underground, buried, and normally inaccessible components.

b. Underground piping manufacturers' installation checklists with proof of delivery to the manufacturer. (Most of the UL 971 piping manufacturers have installation checklists which must be completed and submitted to the manufacturer at the conclusion of the project.)

c. Environmental monitoring system warranty registration and checkout form/Intrinsic Safety Checklist with proof of delivery to the manufacturer. (Most of the environmental monitoring system manufacturers have installation checklists which must be completed and submitted to the manufacturer at the conclusion of the project.)

d. Laminated 11 inch x 17 inch diagram showing all sensor and probe locations throughout the system with corresponding labels to match the environmental monitoring system. (Users need to have a legend describing the relationship between the sensor designation programmed into the monitoring system, and the actual location of the sensor.)

e. Environmental monitoring system final setup printout. (This confirms that the system was properly programmed, and provides a record of the program, should the program ever be lost.)

f. Underground sump test records (dispenser and intermediate/transition sumps). (The contractor must provide a record of sump tests on their company forms, or state-specific forms if available.)

g. Dispenser registration documentation and proof of transmittal to the manufacturer. (Most dispenser manufacturers have warranty registration forms.)

h. Dispenser calibration and startup documentation. (Most dispenser manufacturers have a calibration or setup form, and many companies providing that service have calibration service reports. This provides documentation that the dispenser is calibrated.)

i. A copy of the weights and measures jurisdiction calibration report. (While a formal weights and measures seal is often not required at fleet facilities not dispensing fuel to the public, some jurisdictions require fleet facilities to be "sealed".)

j. Copies of any state/local approvals, authorizations, and permits.

k. Tank and piping test results, vapor recovery test results, and test results for all secondary containment structures or annuluses and all containment sumps.

l. Records of all other inspections and tests (on state or other regulatory agency or manufacturer forms when applicable). (This section must be made project specific, to capture as many tests and inspections on jurisdiction or manufacturer specific forms as possible. At a minimum, every specified test or inspection in the specification must be documented on a contractor provided report or format.)

m. Automatic line leak detector, electronic release detection equipment (sensors and probes), and overfill protection device test results on state regulatory agency forms. (This section must be made project specific, to capture as many tests and inspections on jurisdiction specific forms.)

n. Tank certificates, licenses, and/or registrations (fully executed, and including proof of delivery to the regulatory agency). (It is critical that the final executed and submitted tank registration form be provided. Additionally, tank registration certificates issued by the registering agency in response to the submitted registration must be included.)

o. Warranties for all equipment and apparatus. In general, any product/manufacturer documentation that was provided with the equipment must be provided as part of the closeout documents. Any warranty requiring forms or checklists must be completed and fully executed.

p. Training certification for instruction seminars signed by the individuals trained on these systems. (There must be documentation that the contractor provided training to the operator.)

q. All instruction bulletins, preventive maintenance schedules, operational instructions, and parts lists provided with the tanks, dispensers, monitoring system, and all other systems.

r. Waste disposal documentation (if any).

s. Other environmental information or permits (if any).

t. Copies of receipts for any keys, locks, or other equipment turned over to the owner.

u. Operating and installation manuals and instructions for each piece of equipment that was provided with manuals or instructions, including, but not limited to, the tank installation instructions.

5-3 Tank Types and Specific Requirements

5-3.1 Motor Fuel (Gasoline and Diesel) ASTs

Refer to the UST sections of these standards for information on the installation of underground piping, fuel dispensers, and fuel island areas.

5-3.1.1 Siting

USPS motor fuel ASTs are sited only in remote dispenser configurations, that is the fuel dispensers are located in a separate fueling area and connected to the AST via underground piping. Motor fuel ASTs must be sited such that the tank can be less than a single sloped piping run (approximately 175 ft) to the dispensers. Longer distances will require an intermediate sump, which must

be avoided. The AST must also be sited such that it can be easily accessed by the delivery vehicle. Because of the need for a pressure/pumped delivery, AST delivery vehicles can vary with product, delivery quantity, and supplier. It must always be assumed, however, that the delivery vehicle will deliver to the right, and the vehicle path and tank siting designed accordingly.

Tanks must also be sited such that they are not at the end of a driveway or road curve, which would increase the risk of impact. Raise the AST slab above the surrounding grade to keep sheet flow off the tank area and to minimize the possibility that storm water will enter the transition sump.

Motor fuel ASTs must be located in accordance with National and Local codes and regulations. These regulations often require motor fuel ASTs to be placed away from buildings, property lines and other ASTs.

Surround the tank on all exposed sides with bollards or anchored “Jersey” barriers/K-rails. Bollards must be spaced no more than 4 feet apart, be submerged at least 3 feet in a 15 inch diameter foundation, be a minimum of 4 inch pipe, and must be separated from the tank, where possible, by 5 feet.

If the site is not secured by a fence, surround the AST area with a fence, at least 3 feet from the tank and at least 6 feet high.

All motor fuel AST systems must be equipped with an emergency stop device.

5-3.1.2 Tank Elements

Motor fuel ASTs must be protected tanks, as defined in the fire code, i.e. listed to the UL 2085 standard. In some situations tanks storing Class II liquids may be UL 142 tanks. Except in site specific cases approved by the USPS PM, tanks must be rectangular.

Except on the very smallest tanks where short ladders can easily provide tank top access, side mounted fill boxes with check and operating valves must be provided for motor fuel tanks. Locate the fill box to facilitate easy delivery.

Transition sumps must be provided within the bollard perimeter to connect the steel aboveground piping to the non-metallic underground piping leading to the dispensing area. The transition sump must be monitored by the environmental monitoring system, and must be designed to prevent water from entering.

Gasoline ASTs are subject to hazardous location requirements as defined in the National Electric Code. In addition to the hazardous locations associated with dispensers, vents, and other typical gasoline dispensing facilities, a 10 foot Class I Division 2 radius must be maintained around ASTs.

5-3.1.3 Pump and Piping Elements

Aboveground motor fuel piping must be seamless schedule 40 steel, conforming to ASTM A53. Unless prohibited by local fire codes, piping 2 inches and smaller can be threaded with Class 150 fittings. Larger piping must be welded or flanged. Refer to the UST sections of these standards for information on underground piping.

Gasoline ASTs must be provided with a Stage I vapor recovery piping and connection, which must have a dry-break adaptor and be located within a spill box. Install Stage II vapor recovery systems only if absolutely necessary by local requirement.

An anti-siphon device must be provided after the submersible pump to prevent siphoning of the tank in the event of a downstream piping failure. A normally closed solenoid valve which is energized with the submersible pump must be used.

When serving dispensers with underground piping, an automatic line leak detector must be used. The leak detector must be located downstream of the anti-siphon device to work properly.

A submersible pump, sized for the system, must be provided to deliver fuel to the dispensers. Refer to the UST drawings and specifications for information on pump electrical configuration.

Aboveground piping from the AST must be connected to the underground piping leading to the fueling area in a monitored underground transition sump.

5-3.1.4 Environmental Monitoring

Aboveground motor fuel tanks must be electronically monitored by an environmental monitoring console unless otherwise directed by a USPS PM. The AST must be equipped with an electronic level gauge, interstitial monitor and high-level alarm.

5-3.2 Heating Oil and Standby Power ASTs

These guidelines are intended for tanks storing #2 heating oil and #2 diesel fuel, which are both Class II combustible liquids. Adjustment to these guidelines may be required for other heating oils or engine fuels.

5-3.2.1 Siting

Heating oil and standby power ASTs (i.e., those serving a standby or emergency generator) must be located as close as possible to the user or pump sets serving the user. If placing the tank in a new location, the heating or emergency power system designer must be consulted to ensure that the tank is consistent with the hydraulic design of the system.

Site the tanks to facilitate delivery. Because of the need for a pressure/pumped delivery, AST delivery vehicles can vary with product, delivery quantity, and supplier. It must always be assumed, however, that the delivery vehicle will deliver to the right, and the vehicle path and tank siting designed accordingly.

Tanks must also be sited such that they are not at the end of a driveway or road curve, which would increase the risk of impact. Raise the AST slab above the surrounding grade to keep sheet flow off the tank area.

Surround the tank on all exposed sides with bollards or “Jersey” barriers/K-rails. Bollards must be spaced no more than 4 feet apart, be submerged at least 3 feet in a 15 inch diameter foundation, and be a minimum of 4 inch pipe. If the site is not secured by a fence, surround the AST area with a fence, at least 3 feet from the tank and at least 6 feet high.

5-3.2.2 Tank Elements

Heating oil and standby generator ASTs must be UL-142 listed secondary containment tanks, although there may be some instances in which using protected tanks listed to UL 2085 may be warranted. Site conditions may dictate the need for the less stringent setback associated with protected tanks. Other sites in dense urban areas with greater concern for fire propagation or sites with a history of security issues may benefit from the risk

mitigations provided by the protected tank's fire rating and ballistics resistance. Except in site specific cases approved by the USPS PM, tanks must be rectangular.

Except on the very smallest tanks where short ladders can easily provide tank top access, side mounted fill boxes with check and operating valves must be provided for motor fuel tanks. Locate the fill box to facilitate easy delivery.

5-3.2.3 Pump and Piping Elements

Aboveground heating and generator fuel piping must be seamless schedule 40 steel, conforming to ASTM A53. Unless prohibited by local fire codes, piping 2 inches and smaller can be threaded with Class 150 fittings. Larger piping must be welded or flanged. While underground piping must be avoided on these systems, when necessary, refer to the UST sections of these standards for information on underground piping.

An anti-siphon device must be provided on the suction line after it emerges from the tank to prevent siphoning of the tank in the event of a downstream piping failure. A normally closed solenoid valve which is energized with the fuel suction pumps must be used. Coordination with the oil burner or generator system designs will be required.

Automatic line leak detectors must not be used in generator or heating tanks.

The fuel delivery scheme must be coordinated with the tank design. If the downstream system has a pump set, the tank must be designed with a suction stub. If the tank system is required to deliver fuel to the user under pressure, a submersible pump, sized for the system, must be provided. Overflow lines from day tanks must be designed in accordance with stationary engine codes, and not provided with any valves or restrictions. In any case, the site-specific design professional will have to coordinate with the designer of the new generator or heating system, or provide a design that integrates with the existing systems.

5-3.3 Motor Oil and ATF ASTs

5-3.3.1 Siting

Unless extenuating circumstances warrant otherwise, motor oil and automatic transmission fluid (ATF) ASTs should be located indoors, proximate to the vehicle maintenance operation. While some state-specific codes require motor oil tanks to be in a separate room, it may be desirable to locate motor oil tanks in the same room as the maintenance bays. Larger tanks generally must be sited in a separate room. Motor oil tanks located outdoors must have overhead cover or a cabinet cover to minimize environmental permitting requirements and storm water pollution and environmental exposure.

Because NFPA 30/30A requires that motor oil tanks be separated by 3 feet, it is often desirable to specify compartmented tanks when new and used oil storage are both required, given the space saving potential. Tanks must also be located at least one foot off surrounding walls.

Careful consideration must be made to the delivery connection. Some jurisdictions require that the fill connection be outdoors. Generally this creates a situation where the tank is not visible to the delivery driver, necessitating the need for rigorous overfill protection. If the fill is located on

or at the tank, consideration must be given to the length of hose on the delivery vehicle.

5-3.3.2 Tank Elements

Motor oil and ATF tanks must be rectangular UL-142 listed secondary containment tanks. If located indoors, a factory standard coating is generally sufficient. If located in the maintenance area where vehicles are present, bollard or vehicle impact protections must be included.

The interstitial space on motor oil tanks can be electronically monitored, or in the case when the tanks are regularly observed, can be monitored with a mechanical float type gauge. Motor oil tanks must be equipped with a mechanical level gauge and an audible/visual overfill alarm.

5-3.3.3 Pump and Piping Elements

When pump and piping elements will be replaced with the ASTs, special care must be taken with both piping and pump specifications, given the high pressures associated with motor oil and ATF distribution. These oils are distributed with pneumatic driven piston pumps. Generally, the pumps operate with an output pressure at 5:1 or 10:1 ratio to the input compressed air pressure. For example, compressed air delivered to a 10:1 pump at 100 psi will result in an oil distribution pressure of 1000 psi.

If replacement is required, pipe and pump sizes must be engineered on a site-specific basis by the design professional of record. Significant guidance is provided in PEI RP-700 and in lubrication equipment manufacturer literature.

If the tanks are located outside, motor oil pumps and the air connection that feeds them, must be located inside the maintenance facility.

Motor oil and ATF distribution piping must be seamless carbon steel tubing, connected with compression fittings. Because of the variability of output pressure with input air pressure and the need for pipe testing at 110%, the tubing wall thickness must be specified to have a pressure rating of 2000 psi, unless the operating parameters, including relief valve setting, of the compressed air system are known. If there is high confidence in the maximum possible compressed air pressure, the tubing wall thickness may be reduced accordingly. In no case shall the pressure rating of the tubing be less than 1000 psi for 5:1 pumps and 1500 psi for 10:1 pumps.

For larger systems where it could take some time to reach air shutoff valves in an emergency, or on a system where air shutoff valves are in a separate room or otherwise inaccessible, an e-stop system for the new and used oil system must be installed.

5-3.3.4 Environmental Monitoring

Aboveground motor oil tanks should be electronically monitored by an environmental monitoring console where practical. The AST must be equipped with an electronic level gauge and high level alarm that are operated by the environmental monitoring console or other electronic device. All motor oil ASTs must be equipped with an interstitial monitor, either mechanical or electronic.

5-3.4 Used Oil ASTs

5-3.4.1 Siting

Unless extenuating circumstances warrant otherwise, used oil ASTs should be located indoors, proximate to the vehicle maintenance operation. While some state-specific codes require used oil tanks to be in a separate room, it may be desirable to locate used oil tanks in the same room as the maintenance bays. Larger tanks generally must be sited in a separate room. Used oil tanks can located outdoors must have overhead cover or a cabinet style layout to minimize environmental permitting requirements, storm water pollution, and environmental exposure.

Because NFPA 30/30A requires that used and motor oil tanks be separated by 3 feet, it is often desirable to specify compartmented tanks when new and used oil storage are both required, given the space saving potential. Tanks must also be located at least one foot away from surrounding walls.

Careful consideration must be made to the location of the evacuation connection so that it is easily accessible to the vacuum truck, realizing that vacuum hose is generally employed in fixed lengths, not on a longer hose reel.

5-3.4.2 Tank Elements

Used oil tanks must be rectangular UL-142 listed secondary containment tanks. If located indoors, a factory standard coating is generally sufficient. If located in the maintenance area where vehicles are present, bollard or vehicle impact protections must be included.

The interstitial space on motor oil tanks can be electronically monitored, or in the case when the tanks are regularly observed, can be monitored with a mechanical float type gauge. Motor oil tanks must be equipped with a mechanical level gauge and an audible/visual overfill alarm.

Some states regulate used oil as a hazardous waste. In those cases pay particular attention to labeling and other requirements specific to that condition.

5-3.4.3 Pump and Piping Elements

When replacement is required, used oil must be collected using a 1:1 pneumatic diaphragm pump with a hose connection for oil collection caddies. Provide an air regulator and shutoff valves on both the air and fluid systems.

When replacement is required, pipe sizes must be engineered on a site-specific basis by the design professional of record. Significant guidance is provided in PEI RP-700 and in lubrication equipment manufacturer literature.

Used oil collection piping must be seamless schedule 40 steel, conforming to ASTM A53. Unless prohibited by local fire codes, piping 2 inches and smaller on small systems can be threaded with Class 300 fittings. Piping connections on larger systems or piping must be welded.

Careful consideration must be given to the overfill protection system, especially when the used oil tank is located in a separate room from the collection stations. The compressed air piping serving the used oil collection stations must be routed via the tank top and through a float operated high-level cut out device. This prevents users from continuing to pump used oil into the tank when it is full. Additionally, an audible/visual overfill alarm must be included so that it is audible and visible from each collection station.

For larger systems where it could take some time to reach air shutoff valves in an emergency or on a system where air shutoff valves are in a separate room or otherwise inaccessible, an e-stop system for the new and used oil system must be installed.

Working vents on the primary tank of used oil ASTs must be one nominal size greater than that evacuation connection to prevent the tank from imploding during evacuation.

5-3.4.4 Environmental Monitoring

Aboveground used oil tanks should be electronically monitored by an environmental monitoring console where practical. The AST must be equipped with an electronic level gauge and high-level alarm that are operated by the environmental monitoring console or other electronic device. High level alarms should be located near the evacuation station. All motor oil ASTs must be equipped with an interstitial monitor, either mechanical or electronic.

5-3.5 Coolant (Anti-Freeze) ASTs

5-3.5.1 Siting

Unless extenuating circumstances warrant otherwise, coolant (anti-freeze) ASTs should be located indoors, proximate to the vehicle maintenance operation. While some state-specific codes require coolant tanks to be in a separate room, it may be desirable to locate coolant tanks in the same room as the maintenance bays. Larger tanks generally must be sited in a separate room. Coolant tanks located outdoors must have overhead cover or a cabinet style laout to minimize environmental permitting requirements, storm water pollution, and environmental exposure.

Careful consideration must be made to the delivery connection. Some jurisdictions require that that fill connection be outdoors. Generally this creates a situation where the tank is not visible to the delivery driver, necessitating the need for rigorous overfill protection. If the fill is located on or at the tank, consideration must be given to the length of hose on the delivery vehicle.

5-3.5.2 Tank Elements

Coolant tanks must be rectangular UL-142 listed secondary containment tanks. If located indoors, a factory standard coating is generally sufficient. If located in the maintenance area where vehicles are present, bollard or vehicle impact protections must be included.

The interstitial space on coolant tanks can be electronically monitored, or in the case when the tanks are regularly observed, can be monitored with a mechanical float type gauge. Coolant tanks must be equipped with a mechanical level gauge and an audible/visual overfill alarm.

The primary tank vessel must be made of steel or stainless steel. Consult the product data sheet for the coolant used to ensure that the material is compatible.

5-3.5.3 Pump and Piping Elements

When replacement is required, coolant must be distributed using a 1:1 pneumatic diaphragm pump designed for coolant or windshield washer fluid. Provide a regulator, runaway valve and shutoff valve at the air connection.

When replacement is required, pipe sizes must be engineered on a site-specific basis by the design professional of record. Significant guidance is provided in PEI RP-700 and in lubrication equipment manufacturer literature.

Coolant piping must be seamless schedule 40 steel or 40S stainless steel, consistent with the material chosen for the primary tank vessel. Unless prohibited by local fire codes, piping 2 inches and smaller on small systems can be threaded with Class 300 fittings. Piping connections on larger systems or piping must be welded.

For larger systems where it could take some time to reach air shutoff valves in an emergency on a system where air shutoff valves are in a separate room or otherwise inaccessible, an e-stop system for the coolant system must be installed.

5-3.5.4 Environmental Monitoring

Aboveground coolant tanks should be electronically monitored by an environmental monitoring console where practical. The AST must be equipped with an electronic level gauge and high-level alarm that are operated by the environmental monitoring console or other electronic device. High level alarms should be located near the tank or near the evacuation station. All motor oil ASTs must be equipped with an interstitial monitor, either mechanical or electronic.

6 New Underground Storage Tank Systems

6-1 Codes, Standards, Certifications, and Permits

6-1.1 National Codes and Standards

These design guidelines have been developed to comply with common interpretations of the following codes. As with any project, the requirements of local jurisdictions must be confirmed with the site-specific design professional-of-record as many of the sections in each of these codes can be interpreted in various ways. Additionally, it is important to incorporate in the site-specific design additional requirements or amendments of local or other jurisdictions. Specifically:

- Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks, 40 CFR 280;
- Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A (2012);
- National Electric Code, NFPA 70 (2014), paying particular attention to Articles 500, 501, 511, 514, and 515;
- Motor Fuel-Dispensing Facilities and Repair Garages, The International Fire Code (2012), Chapter 23; and
- Recommended Practice for the Installation of Underground Liquid Storage Systems, Petroleum Equipment Institute (PEI) RP-100 (2011).

6-1.2 Additional Nationally Incorporated Elements

Additionally, these guidelines incorporate a number of additional elements which are known to be required in some states or are being considered in other states. The intent is to provide the highest level of standardization

possible, without making the application of unique requirements unreasonable, given the regional availability of equipment or the regional expertise of installers, associated with unique local or regional requirements.

For example, some elements which are included in these guidelines and therefore must be considered minimum requirements, regardless of local requirement are: (note: this list is not all inclusive)

- Double walled vent piping;
- Individual overfill alarms (one per tank);
- Redundant overfill protection (high level alarm and mechanical device);
- Double-walled spill buckets with a mechanical leak monitor; and
- Brine monitored, double-walled tanks.

6-1.3 Elements Not Nationally Incorporated

Conversely, for example, the following unique local requirements have not been applied across the spectrum, primarily due to the unfamiliarity of the contracting community with those pieces of equipment or methods not normally employed in the region in which they work: (note: this list is not all inclusive)

- Double-walled, monitored containment sumps;
- Multi-port manways;
- 15-gallon spill buckets;
- Structural columns under tank slabs; and
- Positive limiting barriers.

Again, in every case, the design professional must amalgamate these minimum requirements with those at the local or state level when employing these guidelines and designing the upgraded facility.

6-1.4 Permits and Registrations

The securing of all required permits, and the completion of all required registrations and regulatory reports must be included as part of the UST construction project. Generally, each state, and in many cases counties and cities, have unique requirements for permits and registrations. In many cases, permits are required from multiple state agencies and local jurisdictions. For every project, the required permits, registrations, and reports need to be investigated and confirmed. As a general minimum list, the following must be considered:

- UST Registrations: By federal regulation, nearly every motor fuel UST is required to be registered. As such, this must be assumed to be a requirement for all USPS USTs. In most cases, the registration authority has been delegated to the state level. In some cases, the states have further delegated UST registration to counties and municipalities. And in other cases, there are registration requirements at both the state and local level. Usually, the state environmental agency is the registering authority, although in some states the authority might be the state fire authority, agriculture department, or other regulatory board or commission.

- Vapor Recovery Registrations: In most jurisdictions where vapor recovery systems are required, there is a registration process with the state or regional air quality regulator.
- State UST Installation Permits: Many states and counties have a plan review and installation permit issued by a state agency (often the same as the registration authority). In some cases, this is delegated to counties and municipalities, and in other cases, counties and municipalities may require a second permit.
- Construction Notifications: Some of the state permit or registration authorities have a requirement to notify prior to beginning construction of a UST system, usually to facilitate inspection. In some cases, this notification is required in lieu of an installation permit, in others, it is in addition to.
- Building and Trade Permits: In many cases, local building and/or trade (mechanical, plumbing, electrical, fire, UST installer) permits may be required by the local building and/or fire jurisdiction.
- Records of Tests and Inspections: Many registering or permitting authorities require that records of post-construction pipe, tank, monitoring system and/or vapor recovery be submitted immediately after construction. Additionally, most states require that all annual or other periodic tests be conducted on monitoring system sensors, overfill protection devices, and automatic line leak detectors. Post-construction testing of all of these devices must be documented, as part of the project, on the published annual or other state reporting forms, so that the site is in compliance from the time construction is completed until the time the first periodic inspection is completed.

6-1.5 Installer Qualifications and Certifications

Many state and other jurisdictions offer and require UST installer certifications or licenses. The contractor installing the UST must hold the proper certification if required. Additionally, many manufacturers of piping and monitoring systems hold various levels of installer certifications. In all cases, the contractor must hold the highest level of certification for each manufacturer by which it is required.

6-2 Underground Storage Tanks – General Design Elements

6-2.1 Tank Specifications

Tanks must be double-walled fiberglass reinforced plastic (“FRP” or “fiberglass”) with brine monitoring. Steel tanks tend to suffer from internal corrosion when water is allowed to remain in the tank bottom. Brine monitoring is a superior leak detection methodology which allows for breaches in the secondary/interstice to be detected regardless of surrounding groundwater condition. It also allows for a double-indication in the case of a primary breach, in that a drop in brine level due to such a breach is also associated with a high tank water indication. FRP tanks must carry the UL 1316 certification and carry a 30-year corrosion warranty. Tanks must be equipped with manufacturer installed striker plates under every tank opening. Tanks must be designed and installed in strict accordance with the tank manufacturer instructions. Tank manufacturer installation checklists and

warranty forms must be completed by the installer and provided as part of the closeout documents.

6-2.2 Tank Anchoring

All USTs must be anchored with deadmen and manufacturer supplied anchoring straps. FRP tanks must always be anchored with FRP straps, never wire rope straps. Anchoring must be done in strict accordance with the tank manufacturer installation instructions. Buoyancy calculations must be performed for each installation, and must assume groundwater at grade with the tanks empty.

6-2.3 Tank Sizing

A variety of tank sizing options are provided in the drawing details. Tanks must be sized on a site-specific basis, considering the following criteria: usefulness of the existing tanks; future planned changes to the vehicle fleet or operating profile, transaction counts and sizes; reserve capacity; full load pricing discounts; and delivery frequency. The largest delivery vehicle must be assumed to be an ASSHTO “WB-50” with a load of 9,000 gallons (this varies slightly by state). As such, if the site desires to buy only full loads of fuel, 12,000 gallons minimum, but ideally 15,000 gallons of storage capacity is needed (assuming standard tank sizes). Additionally, once a tank is 15,000 gallons or more, delivery frequency will be determined by usage only, and not tank size.

6-2.4 Tank Excavations

It is of critical importance that tank excavations comply with OSHA regulations for slope stability. Excavations can either be “open-cut” with appropriately sloped excavation walls or supported by engineered shoring. Shoring systems must be designed by a Professional Engineer licensed in the appropriate jurisdiction, and sealed shoring plans must always be provided to the design team in advance, for review, by the shoring installer.

Shoring is always the preferred method, but results in increased cost. In any case, shoring must be used when:

- Installing tanks in shallow groundwater conditions, as it reduces the infiltration of water into the excavation and reduces the amount of water that needs to be handled;
- When physical site constraints dictate. Shoring allows the tank excavation footprint to be substantially smaller, and can help minimize construction impacts to the surrounding operation.
- When structures are located near the excavation. While exact setbacks from structures and the tank excavation have to be evaluated on a site-specific basis, shoring can help manage the interaction between the excavation and the structure, and can prevent undermining of the structure.
- When there is known soil or water contamination, since shoring reduces the amount of contaminated water or soil that will have to be handled. (In cases of known contamination, always ensure that the project team includes a qualified environmental professional to assist with the appropriate and efficient handling of contaminated materials.)

6-2.5 Turbine Enclosures/Tank Sumps

Turbine enclosures (tank sumps) must be supplied by the tank manufacturer and always be constructed of FRP. Containment sump covers must always be specified as the largest size produced by the manufacturer, but never less than 39 inches in diameter. Covers must be watertight.

6-2.6 Tank Manway Covers

Tank manways are at-grade ports that allow the operator to access tank top fittings and containment sumps. The manway typically includes a cover, which is seen at grade, and a skirt, or short vertical cylinder which supports the cover and keeps the surrounding backfill from covering the item, e.g. sump, being accessed.

Large tank manway covers (over turbine enclosures/piping sumps) must always be of composite construction, and with an H-20/HS-20 load rating. Large steel manways are difficult to lift by a single person and tend to result in increased worker injuries and more difficult regular inspections.

6-2.7 Tank Covering Slab

Concrete covering slabs must be designed for HS-20 loading to allow for a loaded delivery vehicle to drive over while positioning. The slabs must be designed for site-specific soil and other conditions, but in no case must be less than 8 inches thick with two rows of #4 reinforcing bar and a minimum compressive strength of 3000 psi. Corners must be beveled to avoid corner cracking. Vehicles should not be allowed on new concrete until it has properly cured. All concrete joints and sawcuts must be sealed with a self-leveling gasoline resistant caulk.

6-2.8 Tank Manway Crowning

All tank top covers in the slab must be crowned, such that water can never puddle over covers, and such that sheet drainage flows can never pass over and cover the manway. Tank slabs must be graded as a level plateau with a slight crown whenever possible, so that puddles don't form and so that sheet flow cannot pass over the slab. All tank manway covers, except spill buckets, must be bolted down.

6-2.9 Observation Wells

Tank area observation wells must not be provided unless specifically required by local or state requirements. When provided, they must be carefully designed and constructed such that dispenser area spills do not enter the well and therefore never enter the subsurface or groundwater.

6-2.10 Tank Venting

All tanks require atmospheric vents. Tank vents must be run underground to an area not in the path of vehicle traffic or otherwise subject to damage, preferably above a curb line. Vent piping must be double-walled FRP. Terminate the vent as shown in the drawing detail. Only when required by local code, terminate the vents in a monitored FRP sump. If installing a sump, surround it with a small raised concrete collar, and ensure that stormwater cannot enter the sump. Always protect vent risers with bollards, and support the vent with a structure set in a concrete foundation. Diesel vent caps must be atmospheric. Gasoline vent caps must be specified in

accordance with the local air quality regulations and considering whether Stage I or Stage II vapor recovery is installed.

6-2.11 Tank Testing

Throughout the installation process, tanks must be tested in accordance with the tank manufacturer's requirements, and in accordance with any other local testing requirements. Tank manufacturer installation checklists must be completed and submitted as part of the closeout documents. Additionally, all tanks, at the conclusion of the project after all backfill and concrete is complete, must be tested by a third party using a precision method capable of detecting a 0.005 GPH loss of product.

6-3 UST Tank Top Equipment

6-3.1 Phase I Enhanced Vapor Recovery Standard

All tank top equipment, including spill containment devices, overfill prevention valves, vent caps, and extractors must be certified to meet the California Air Resources Board (CARB) Phase I Enhanced Vapor Recovery (EVR) Standard. As many states remove the requirement for Stage II Vapor Recovery, many are requiring that the remaining Stage I equipment meet the Phase I EVR standard.

6-3.2 Spill Buckets

Spill containment devices or "spill buckets" must be installed on every fill port and on gasoline Stage I vapor recovery ports. Spill buckets must always be double-walled, and capable of removing/replacing the primary vessel without excavation, and testing the secondary without excavation. They must be equipped with a mechanical indicator, locally on the device, which can alert the user if liquid is present in the secondary containment vessel. Spill buckets must not be equipped with a drain, and must come equipped with a small hand pump for returning product into the tank via the fill port. Fill ports must be equipped with a swivel adaptor with lockable cap and vapor recovery ports with a dry break adaptor. The top of the fill cap must be 4 inches ±1 inch below the bottom of the spill bucket cover at grade. Installing the fill port too deeply into the bucket will prevent the adaptor from the delivery vehicle from properly connecting. Installing the fill port too shallow will risk the cover resting on the fill port, risking serious damage to the tank.

All fill ports must be configured for gravity drops only, i.e., the elevation of the delivery vehicle ports must be higher than the fill ports. All fills must be the direct type, i.e., remote fills must be prohibited.

Only when required by state or local requirements, enclose spill buckets within a full tank sump/turbine enclosure and provide a manway with integral fill port covers. Include a water-shroud-type device to keep water from entering the sump. Do not install spill buckets in this configuration unless required, as the manway covers become more difficult to open and the containment area more difficult to inspect.

6-3.3 Overfill Protection Devices

Each tank must be installed with an audible and visual overfill protection device. Where two or more tanks are installed, each tank must have its own, dedicated device. This prevents confusion when delivering to both tanks in the same delivery. The audible and visual overfill protection device must be

provided as part of the environmental monitoring system (same manufacturer) and be activated by the automatic tank gauge probe. The alarm must be programmed to actuate when the tank reaches 90% of actual capacity. (See the section on the Environmental Monitoring System for more information.)

All fill ports must also be provided with a Phase I EVR mechanical overfill protection device. The device must be configured to begin restricting flow when the tank reaches 92% of actual capacity, and shutting off flow completely when the tank reaches 95% of actual capacity.

Overfill devices that restrict airflow in the vent, i.e., ball floats, must never be used.

An overfill alarm sign must be placed adjacent to the overfill alarm strobe/horn assembly. Additionally, a manufacturer provided metal tag must be placed in the spill bucket of fill risers equipped with mechanical devices, so that the delivery driver is alerted to its presence.

6-3.4 Sumps

Piping sumps or turbine enclosures must be manufactured of FRP and provided by the tank manufacturer. 42 inch composite cover manways and skirts must be provided such that water that penetrates the manway cover will shed without entering the sump through the cover. As mentioned previously, it is critical that the manway cover be constructed of composite material, so that it can be easily removed by a single person.

6-3.5 Interstitial Monitor

Each tank must be equipped with an interstitial monitoring riser to monitor the brine level in the interstitial space. The interstitial monitor must be accessible through a steel manhole cover, and be contained within a steel pipe riser which is externally coated with fiberglass epoxy or mastic. Refer to Section 6-8 for more information about the monitoring system.

6-3.6 Automatic Tank Gauge Probe

Each tank must be equipped with a magnetostrictive tank gauge probe in a dedicated tank top riser. Refer to Section 6-8 for more information about the monitoring system.

6-4 Underground Piping and Pumps

6-4.1 Underground Product Piping

All underground fuel and vent piping must be double-walled and meet the UL 971 standard. Product piping must be the semi-rigid type, such that there are no underground piping joints. Vent piping must be the FRP type to ensure that it is installed with a straight slope. All piping must be sloped a minimum of 1% back to the monitored tank piping sump, and installed without dips, traps, or other opportunities for draining liquid to collect. This allows for proper leak detection, whereby fuel that escapes the primary pipe in the case of failure will drain into the monitored containment sump and be detected by the sump sensor.

6-4.2 Pipe Testing

All piping must be tested in accordance with the manufacturer's requirements during installation. In the absence of such specific instructions, the testing must be in accordance with PEI RP 100. Manufacturer provided installation checklists and test report forms, when available, must be completed and included in closeout documents. Additionally, all piping, at the conclusion of the project after all backfill and concrete is complete, must be tested by a third party using a precision method capable of detecting a 0.005 GPH loss of product. It is critical, at the conclusion of the project, that all test boots or fittings be backed off or removed so that the secondary pipe can freely communicate with all containment devices and therefore allow for proper leak detection. Additionally, all vapor recovery systems must be tested in accordance with state or local requirements for new systems.

6-4.3 Vapor Recovery Systems

When required, all gasoline systems must be installed with vapor recovery systems. A Stage I vapor recovery system will likely be required at most or all facilities. The systems must be a two-point (not coaxial) system. The system must be compliant with Phase I EVR requirements as promulgated by the CARB. Stage II systems must be installed only if absolutely required, as U.S. EPA has given the states the authority to remove those requirements. The site-specific design professional must contact the governing air quality regulator to confirm the requirements. Stage II systems must be the "balanced" type.

Some jurisdictions have additional vapor recovery requirements. The South Coast Air Quality Management District (SCAQMD) in Southern California, for example, has Phase II EVR requirements, which are both extensive and unique to that jurisdiction.

6-4.4 Pumps and Pumping Systems

Pumping systems can either be the "pressure" or "suction" type.

- Suction systems must generally be limited to smaller facilities with only a single dispenser per product. Because most suction systems have priming limitations, they must be used only where the tank can be located immediately adjacent to the dispensing area, and must not be used on USTs greater than 8 feet in diameter. Consult the suction dispenser manufacturer for specific horizontal and vertical distance limitations. Suction systems must always be the "safe" or "European" type system, whereby the check valve in the suction piping is located at the dispenser. Although many legacy systems may be configured in such a manner, check valves must never be placed on the tank top end of the suction piping. This is also referred to as an "American" suction system.
- Pressure systems are generally more common and must be used at larger facilities. Pressure systems use a submersible turbine pump installed in the tank to create fuel flow. Pressure systems must always be equipped with an automatic line leak detector located at the submersible pump, which senses pump startup pressure and restricts flow in the event that a loss of pressure, or leak, is detected.

6-5 UST Electrical Systems

6-5.1 Electrical Requirements

The electrical system must be designed and installed in accordance with all local and state electrical codes. At a minimum, the National Electric Code (NFPA 70) must always apply, with particular attention paid to Article 514. Specifically, the requirements for classified areas, conduit seals, dispenser disconnects, and appropriately rated equipment must all be considered in the design.

6-5.2 Electrical Power

The system must be served from a new dedicated panel. There must be no electrical receptacles placed in the fuel island area, even if located outside of the classified area.

6-5.3 Emergency Stop Device

Emergency stop devices must be located no less than 20 feet but no more than 100 feet from every fuel dispenser.

6-5.4 Manual Transfer Switch

Provisions for a future emergency generator must be provided by installing a manual transfer switch upstream of the fuel system feeder panel. The need for a manual transfer switch, as well as other standby power options, must be confirmed on a project-specific basis.

6-5.5 Future Provisions

Conduit provisions must be made for future fuel management systems. A disconnecting scheme must be included to allow future data feeds entering and exiting the dispenser to be disconnected in the event of an emergency stop or for dispenser maintenance. Spare conduits from the electrical room must be provided to the dispenser sumps, and each tank sump.

6-5.6 Dispensing Area Restrictions

General purpose receptacles must never be provided at the dispensing area. In addition to the potential for having a spark producing device within the hazard area, there is the potential to bring unapproved electrical appliances (such as portable vacuums) into the classified area, thereby creating a significant risk of explosion if vapors were present.

6-6 Monitoring System

Every system must be equipped with an environmental monitoring system approved by the National Working Group on Leak Detection Evaluations (NWGLDE).

The system must include a console that has an audible/visual alarm in the case of a detected leak or high or low product condition. The console must be mounted in a manager office or other normally manned space. The system must include leak sensors in each containment sump, a brine interstitial leak sensor for the interstitial space, one magnetostrictive probe for each tank to measure tank inventory level, dispenser interface modules (DIMs) appropriate for the dispenser providing the pulse signal, and one overfill alarm repeater for each tank. The tank probe must have sufficient resolution to provide the inventory reconciliation function when the system is connected to the dispenser pulse output. Additionally, the probe and systems must be selected such that they have the capability to perform in tank leak

detection, and the Business Inventory Reconciliation (BIR) function must be installed and programmed to function. The system must be IP addressable and capable of remote monitoring over the internet, and be located such that connection to the internet is facilitated.

6-7 Fuel Management System

When desired, a fuel management system must be provided.

The system must be card activated, and serve the function of authorizing fuel transactions and providing a record of each transaction, tied back to the user.

The system must be IP addressable to allow for remote internet monitoring, and have the capability to record both employee and vehicle information at each transaction.

Specific user input must be gathered to ascertain any site-specific needs for the system. Additionally, specified systems must be consistent with national fuel management and accountability and information technology programs.

6-8 Closeout Documentation

Within 30 days of the completion of construction, the contractor is required to complete the Storage Tank Project Closeout Document Checklist (see template at Appendix M4-C) and submit it, along with all required supporting documentation, to the COR. The documents must be assembled in electronic and binder formats.

Closeout documents are a critical component of a successful fuel system project, because a complete set of closeout documents is necessary for the facility to meet life cycle environmental compliance requirements. In the specification, this section must be highly detailed and site specific, as experience has shown that contactors submit complete packages when specific forms are listed or provided.

The Storage Tank Project Closeout Document Checklist must be customized for the jurisdiction in which the project is located and the equipment and scope of the project. Consult manufacturer Web sites and contact manufacturer representatives for examples of common installation checklists and test reports. Contact the UST regulatory program for the project jurisdiction, or visit the program Web site, for state-specific forms and checklists.

Even though the state inspection forms and checklists may not be required by the agency to complete the project, many forms and checklists related to annual or other periodic tests must be specified and completed during the project. If that documentation is completed, the operator has all of the routine testing information in place, at the completion of the project, to be compliant for the initial operating period.

For example, the Commonwealth of Kentucky has a form entitled DEP 4063 - ELECTRONIC RELEASE DETECTION EQUIPMENT TEST, which is required to be submitted for all UST leak detection equipment annually within the Commonwealth. Since the specifications require the testing of leak detection equipment during commissioning of USPS facilities, that initial testing must be documented on the specific, appropriate state form, so that the owner has the test properly documented from the first day of operation. Achieving this level of project compliance, however, requires the project A/E to develop specific, customized closeout document specifications. Also

consider inserting blank copies of the actual forms into the construction documents.

The following is a list of documents commonly required at the completion of a storage tank project. The design A-E must prepare a Storage Tank Project Closeout Document Checklist, based on the template at Appendix M4-C, that is to be customized for the particular jurisdiction of each project. The Checklist must be included in the Work Order or solicitation for each project.

- A minimum of 96 high resolution (no less than 4 mega-pixel) digital (.jpeg format) photographs depicting the installation at each critical construction phase. Particular attention must be paid to underground, buried, and normally inaccessible components.
- UST manufacturer installation/warranty checklist with proof of delivery to manufacturer. (All of the FRP tank manufacturers have installation checklists which must be completed and submitted to the manufacturer at the conclusion of the project.)
- Underground piping manufacturers' installation checklists with proof of delivery to the manufacturer. (Most of the UL 971 piping manufacturers have installation checklists which must be completed and submitted to the manufacturer at the conclusion of the project.)
- Environmental monitoring system warranty registration and checkout form/Intrinsic Safety Checklist with proof of delivery to the manufacturer. (Most of the environmental monitoring system manufacturers have installation checklists which must be completed and submitted to the manufacturer at the conclusion of the project.)
- Laminated 11 inch x 17 inch diagram showing all sensor and probe locations throughout the system with corresponding labels to match the environmental monitoring system. (Users need to have a legend describing the relationship between the sensor designation programmed into the monitoring system, and the actual location of the sensor.)
- Environmental monitoring system final setup printout. (This confirms that the system was properly programmed, and provides a record of the program, should the program ever be lost.)
- Underground sump test records (dispenser, tank top, and intermediate/transition sumps). (The contractor must provide a record of sump tests on their company forms, or state-specific forms if available.)
- Dispenser registration documentation and proof of transmittal to the manufacturer. (Most dispenser manufacturers have warranty registration forms.)
- Dispenser calibration and startup documentation. (Most dispenser manufacturers have a calibration or setup form, and many companies providing that service have calibration service reports. This provides documentation that the dispenser is calibrated.)
- A copy of the weights and measures jurisdiction calibration report. (While a formal weights and measures seal is often not required at fleet facilities not dispensing fuel to the public, some jurisdictions require fleet facilities to be "sealed".)

- Copies of any state/local approvals, authorizations, and permits.

  (This section must be made project specific. If it is known that the State Fire Marshal, for example, issues a permit to construct for UST systems, providing a copy of that permit must be specified. Key permits must be listed and a generic statement included to capture ancillary permits.)

- Tank and piping test results, vapor recovery test results, and test results for all secondary containment structures or annuluses and all containment sumps.

- Records of all other inspections and tests to include (on state or other regulatory agency or manufacturer forms when applicable).

  (This section must be made project specific, to capture as many tests and inspections on jurisdiction or manufacturer specific forms as possible. At a minimum, every specified test or inspection in the specification must be documented on a contractor provided report or format.)

- Automatic line leak detector, electronic release detection equipment (sensors and probes), and overfill protection device test results on state regulatory agency forms. (This section must be made project specific, to capture as many tests and inspections on jurisdiction specific forms.)

- Tank certificates, licenses, and/or registrations (fully executed, and including proof of delivery to the regulatory agency).

  (It is critical that the final executed and submitted tank registration form be provided. Additionally, tank registration certificates issued by the registering agency in response to the submitted registration must be included.)

- Warranties for all equipment and apparatus. In general, any product/manufacturer documentation that was provided with the equipment must be provided as part of the closeout documents. Any warranty requiring forms or checklists must be completed and fully executed.

- Training certification for instruction seminars signed by the individuals trained on these systems. (There must be documentation that the contractor provided training to the operator.)

- All instruction bulletins, preventive maintenance schedules, operational instructions, and parts lists provided with the tanks, dispensers, monitoring system, and all other systems.

- Waste disposal documentation (if any).

- Other environmental information or permits (if any).

- Copies of receipts for any keys, locks, or other equipment turned over to the owner.

- Operating and installation manuals and instructions for each piece of equipment that was provided with manuals or instructions, including, but not limited to, the tank installation instructions.

7 Technical Requirements of the USPS National Centralized Bulk Storage Tank Monitoring & Notification System

The following technical requirements are applicable to all USPS facilities with storage tanks:

- USPS user access to tank data must be available on any internet enabled device (smart phone, computer, tablet).
- Must have at least 3 levels of password protected remote access to the data (national, regional, district).
- Ability to communicate with different brands of ATG equipment.
- Capable of capturing real time or near real time fuel volume in each tank.
- Ability to integrate the tank monitoring system with the facility fuel management system and capable of identifying fuel inventory variance with customizable date ranges (7-day, 10-day, 30-day, etc.) and provide a written report.
- Immediate real time remote notification of all tank ATG alarms and critical events to USPS specified personnel (inside or outside USPS) via email, text, or FAX.
- Capable of providing remote administrative alarm diagnostic assistance and resolution.
- Remote capability to complete compliance reporting and meet federal and local regulatory recordkeeping requirements.
- Archive a minimum of 7 years of USPS storage tank compliance related data and make available 3 years of all environmental documents online for immediate retrieval
- Capable of connecting to USPS ATG monitoring equipment via modem or transmission control protocol/internet protocol (TCP/IP)
- Ability to automate the tank monitoring system data collection and utilize this data through a customized written report.
- Have the capability to meet or exceed all federal, state, and local storage tank environmental compliance reporting and monitoring requirements.
- Ability to “push-out” and “pull-in” data and be able to provide alarm monitoring and notification.
- Ability to monitor and report on fuel volumes and fuel inventories and have the capability for “smart fuel ordering."
- Ability to store and archive critical storage tank systems data, provide compliance reports and status, and provide customized reporting and data analysis.
- Ability to provide automatic inventory status updates via email or FAX.
- Ability to store all environmental permit-related documents.
- Ability to monitor alarms events generated by the ATG console for hardware, software, sensors and communication alarms.
- Ability to set ATG alarm thresholds remotely, individual site and network-wide.
- Ability to provide back end geospatial site information.

Module 4F - Historic Buildings and Fine Arts

1 Historic Buildings

2 Fine Arts in Postal Buildings

2-1 Murals
2-2 Sculptures
2-3 Art Conservation

1 Historic Buildings

The United States Postal Service (USPS) has a diverse inventory of buildings that it occupies to accomplish its mission as provided under U.S.C. TITLE 39 – POSTAL SERVICE (as revised). Some buildings currently occupied by the USPS are "historically significant." The first step is to determine whether or not the building to be renovated is in fact historically significant.

Historic properties are listed or eligible for listing in the National Register of Historic Places (NRHP) and, for USPS planning purposes, buildings that are at least 50 years of age, pending final determination by the USPS Federal Preservation Officer (FPO). The FPO is responsible for reflecting the appropriate historic status of USPS-owned and –leased properties in eFMS. A property's historic status is located in eFMS within the information tab of the Property Information screen.

In addition to properties that potentially meet historic eligibility requirements themselves, a non-historic Postal building that is located near historic properties and/or within a NRHP-listed or –eligible historic district, may also be identified as historic in eFMS simply to alert users that they need to consider the effects of their actions taken at such a property. Contact the FPO if you believe the eFMS property status is incorrect [USPSFPO@USPS.gov].

A historic building is an example of a "cultural resource." A cultural resource can be an architectural feature, an archaeological object, artwork, or USPS-owned or –leased real property. A Cultural Resources Management Plan (CRMP) that establishes standards and processes for meeting Facilities historic preservation obligations guides USPS Facilities actions [http://facilities.blueshare.usps.gov/sites/Facilities/prog_mgmt/HistoricPreArt/SitePages/Home.aspx]. (For Postal employees only.) The CRMP tackles the most frequent activities that may require cultural resource compliance action. These include HUB projects, R&A projects and AQ buildouts, among others. **Refer to the CRMP for specific guidance when your project affects a historic property.** Information in the CRMP includes process flowcharts, SOPs, preservation consultation and compliance guidance, guidance exempting projects from further compliance review, and a cultural resources process checkup and review that will be used to ensure compliance.

Building specifications and recommended guidance documents have been developed for use on USPS historic preservation projects. The specifications are distinguished by filenames ending in ra_H and are located in Building Design Standard Folder C6, *R&A Specifications*. They address regulatory guidance concerning historic period materials treatment. Supplemental reference documents providing additional guidance and resources for locating additional information on historic preservation matters are located in Building Design Standards Folder G5, *Historic Preservation*.

Integrate these into current SOPs. Use them when undertaking maintenance, repair and alterations actions that affect historic building materials and features. Specifications may be edited as required to address individual project needs and submitted to the FPO or designated representative for review and approval. You are encouraged to propose additional specifications or reference documents for use in historic

preservation projects. Submit any recommendations to the FPO for review and approval.

2 Fine Arts in Postal Buildings

The USPS inventory of fine arts forms a vital part of America's national heritage. Postal Service-owned murals and sculptures commissioned specifically for Postal facilities from 1934 to 1944 under the Treasury Department Section of Painting and Sculpture, Section of Fine Arts; and the Treasury Relief Art Project make up the New Deal Art Collection. This collection was created between 1934 and 1944 as part of President Roosevelt's New Deal agenda to get people back to work and to restore the economy. It is the Postal Service's policy to preserve, protect and maintain the Collection.

Recognizing the importance of the Collection, the Postal Service makes every effort to preserve and safeguard it for future generations by providing for the relocation of these works into the new building when it is necessary to move from an existing building. Architects for any new postal-owned facility must be made aware of any works of fine art in the existing building that need to be accommodated in the lobby design of the new building. Any changes to the standard plans as necessary to accommodate the art work must follow the deviation policy outlined in the Introduction chapter of this handbook.

The Postal Service FPO has responsibility for the New Deal Art Collection. No New Deal Art Collection artwork may be removed, sold, lent, or otherwise disposed of without the FPO's written approval. Similarly, if a work of fine art cannot be relocated for some reason, notify the FPO.

2-1 Murals

Murals were typically created using one of two media: either painted on canvas which is then glued to the wall, or painted directly on the wall surface as a fresco. A canvas painting must be carefully removed and relocated to an area of the new building for viewing by the general public, usually in the lobby, by a conservator recognized by the American Institute for Conservation of Historic Artworks. Unfortunately, a fresco is prohibitively expensive to move and must remain as an integral part of the existing building.

2-2 Sculptures

Sculptures were produced from various materials such as metal, stone, plaster, wood, or other types of common material. Sculptures must be examined carefully and a decision must be made by the Project Manager as to the feasibility of relocation to the new building. If it is not feasible to relocate the sculpture, Facilities personnel responsible for disposing of postal buildings coordinate with the FPO to determine other means of preserving the sculpture.

2-3 Art Conservation

Art conservation is the field of professionals who are trained to restore artwork and to understand art materials, causes of deterioration, and the environment required to preserve optimal artwork condition over time. Consult with the FPO promptly if conditions within the USPS building setting appear to endanger the artwork by defacement, accident, water intrusion, excessive heat or light, and so on.

Appendix M4-A

BMEU Space Estimating Procedure

When the Postal Service initiates plans to build a new postal facility (or renovate an existing facility), it is imperative that BMEU management compute the overall space required for efficient BMEU operation. The results of this exercise must be used to determine the proper sizing of the BMEU in accordance with Handbook AS-504, *Space Requirements*, section 328.5, Part C. Additionally, the results must be used to document and justify the BMEU space request.

The BMEU design only incorporates the functional activities and needs of the BMEU, and the BMEU space estimating procedure only evaluates the space needs for BMEU operations. It is important to note that neither the BMEU design nor the space estimating procedure addresses the design or space needs for the mailing requirements (MR) function. MR is a separate function from the BMEU. Therefore, MR space needs to be determined separately and the MR function must never be located within the space designated for BMEU use. However, if desired locally, the MR functional space could be located adjacent to the BMEU space. Since the BMEU design is for BMEUs only, the design of the MR space would have to be developed separately. When the two functions are located side by side, the Prototypes colors and finishes could be adapted in the MR space for visual consistency.

Note: This procedure must be performed manually.

STEP 1 - Collecting Data

Peak periods for customer traffic, trucks at the platform and mail volume usually occur at different times of the day. Therefore, extend truck and customer traffic surveys over several weeks to clearly identify the peak 1-hour period for each. Then:

- During the identified peak 1-hour for mail volume, measure the volume on hand. If the measurement is in linear feet or pieces, convert the product into pounds of mail. For a more accurate measurement, conduct separate counts for different classes of mail.
- Divide the total pounds of mail by the weight capacity of a standard general-purpose mail container (GPMC) to find the number of GPMCs (or equivalent containers) on hand during at the heaviest time during the peak 1-hour period.
- Find the number of customers during the peak 1-hour period of customer traffic.
- Survey the number of desks, file cabinets, workstations, and scales needed or used in the unit.
- Perform a survey of truck and other vehicle usage at the platform during the peak 1-hour period of platform use to determine the number of bays in use for each dock height.

STEP 2 - Calculating Space Needs

After determining mail volume, customer traffic, office equipment counts, and platform occupancy, multiply the results by the appropriate factors listed below to determine required square footages:

- Exterior Space
  - Determine the total square footage required for customer parking by subtracting the number of trucks at the platform from the number of customers during the 1-hour peak period times 270 square feet.
- Platform Space
  - Number of bays in use at 30-inch platform times 450 square feet.
  - Number of bays in use at 48-inch platform times 600 square feet.
  - Number of dock workstations needed times 70 square feet.
  - Number of platform floor scales times 35 square feet.
- Customer Service Space
  - Number of customers divided by 6 times 100 square feet (for lobby).
  - Number of counterline workstations needed times 130 square feet.
  - Number of counterline workstations times 68 square feet (for screenline).
  - 150 square feet for rework.
- Mail Handling Space
  - Number of GPMCs, or equivalent in terms of cubic feet of mail, at the heaviest time during the peak 1-hour period, times 45 square feet (for mail flow and staging).
  - One half of total space computed for mail flow and staging (for cleared mail).
  - Number of GMPCs, or equivalent in terms of cubic feet, of reject/hold mail on hand at the heaviest time during the peak 1-hour period times 45 square feet.
  - Number of 70- to 100-pound scales used the workroom times 6 square feet.
  - Number of workroom workstations needed times 64 square feet.
- Administrative Space
  - Number of clerk administrative work desks needed times 42 square feet.
  - Number of file cabinets and record storage units times 6 square feet.
  - 120 square feet for supervisor's office.
  - 120 square feet for storage room.

STEP 3 - Total BMEU Space Required

Total space required is the sum of all results obtained in Step 2.

Appendix M4-B

Exterior Signage/Site Survey Instructions

General Information

For all existing facilities that are historic, historic eligible, or in a historic district, and consequently require the design of custom exterior signage in lieu of standard exterior signage, it is necessary to submit a completed Site Survey package to Facilities Program Management, in order to obtain the required signage from the USPS Signage Direct Vendor. For new facilities in a historic district, in a community with strict signage guidelines, or in a lease arrangement where signage guidelines are applicable, it is necessary to follow the same procedure. (See also Module 4C - Exterior Signage.) Please provide the following information on the sheet titled "General Information" included in this survey package:

- Site Name
- Post Office Name
- FMS Project #
- District Name
- Postmaster and phone #
- Project Manager and phone #
- Architectural Firm and phone #
- Site Address (including Street, City, State, and Zip Code)
- Hours of Operation
- Facility Plan Type: Retail; Combined Retail and Non-Retail; Non-Retail

Photographing the Site

Please follow the suggestions below for taking meaningful pictures of the site. It is also helpful to first examine the entire site to determine what viewpoints would be most effective, and always indicate on the site plan the position of the camera for each photo.

Distance shots: important in showing the site's layout, and how approaching traffic is able to see the site and its signs. Please check the surrounding area for any outlying or multi-tenant signs (pylons; monuments). (Exhibits 1, 6 & 7)

Close-range shots: Take these shots to show what foot traffic may see while walking by or inside the site. Take shots of currently existing signs as well as possible locations for future signs. Be sure to take shots of entrance(s). (Exhibits 2, 3, 4, 8 & 9)

Detail shots: Extreme close-up shots are sometimes useful for sign placement and copy content. When in doubt, take the shot (Exhibit 5)

Site Survey Drawings

Please provide the following information to properly document the site conditions:

- Overview of the site (including cross-streets, mall name, traffic patterns, outlying signs, neighboring businesses; denote North orientation etc.).
- Plan view drawing of the site (exterior and interior).
- Elevations (exterior and interior) to show existing sign or building conditions.
- Measurements of existing architectural elements for tolerances and possible placement of the new signs (brick sizes, column dimensions, fascia heights, window/door sizes, etc.).
- Note existing signs (type, location, and size). Please take note of materials used, letters sizes, color constraints (imposed by city or landlord), etc. Also note the size of any signs that could have acrylic panels replaced with new faces (monuments and pylons).
- Electrical conditions and location of nearest available electrical feed.
- CAD drawings of the site plan with exterior elevations if available - in AutoCAD format (Usually provided by the architect.)

Mail Survey To:

Manager, Facilities Program Management.

Exterior Signage/Site Survey

General Information:

- Site Name _____
- Post Office Name _____
- FMS Project # _____
- Finance Number _____
- FEDSTRIP Number _____
- District Name _____
- Postmaster/phone # _____
- Project Manager/phone # _____
- Architectural Firm/phone # _____
- Site Address (including Street, City, State, and ZIP Code)

  _____

  _____
- Facility Plan Type:
  - □ Retail
  - □ Combined Retail and Non-Retail
  - □ Non-Retail

Questions:

What are the landlord restrictions?_____

_____

_____

City code restrictions? (Please provide copy of local codes if available)

_____

_____

Other restrictions?_____

_____

_____

Is the exterior electrical connected via store circuit or on a common mall circuit? How is on/off controlled?_____

Where is the breaker box for the site?_____

Notes:

_____

_____

_____

_____

_____

Photographic Examples

Exhibit 1
Distance Shot (showing building and traffic flow)

Exhibit 2
Building - West Elevation – Close Range

Exhibit 3
Building - South Elevation – Close Range

Exhibit 4
Directional/ Drive-up – Close Range

Exhibit 5
Building Construction - Detail Shot

Exhibit 6
Distance Shot (showing tenant pylon & strip mall)

Exhibit 7

Distance Shot (showing pylon & traffic flow)

Exhibit 8

Building – South Elevation – Close Range

Exhibit 9

Entrance – Close Range

Drawing Examples

Exhibit 10
Typical Exterior Plan View-Freestanding Post Office

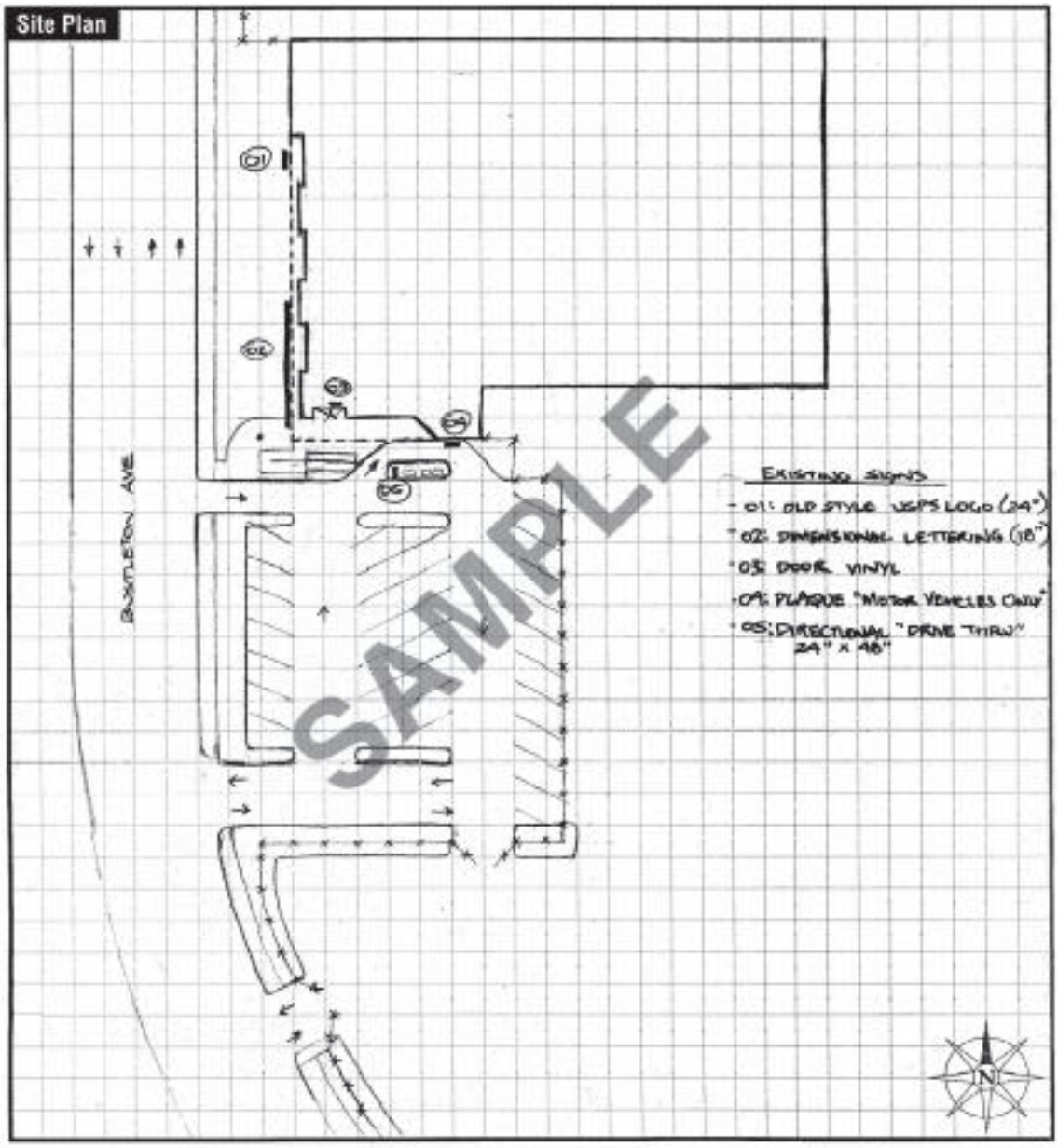
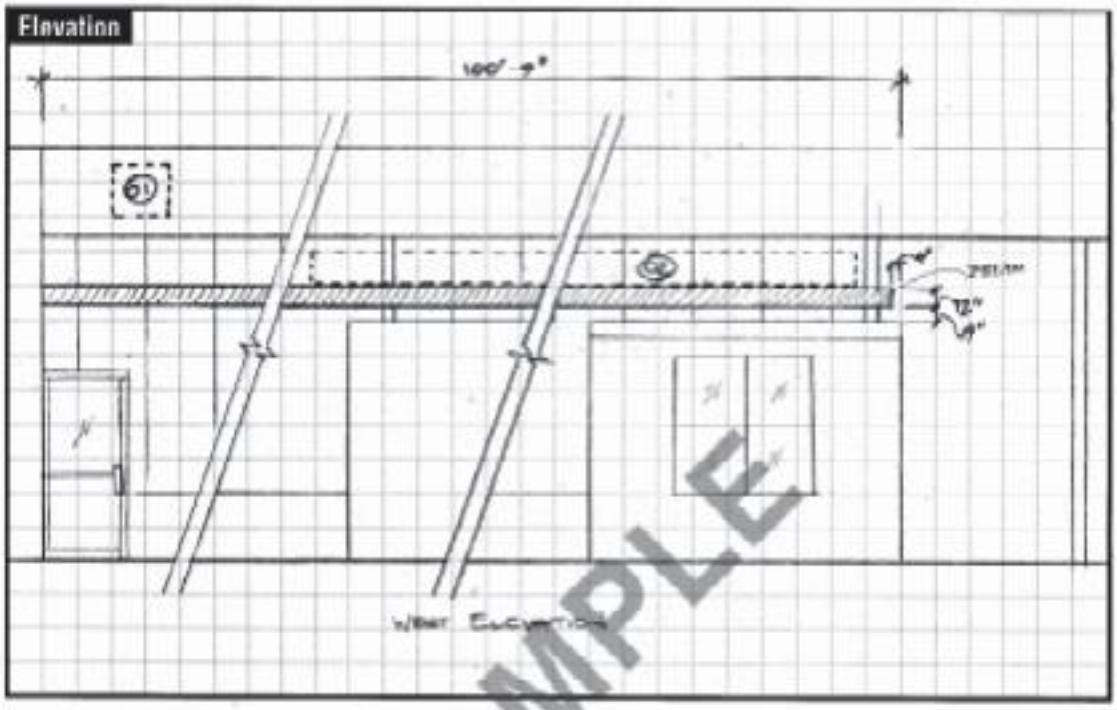


Exhibit 11

Typical Exterior Elevation-Freestanding Post Office



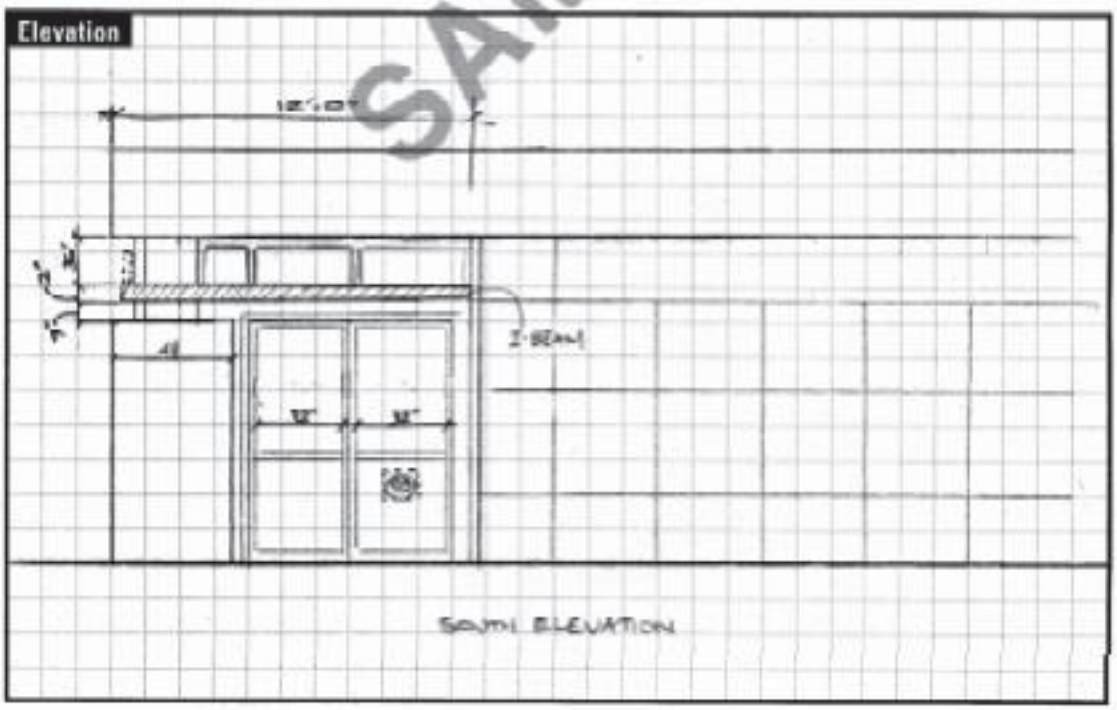


Exhibit 12

Typical Exterior Plan View -Post Office as Mall Tenant

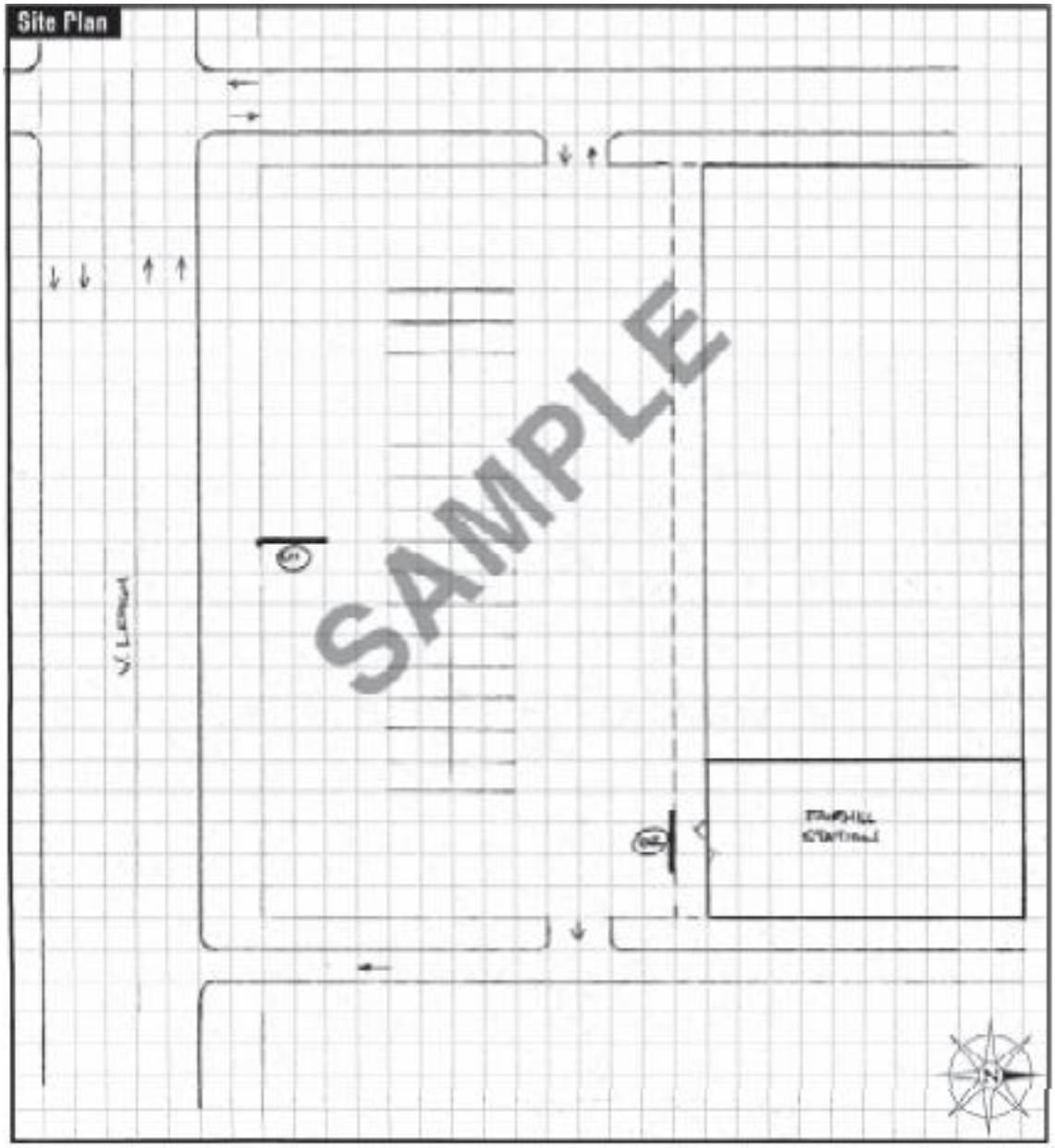
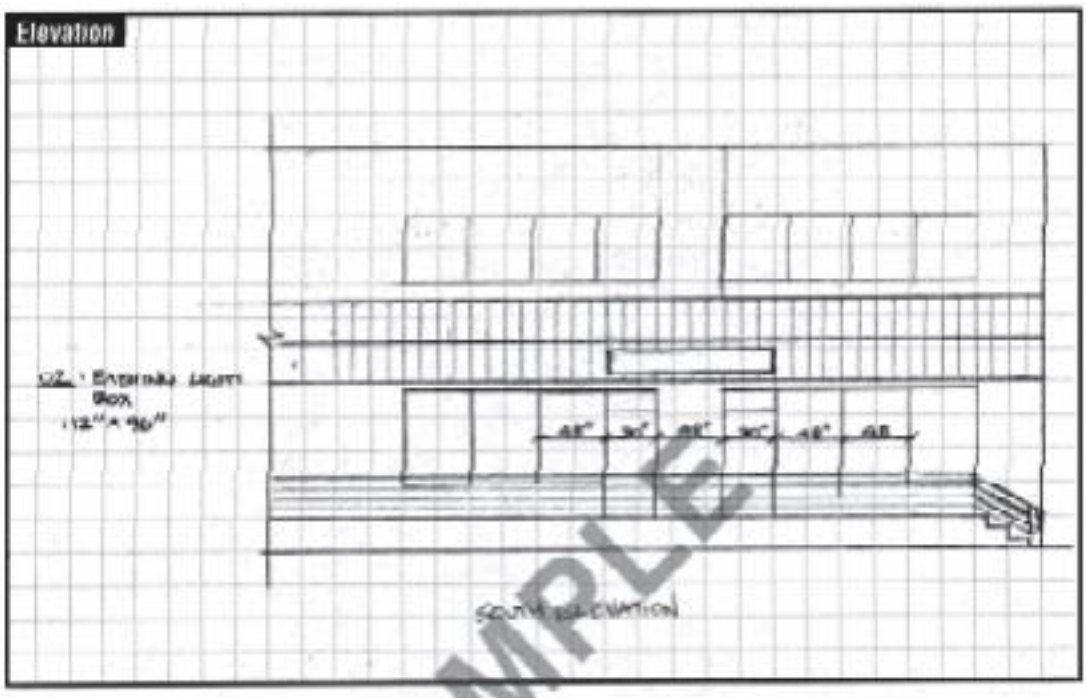


Exhibit 13

Typical Exterior Elevation-Post Office as Mall Tenant



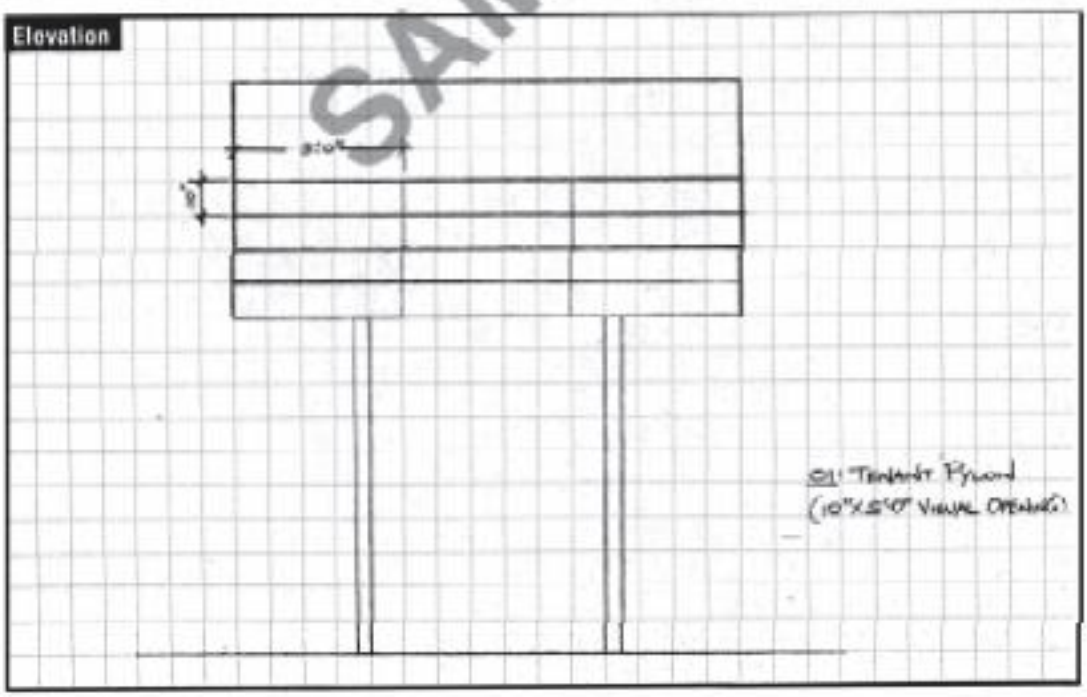


Photo Mounting Sheet

Site Name: _____

PLACE
3 1/2"x 5"
PHOTO HERE

Photo # _____

PLACE
3 1/2"x 5"
PHOTO HERE

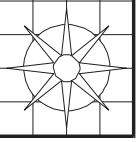
Photo # _____ **Sheet** ____ **of** ____

Site Name
Address
City, State, ZIP

FMS #

Site Contact/ Phone
FSO Contact/ Phone
Surveyor/Company/Phone
Architect/ Phone

Site Plan



Elevation:

Elevation:

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Appendix M4-C

Storage Tank Project Checklists:

- Pre-Removal Checklist
- Post-Removal Checklist
- Storage Tank Project Closeout Document Checklist

UNDERGROUND STORAGE TANK CLOSURE
PRE-REMOVAL CHECKLIST

PROPERTY ID:
FACILITY ADDRESS:
UST(S) CLOSED:
USPS COR:
UST DECOMMISSIONER:
QUALIFIED ENVIRONMENTAL PROFESSIONAL:

TASK		
TRAINING AND CERTIFICATION		
1. Do all UST removal personnel have appropriate safety and health training as required by OSHA?	**YES**	**NO**
List Training:		
2. Have appropriately licensed/certified contractors been hired for the UST removal?	**YES**	**NO**
List State and/or UST Decommissioner certification number(s) below:		
3. Has a qualified environmental professional been identified in the event contamination is encountered?	**YES**	**NO**
Identify State or local certification/license number (if required) below:		
4. Is a UST closure assessment required by state or local agency?	**YES**	**NO**

PRE-CLOSURE NOTIFICATONS, PERMITS, & PLANNING		
1. Have appropriate regulatory agencies been notified in advance of tank removal?	**YES**	**NO**
List Agency(ies) Notified:		
a. Has documentation of notification been received?	**YES**	**NO**
2. Have all necessary permits been acquired and permit fees paid?	**YES**	**NO**
List Permits and Fees:		
a. Have copies of permits been received?	**YES**	**NO**
SITE SPECIFIC EVALUATION		
1. SITE VISIT		
Has a site visit been conducted?		
2. SCOPE OF REMOVAL		
Has the scope of removal been determined to include the following?		
a. Number, size, contents, and material of UST(s) to be removed?		
b. Will UST(s) be removed and not replaced?		

		YES	NO
c.	If UST(s) will not be replaced, will other UST systems on-site be impacted?		
	If yes, has the contractor provided a plan for addressing the systems to remain? ***Attach plan.***		
d.	Has the extent of piping, containment sumps, dispensers, or other product containing structures to be removed been determined?		
e.	Has the extent of electrical and communications equipment to be removed been determined?		
f.	Has the extent of structural removals, including canopies, dispenser enclosures or other system related buildings been determined?		
g.	Will any equipment by retained or reused? ***If yes, list equipment:***		
h.	Are non-traditional samples or data required (e.g., for research purposes)?		
3. UTILITY CLEARANCES			
a.	Has notification to the appropriate local utility clearance hotline been made?		
	Notification confirmation #:		
b.	Have available as-built plans been reviewed for utilities located in the planned work area?		
c.	Has a private utility locator been engaged to confirm the location of utilities and other below ground structures?		
d.	Have aboveground utilities been evaluated for potential conflicts?		
e.	Do utility conflicts exist?		
	If yes, has a plan been developed to ensure utilities are secured, rerouted, removed or de-energized prior to the start of work? ***Attach plan.***		

UNDERGROUND STORAGE TANK CLOSURE
PRE-REMOVAL CHECKLIST

4. ADDITIONAL CLEARANCES	YES	NO
a. Will tank removal activities compromise existing structures such as buildings, sidewalks, canopies, retaining walls, and light poles?		
b. If yes, has a plan been developed to mitigate any potential damage to these structures? ***Attach plan.***		
5. WORK AREA		
a. Has the work area for excavation activities been determined?		
b. Will any special plans or permits be required due to proximity of the work area to wetlands or surface water bodies?		
If yes, list permits and plans :		
c. If plans or permits are listed above, have they been submitted or obtained prior to the start of work?		
d. Has the contractor submitted a site plan depicting planned areas for equipment and material staging, equipment operation, stockpiling of soil and backfill, temporary storage of the UST system and parking? ***Attach site plan.***		
e. Is the location of the work area likely to cause vehicular or pedestrian traffic conflicts? ***If yes, attach a traffic control plan.***		
f. Is the work area likely to cause interference to the operations of the facility (i.e., blocked entrance or loading dock). ***If yes, attach a plan been developed to minimize disturbance to operations.***		
g. Has the work area been evaluated to determine if operations will cause a nuisance (i.e., noise, odor) to employees, patrons, neighbors, or passers-by, etc. and configured to minimize these concerns?		
6. TANK STATUS AND STOP DELIVERY		
a. Has the status and liquid level of the UST(s) to be closed been determined and delivery of product stopped?		
b. Has closure of the UST(s) been planned so that any existing product will be used to the maximum extent possible?		

UNDERGROUND STORAGE TANK CLOSURE
PRE-REMOVAL CHECKLIST

7. KNOWN CONTAMINATION AND LAND USE RESTRICTIONS	YES	NO
a. Has a review been conducted to determine whether any environmental contamination is known to exist at the site or any land use restrictions?		
b. Are environmental contamination or land use restrictions are present? If yes, have the following occurred?		
i. Have special procedures for addressing these issues been incorporated into the site health and safety plan?		
ii. If required, has a plan been submitted or approval received from the environmental agency having jurisdiction before removal activities begin?		
iii. Has an environmental professional been engaged to ensure removal activities do not have a negative impact on existing cleanup or monitoring activities for the site?		
iv. If a land use restriction is in place, are all conditions of the restriction being adhered to?		
8. LIKELIHOOD OF DEWATERING		
a. Has a review been conducted of available information for the site to determine whether dewatering will be necessary during removal activities?		
b. Is dewatering likely to be required? ***If yes, attach a dewatering plan.***		
c. Will a permit will be required for dewatering?		
d. If yes, has a permit been obtained. ***Attach permit.***		
9. HAZARDOUS WASTE GENERATOR STATUS		
a. Has the generator status of the site been determined (i.e., small quantity generator, large quantity generator, or not listed as a generator of hazardous waste?		
Identified generator status:		
Generator ID # (if applicable):		

	YES	NO
b. Has a waste disposal plan been developed for any waste fuel and sludges generated during removal activities that is most advantageous to site's generator status?		
c. Has the contractor activated or obtained any necessary generator ID numbers (i.e. temporary generator ID) in advance of tank removal activities?		
10. SEASONAL CONSIDERATIONS		
a. Have seasonal issues (i.e., potentially high water table during excavation, temperatures too cold for paving) been considered prior to scheduling the tank removal?		
11. SPECIALIZED RESTORATION		
a. Will the area of the UST removal require specialized restoration (i.e., reinforced concrete, retaininq wall)?		
b. Have any specialized restoration requirements been addressed in the design drawings or project plans?		
12. OPERATIONAL CONTINUITY		
a. Have tank removal activities been planned to ensure operational continuity of the site (i.e., tank removal completed after installation of replacement tank or temporary tank needed)?		
b. Has a plan for operational continuity been developed?		
13. ENVIRONMENTAL OR OTHER PERMIT MODIFICATIONS		
a. Have the site environmental permits, registrations, and plans been surveyed to determine which documents will require modification?		
List permits, registrations, and plans that will require modification:		

UNDERGROUND STORAGE TANK CLOSURE
POST-REMOVAL CHECKLIST

PROPERTY ID:
FACILITY ADDRESS:
UST(S) CLOSED:
USPS COR:
UST DECOMMISSIONER:
QUALIFIED ENVIRONMENTAL PROFESSIONAL:

Use this checklist to record that all required documentation is being submitted to the COR. Indicate in the appropriate spaces below the documentation being submitted.

NOTIFICATION DOCUMENTATION			
Copies of any forms or other communications submitted to agencies with jurisdiction as notification of the planned removal	**Yes**	**No**	**NA**
List Notification Documents:			

PERMITS			
Copies of any permits obtained as part of the tank removal	**Yes**	**No**	**NA**
List Permits:			

UNDERGROUND STORAGE TANK CLOSURE
POST-REMOVAL CHECKLIST

UPDATED REGISTRATION			
Final copy of the updated registration along with documentation indicating transmittal of the updated registration to the appropriate agency(ies)	**Yes**	**No**	**NA**
CLOSURE ASSESSMENT REPORT			
Final copy of the Closure Assessment Report (including supporting documentation) along with documentation indicating transmittal of the report to the appropriate agency(ies)	**Yes**	**No**	**NA**
ADDITIONAL FACILITY PLAN/REPORT UPDATES			
Copies of any updated facility plans/reports/operating permits that reference petroleum storage as applicable:			
Stormwater Pollution Prevention Plan (SWPPP)	**Yes**	**No**	**NA**
Spill Prevention, Control and Countermeasure (SPCC) Plan	**Yes**	**No**	**NA**
National Pollutant Discharge Elimination System (NPDES) Permit	**Yes**	**No**	**NA**
Other (Specify)	**Yes**	**No**	**NA**
Other (Specify)	**Yes**	**No**	**NA**
Other (Specify)	**Yes**	**No**	**NA**
WASTE DISPOSAL DOCUMENTATION			
Copies of all manifests, bills of lading, and receipts documenting waste disposal	**Yes**	**No**	**NA**
List Disposal Documents:			
FINAL SITE INSPECTION			
Documentation that a final site inspection was conducted by the COR or designated representative	**Yes**	**No**	**NA**

Storage Tank Project
Closeout Document Checklist

Facility Name: Date:

Address: Completed By:

	A minimum of 96 high resolution (no less than 4 mega-pixel) digital (.jpeg format) photographs depicting the installation at each critical construction phase. Particular attention should be paid to underground, buried, and normally inaccessible components.
	UST manufacturer installation/warranty checklist with proof of delivery to manufacturer.
	Underground piping manufacturers' installation checklists with proof of delivery to manufacturer.
	Environmental monitoring system warranty registration and checkout form/Intrinsic Safety Checklist with proof of delivery to manufacturer.
	Laminated 11" x 17" diagram showing all sensor, probe locations throughout system with corresponding labels to match environmental monitoring system.
	Environmental Monitoring System final setup printout.
	Underground sump test records (dispenser, tank top, and intermediate/transition sumps).
	Dispenser registration documentation and proof of transmittal to manufacturer.
	Dispenser calibration and startup documentation.
	Copy of the Weights and Measures jurisdiction calibration report.
	Copies of any State/Local approvals, authorizations, and permits, to include: [ ]; [ ]; [ ].
	Tank and Piping Test Results, Vapor Recovery Test Results, and Test Results for all secondary containment structures or annuluses and all containment sumps.
	Records of all other inspections and tests to include (on state or other regulatory agency or manufacturer forms when applicable): [ ]; and [ ].
	Automatic line leak detector, electronic release detection equipment (sensors and probes), and overfill protection device test results on state regulatory agency forms.
	Tank certificates, licenses, and/or registrations (fully executed, and including proof of delivery to the regulatory agency) to include [ ].

	Warranties for all equipment and apparatus. In general, any product / manufacturer documentation that was provided with the equipment shall be provided as part of the closeout documents. Any warranty requiring forms or checklists shall be completed and fully executed.
	Training certification for instruction seminars signed by the individuals trained on these systems.
	All instruction bulletins, preventive maintenance schedules, operational instructions, and parts lists provided with the tanks, dispensers, monitoring system, and all other systems.
	Waste disposal documentation (if any).
	Other environmental information or permits (if any).
	Copies of receipts for any keys, locks, or other equipment turned over to the Owner.
	Operating and installation manuals and instructions for each piece of equipment that was provided with manuals or instructions, including but not limited to the tank installation instructions.