Exhibit “B”

May 1, 2024

1. INTRODUCTION

2. GENERAL REQUIREMENTS
2.1 General
2.2 Codes
2.3 Standards
2.4 References
2.5 Pricing Standards

3. PLANNING AND DESIGN CRITERIA
3.1 Background
3.2 PACT Guiding Principles
3.3 Community Based Outpatient Clinics (CBOC) Planning Approach
3.4 Room Data Matrix
3.5 Surgical Design Criteria

4. TECHNICAL NARRATIVE
4.1 Site/Civil
4.1.1 Pedestrian and Vehicle Access & Circulation
4.1.2 Parking
4.1.3 Site Grading
4.2 Architecture
4.2.1 General Criteria
4.2.2 Accommodation for Care of Patients of Size
4.2.3 Acoustics
4.2.4 Equipment/Accessories/Furnishings
4.2.5 Signage and Wayfinding
4.2.6 Critical Dimensions
4.2.7 Entry Canopies
4.2.8 Elevators
4.2.9 Slab Depressions and Thickened Slabs
4.2.10 Millwork
4.2.11 Joint Sealant Systems
4.2.12 Doors and Frames
4.2.13 Hardware
4.2.14 Pharmacy Dispensing Windows
4.2.15 Radiation Shielding
4.2.16 Radio Frequency Shielding and Magnetic Shielding
4.3 Interior Design
4.3.1 General Criteria
4.3.2 Acoustic Ceiling Tile
4.3.3 Concrete Floor Treatment
4.3.4 Fiberglass-Reinforced Panels
4.3.5 Painting
4.3.6 Wall Protection
4.3.7 Window Shades
4.3.8 Privacy Curtains / Screens
4.3.9 Flooring, Carpet
4.4 Mechanical

4.4.1 References
4.4.2 HVAC Design Basis
4.4.3 Air Handling Units (AHUs)
4.4.4 Exhaust Systems
4.4.5 Cooling System
4.4.6 Hot Water Heating System
4.4.7 Humidification System
4.4.8 HVAC Piping Systems
4.4.9 Air Distribution and Duct Systems
4.4.10 HVAC Insulation Systems
4.4.11 Testing, Adjusting and Balancing
4.4.12 Automatic Temperature Control Systems
4.4.13 Special Conditions
4.5 Plumbing
4.5.1 References
4.5.2 Plumbing Design Basis
4.5.3 Materials
4.5.4 Medical Gases
4.5.5 Special Conditions
4.6 Electrical
4.6.1 Standby Generator
4.7 Lighting
4.7.1 General
4.7.2 Indoor Lighting Specifics
4.7.3 Lighting Controls
4.7.4 LED Drivers
4.7.5 Special Conditions
4.8 Telecommunications
4.8.1 Scope of Work
4.8.2 Pathways
4.8.3 Spaces
4.8.4 Telecommunications Bonding and Grounding
4.8.5 Equipment Racks and Equipment Cabinets
4.8.6 Power Distribution Units and Uninterruptable Power Supplies
4.8.7 Telecommunications Infrastructure Plant
4.8.8 Special Systems

5. Hardware Groups and Modifiers

SECTION 1 - INTRODUCTION

1.1 The purpose of this Leased CBOC Design Narrative is to consolidate the governing codes, standards, references, and guidelines in a document that provides performance-based standards for a VA leased CBOC.

1.2 The governing codes, standards, and references are based on a VA affiliated outpatient clinic.

1.3 The design of the VA leased CBOC shall be based on the Prototype for Standardized Design and Construction of Community Based Outpatient Clinics which is described in Part 3 Planning and Design Criteria.

1.4 This document, and the associated Room Data Matrix (RDM), provides performance-based standards for rooms/functions that are a part of the project's Program for Design. If there are standards covered by this document, or room types in the RDM, that are not a part of a specific project's Program for Design, those standards are considered not applicable to that specific project. However, standards added to the grey "additional requirements" boxes in this document are project specific and are applicable.

1.5 Commonly Used Acronyms and Definitions:

PCMH	Patient Centered Medical Home A team based, comprehensive, coordinated patient care model (refer to PACT)
PACT	Patient Aligned Care Team Provides service to veterans that are patient-centered with the right care at the right time by the right person. A typical "teamlet" serving a veteran consists of four caregivers: A Primary Care Provider – physician (MD), physician assistant (PA) or nurse practitioner (NP); a Registered Nurse (RN); a clinical staff assistant (LPN or Medical Assistant) and an administrative staff member (Clerk).
CBOC	Community Based Outpatient Clinic Is VA-operated, VA-funded, or VA-reimbursed site of care which is located separate from a VA Medical Facility. A CBOC can provide primary, specialty, subspeciality, mental health, or any combination of healthcare delivery services that can be appropriately provided in an outpatient setting.
PFD	Program for Design Net square feet (NSF) listing of all spaces and rooms that are to be included in a construction project.
VA	Veterans Affairs
VHA	Veterans Health Administration
VISN	Veterans Integrated Services Network
GLA	Greater Los Angeles Healthcare System
RDM	Room Data Matrix

SECTION 2 – GENERAL REQUIREMENTS

2.1 General

2.1.1 The codes and standards listed below indicate minimum performance requirements. Minimum requirements or standards may be exceeded by site specific project design.

2.1.2 Compliance is required with applicable codes and standards throughout the process of design, construction, acceptance, and on-going maintenance of the facility.

2.1.3 Design and construction of the CBOC shall be in compliance with the requirements of the GSA Form L100 Global Lease as well as the codes and standards listed below. This Leased CBOC Design Narrative covers construction materials and standards not fully addressed by the codes, standards, and references below.

2.1.4 Use the most current edition at the date and time of bid submission.

2.2 Codes

2.2.1 All VA leased CBOC facilities are to conform to the most recent applicable codes, which include but are not limited to following:

2.2.1.1 State and local codes as required by the local Authority Having Jurisdiction (AHJ).

2.2.1.2 National Fire Protection Association (NFPA), NFPA 101 Life Safety Code and those codes and standards referenced by NFPA 101. (NFPA 99 Health Care Facilities Code, etc.)

2.2.1.3 NFPA 70B Standard for Electrical Equipment Maintenance, NFPA 70E Workplace Electrical Safety, NFPA 75 Standard for the Fire Protection of Information Technology.

2.2.1.4 Architectural Barriers Act Accessibility Standards (ABAAS), current edition.

2.2.1.5 International Building Code (IBC): The latest edition shall be used for structural, wind load and seismic design.

2.3 Standards

2.3.1 All leased CBOC facilities are to conform to the following standards:

2.3.1.1 FGI Guidelines for the Design and Construction of Outpatient Facilities, current edition (referred to as FGI Guidelines herein).

2.3.1.2 The Joint Commission (TJC) accreditation standards apply to the facility under the affiliated VA medical center license. Building construction and on-going maintenance procedures shall meet TJC standards. Lessor shall provide and submit all documentation that is required for TJC requirements.

2.3.1.3 Facility Security Level (FSL) shall be as outlined in GSA Form L100 Global Lease.

2.3.1.4 Sustainability standards shall be as outlined in GSA Form L100 Global Lease.

2.3.1.5 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 170, Ventilation of Health Care Facilities, current edition (referred to as ASHRAE 170 herein)

2.3.1.6 ASHRAE Standard 12, Minimizing the Risk of Legionellosis Associated with Building Water Systems, current edition.

2.3.1.7 ASHRAE Standard 188, Legionellosis: Risk Management for Building Water Systems, current edition.

2.3.1.8 ASHRAE Standard 62.1, Ventilation for Acceptable Indoor Air Quality, current edition (referred to as ASHRAE 62.1 herein)

2.3.1.9 ANSI/ASHRAE/IES Standard 90.1-2019 -- Energy Standard for Buildings Except Low-Rise Residential Buildings

2.3.1.10 Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Standard, HVAC Duct Construction Standards - Metal and Flexible.

2.3.1.11 USP General Chapter 795 Pharmaceutical Compounding – Nonsterile Preparations

2.3.1.12 USP General Chapter 797 Pharmaceutical Compounding – Sterile Preparations

2.3.1.13 USP General Chapter 800 Hazardous Drugs - Handling in Healthcare Settings

2.3.1.14 Association for the Advancement of Medical Instruments (AAMI) standards as applicable to SPS and RME storage

2.3.1.15 Illuminating Engineering Society North America (IESNA) Handbook - latest edition

2.3.1.16 VA Signage Design Manual PG 18-12

2.3.1.17 H 18-8 Seismic Design Handbook is required when the clinic includes Ambulatory Surgery

2.3.1.18 VA HVAC Design Manual (Specifically regarding the AHU design requirements for Pharmacy Compounding Suite, Sterile Processing Service (SPS), and Surgical Suite)

2.4 References

2.4.1 The following guides, manuals, and other references developed by VA are for reference only:

2.4.1.1 VA Enterprise Facility IT Support Infrastructure Standard, most current.

2.4.1.2 Prototype for Standardized Design and Construction of Community Based Outpatient Clinicshttps://www.cfm.va.gov/til/prototypes.asp#CBOC

2.4.1.3 PACT Space Module Design Guide https://www.cfm.va.gov/til/dGuide/dgPACT.pdf

2.4.1.4 Room Templates, Leased Community Based Outpatient Clinics https://www.cfm.va.gov/til/rTemplate/LeasingCBOCw.asp

2.4.1.5 VA Design Guides (PG18-12)

2.5 Pricing Standards

2.5.1 Building Shell Definition

2.5.1.1 Building shell is the complete enveloping structure, the base building systems, the complete HVAC system, and the finished common areas (building common and floor common) of a building that adjoin the occupant areas.

2.5.1.2 Any demolition cost necessary shall be included in the building shell rental rate.

2.5.1.3 Third-party green building certification do not change what elements are considered part of building shell or tenant improvements. Instead, building elements may be required to have certain attributes, such as low volatile organic compound emissions.

2.5.1.4 Section 3 of the L-100 provides minimum requirements of the shell. Any further requirements identified in this LDN to items in Section 3 shall remain shell unless specifically designated as TI.

2.5.1.5 The following table shows the Shell requirements of the Base Building and the Occupant Areas.

Base Building	Occupant Areas
Base structure and building enclosure components (windows with exterior finishes) and any required enhancements (canopies, progressive collapse, etc.) are complete.	Broom-clean concrete floor slab, with a flat and level floor.
Base building electrical and plumbing systems (e.g., central fire alarm, chiller plant, cooling tower) are complete and functional.	Gypsum wallboard, spackled and prime painted, on exterior perimeter walls and tenant demising walls, without suite entry door.
Entire HVAC system is complete and functional.	Conditioned space per the RDM.
All common areas, such as lobbies, elevators, fire egress corridors and stairwells, garages, and service areas are complete.	Suspended acoustical ceiling system including grid and lay-in tiles (or other building standard). Lighting luminaires should be installed in the ceiling grid for an open office plan at the rate of fixtures per 80 USF. Lighting controls with ambient lighting adjusted per daylight availability, occupancy, vacancy, or other building automation system signals.
Building common restrooms are complete and operational.	
Tappable domestic water riser, service sanitary drain, sanitary vent, ready for extension to tenant demised areas.	
All electrical power distribution panels and circuit breakers available in electrical closets, with capacities at 120/208 volt, 3- phase, 4-wire and 277/480 volt, 3-phase, 4-wire.	
Any portion of a code required alternate power source (emergency generator, Essential Electrical System, etc.), required to support building life safety requirements including but not limited to transfer switches and distribution.	
Designated connection point to the central fire alarm system for extension to tenant demised areas.	All fire alarm devices necessary required by tenant layout and AHJ.
Fire suppression system ready for extension to tenant demised areas.	Sprinkler mains and distribution piping in a protection layout (open plan) with heads turned down, concealed with an escutcheon or trim plate, are installed.
Conduit pathways to distribution backboard within a demarcation room for connection to tenant telecommunications MCR or TR.	
All security requirements designated as “Shell” in the Facility Security Level (FSL) Appendix are complete.	
Proposed and required exterior site (property) improvements required for VA’s use of the premises and local municipality required off-site improvements are complete.	

2.5.2 Tenant Improvement Definitions

2.5.2.1 TIs are the finishes and fixtures that typically take space from the shell condition to a finished, usable condition. The resulting space is complete and meets applicable building codes.

2.5.2.2 TIs are typically items in addition to the items listed in the table above.

2.5.2.3 Section 5 of the L-100 provides minimum requirements of the TI. Any further requirements identified in this LDN to items in Section 5 shall remain TI unless specifically designated as Shell.

2.5.2.4 Typical Tenant Improvements include:

2.5.2.4.1 Electrical wiring, outlets, and horizontal conduit, including cable trays and hooks, within the demised premises. Telephone jacks, data, jacks, and horizontal conduit, including cable trays and hooks, within the demised premises.

2.5.2.4.2 Carpeting or other floor covering; raised access flooring.

2.5.2.4.3 Plumbing fixtures withing the demised premises and all distribution, drainage and vent piping connecting to the building core – except for common bathrooms.

2.5.2.4.4 Partitioning and wall finishes

2.5.2.4.5 Doors, sidelights, frames, and hardware.

2.5.2.4.6 Millwork

2.5.2.4.7 Window treatments

2.5.2.4.8 Adjustments or repositioning of fire sprinkler to avoid conflict with partitioning; additional sprinklers required by code to meet layout.

2.5.2.4.9 VA required signage on site, in the common areas and within the demised premises.

2.5.2.4.10 Additional lighting over the open office layout at a rate of fixtures per 80 USF.

2.5.2.4.11 Exterior site amenities required such as therapy gardens, gait training therapy areas and dining areas (site amenities proposed as building improvements by the lessor shall be shell).

2.5.2.4.12 Interior and exterior components of special systems required such as nurse call and duress systems.

SECTION 3 – PLANNING AND DESIGN CRITERIA

3.1. Background

3.1.1. VHA has committed to the development of a patient-centered medical home model for enhanced outpatient primary care services to veterans. The result was a patient care delivery model and a set of planning and design standards.

3.2. PACT Guiding Principles

3.2.1. An operational and planning design guide was developed which identified key principles and objectives. Refer to PACT Space Module Design Guide under References Section 2.4.

3.3. Community Based Outpatient Clinics (CBOC) Planning Approach

3.3.1. The development of the PACT Planning Module was complimented by the development of a Prototype for Standardized Design and Construction of Community Based Outpatient Clinics. Using the PACT Module as the building block, prototypes were developed for three types and sizes of outpatient facilities.

3.4. Room Data Matrix

3.4.1. A collection of typical rooms within leased CBOCs. It lists the required finishes, STC ratings, ceiling heights, door size and type, hardware sets, HVAC space ventilation, number of electrical receptacles, lighting controls and fixture types, and number of standard density work area outlets for each room type.

3.4.2. The Lessor shall associate rooms listed on the program for design with the room data matrix by room name. Use department level room names and types when available, otherwise use general room/space for like room function.

3.4.3. FGI Equivalent for ASHRAE 170 – Where HVAC space ventilation requirements are omitted, ASHRAE 170 Tables 8-1 and 8-2 shall be followed. Column “FGI Equivalent for ASHRAE 170” lists the equivalent room name for use in the tables.

3.4.4. FGI Equivalent for Table 1.2-5 “Minimum Sound Isolation” - Where Column “STC” in the Room Data Matrix states “See FGI”, Column “FGI Equivalent for Table 1.2-5 Minimum Sound Isolation” lists the equivalent room name for use in FGI Table 1.2-5.

3.4.5. Additional Requirements in this LDN take precedence over the standard in the RDM.

SECTION 4 – TECHNICAL NARRATIVE

4.1 Site/Civil

4.1.1 Pedestrian and Vehicle Access & Circulation

4.1.1.1 Minimum traffic lane width is 12 feet, and minimum sidewalk width is 4 feet. Curves for traffic lanes and radii at intersections must be adequately sized to prevent vehicles from encroaching on an opposing lane of traffic.

4.1.1.2 Primary pedestrian access and circulation paths shall comfortably accommodate two-way wheelchair traffic.

4.1.1.3 An accessible route must be provided from the public right-of-way abutting the site to the accessible building entrance.

4.1.1.4 For one way traffic lanes that are used as fire and emergency equipment access the minimum width shall be 20 feet.

4.1.1.5 Provide a service/loading area designed to accommodate truck (WB-62) maneuverability. Provide canopy for unloading in adverse weather conditions with 14 feet of clearance from grade to the underside of the canopy.

4.1.1.6 Service area shall accommodate vehicles that pick-up trash and recycled materials. Locate service area away from public and patient areas.

4.1.2 Physical Security

4.1.2.1 The physical security requirements are listed in the FSL Appendix as developed by the ISC process.

4.1.3 Parking

4.1.3.1 Parking lots with 90-degree stalls must have minimum parking stall dimensions of 9 feet by 18 feet, and a minimum drive aisle width of 24 feet. Angled parking must have one-way drive aisles with the same stall sizes as 90-degree parking. Angled parking drive aisle width must comply with a published design standard for a designated parking angle.

4.1.3.2 The total amount of accessible parking spaces provided shall be 6% of the total required spaces, unless more is required by local code.

Additional Parking Requirements:

Minimum of 47parking spaces.

4.1.4 Roadway & Walkway Cross Slopes

4.1.4.1 Roads and walks should have a typical cross slope of 2% unless adequate surface drainage is provided by other slope conditions.

Additional Site/Civil Requirements:

4.2 Architecture

4.2.1 General Criteria

4.2.1.1 Refer to Appendix: Room Data Matrix for Door, Hardware and Acoustic requirements listed by Room Type.

4.2.2 Accommodations for Care of Patients of Size

4.2.2.1 Refer to FGI Guidelines for Outpatient Facilities for accommodations for care of patients of size. Minimum requirements are to provide access to a Procedure Room and Procedure Room Toilet in one PACT Module. A 750lb capacity must be used for the design of the space and its contents to include but not be limited to the lavatory, toilet, patient lifts, and necessary infrastructure to support. Additional capacity may be required and listed in the project specific requirements.

4.2.2.2 Rooms that are designed for access by individuals of size as noted on the PFD as Bariatric must have space for bariatric wheelchairs along the whole accessible route from the front doors to the bariatric spaces, to include elevators and lobby doors.

4.2.2.3 Turning Radius, Bariatric must be 1830 mm (6’0”)

4.2.2.4 T-Shaped Turning Space, Bariatric must be 1830 mm (6’0”) x (6’0”)

4.2.2.5 Distance from edge of toilet to side stall, Bariatric must be 915 mm (3’0”)

4.2.2.6 Grab bar configuration must have double swing-up bars with integral toilet paper dispenser.

4.2.2.7 Minimum width of doors in route to bariatric space must be 1220 mm (4’0”)

4.2.3 Acoustics

4.2.3.1 Refer to FGI Guidelines for Outpatient Facilities for acoustics requirements for enclosed rooms. Refer to the Room Data Matrix-Interior Construction for information on rooms not covered under FGI or rooms with special acoustics requirements.

4.2.4 Equipment/Accessories/Furnishings

4.2.4.1 Refer to CBOC Project Contents List and Room Template sheets provided with the RLP for equipment, accessories, and furnishings descriptions and locations. Items to be provided and/or installed by Lessor are noted on the list. Provide partitions, partition backing, and above ceiling structural support as required for wall and/or ceiling mounted equipment, accessories, and furnishings. Provide required utility connections for scheduled equipment.

4.2.5 Signage and Wayfinding

4.2.5.1 Refer to VA Signage Design Guide in Section 2.4 for signage standards and requirements.

Additional Signage Requirements:

N/A

4.2.6 Critical Dimensions

4.2.6.1 Patient-use corridors are to be 6 feet minimum. Staff corridors for transport of supplies from loading dock area to services shall be 6 feet minimum.

4.2.6.2 Patient-use corridor doors must be a minimum of 42 inches wide.

4.2.6.3 Refer to Room Data Matrix – Interior Construction for required ceiling heights by room type.

4.2.7 Entry Canopies

4.2.7.1 Provide non-combustible canopies over the following locations: patient entry to

clinic, ambulance building access point and receiving area/loading.

4.2.7.2 At patient entry, provide a covered patient drop-off zone with space for at least one full size passenger vehicle (19 feet long). The drop-off zone must have minimal change in level from drive aisle to walkway for a minimum length of 20 feet.

4.2.7.3 At ambulance building access point, provide a covered patient drop-off zone with space for at least one ambulance (typical size used in area) and an accessible access aisle.

4.2.7.4 Provide clearance from grade to underside of canopy with for typical emergency and transport vehicles used in the area.

4.2.8 Elevators

4.2.8.1 Where elevators are provided in a leased facility, not less than one elevator car shall accommodate an ambulance stretcher of 24 inches by 84 inches in the horizontal open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall be not less than 3 inches high placed inside on both sides of the hoist way door frame.

4.2.8.2 Where bariatric spaces are above ground level, elevator doors must open minimum 48 inches.

4.2.9 Slab Depressions and Thickened Slabs

4.2.9.1 At new construction, provide slab depression and thickened slabs as required to provide flush threshold installation at audiology booths, MRIs, and other equipment requiring recessed installation or additional structure as recommended by equipment manufacturers. At these equipment locations, concrete slab levelness shall be level and true to meet vendor requirements and shall have a minimum flatness and levelness of FF=45 and FL=35. At existing construction, provide ramp to meet ABAAS.

4.2.10 Millwork

4.2.10.1 Quality compliance to conform to Architectural Woodwork Institute (AWI) and Woodwork Institute (WI) quality standards.

4.2.10.2 Wood Veneer Casework Construction: Combination of custom wood casework and countertops to conform to program and functional requirements. (Location: Lobby, Reception)

- Construction: Flush overlay construction with concealed hinges. AWI custom grade.

4.2.10.3 Plastic Laminate Casework Construction: Custom plastic laminate casework to conform to program and functional requirements. (Location: Typical).

- Construction: Flush overlay construction with concealed hinges, AWI Custom Grade.
- Cabinet Hardware:
  - 4.2.10.3..1 Concealed hinges, all metal, 110-degree opening, self-closing.
  - 4.2.10.3..2 Full extension drawer guides, 100 lbs.capacity.
  - 4.2.10.3..3 Door and drawer pulls: 4” center to center wire pull, 5/16” diameter round, 1 ¼” projection, satin chrome.

4.2.10.4 Solid Surface Fabrications: Hard, solid, non-porous mineral-filled acrylic resin (methyl methacrylate) material in color to be selected by designer. Thickness: 1/2” minimum.

- Locations:

4.2.10.4..1 Transaction tops at nurse stations and reception desks.
4.2.10.4..2 All counters in patient treatment areas to have solid surface countertop with 4” high minimum integral coved side and backsplash.
4.2.10.4..3 Where scheduled as wall protection, provide ¼” thick material with welded seams.

4.2.11 Joint Sealant Systems

4.2.11.1 Joints at plumbing fixtures, ceramic tile to be mildew resistant silicone.

4.2.12 Doors and Frames

4.2.12.1 Refer to Room Data Matrix for door and hardware requirements by room type.
4.2.12.2 Minimum width of any door for patient use not specified in the RDM must be 42”.
4.2.12.3 Finish: Prefinished in compliance with AWI Section 1500.
4.2.12.4 Access Panels:

- Flush stainless steel at toilet areas.
- Flush gypsum board surface with concealed hinges at public and office areas.
- Fire rated steel at rated construction.

4.2.13 Hardware

4.2.13.1 General Note

- Hardware sets shall be provided as per RDM and Section 5 Hardware Groups and Modifiers. Provide extra heavy duty, Grade 1 hardware for all components.

4.2.13.2 Major components and finishes are as follows:

- Cylinders and Keying: Key locks/cylinders in groups with new master key or grandmaster key system as directed by Owner. Provide three (3) keys per lock. Provide construction master keying. Cylinders shall meet the requirements of ANSI/BHMA A156.5-14. If a cylinder lock is required, the locking hardware and master keyed are to match existing GLA Schlage Everest D/ Six Pin IC Cylinders.
- Electronic access control: Electronic access control system/device(s), power supplies (unless otherwise noted in hardware group) and monitoring/alarm(s) are provided with Security System. General Contractor to coordinate the provision and installation of the products. Refer to documents with Security Information for location(s) and type(s) of control(s). Connection by Electrical.

4.2.14 Radiation Shielding

4.2.14.1 For Dental X-Ray Rooms, obtain the services of a physicist to design, specify the level of radiation protection required, test and certifies the installations.
4.2.14.2 Comply with requirements of the National Council on Radiation Protection and Measurement (NCRP) Report, Current Report.
4.2.14.3 Provide lead lining of gypsum wall board, wood doors and hardware, hollow metal frames, and lead glass view window.
4.2.14.4 Lead sheet to be FS QQ-L-201, Grade C, thickness as required by physicist report but not less than 1/16 inch.

4.3 Interior Design

4.3.1 General Criteria

4.3.1.1 Refer to Appendix: Room Data Matrix – Interior Construction for finish requirements listed by room type.

4.3.2 Acoustic Ceiling Tile

4.3.2.1 AT: Acoustical ceiling tile, standard size to be 24”x24”x 1”.

4.3.2.2 AT-SP: Acoustical, scrubbable ceiling tile, standard size to be 24”x24”x 1”, with vinyl- laminated or sealed face and sealed edges.

4.3.3 Concrete Floor Treatment

4.3.3.1 Concrete Sealer (CS): 30 percent clear, non-yellowing, waterborne, membrane-forming curing and sealing compound: ASTM C1315, Type 1, Class A, minimum 30 percent total solids. Comply with ACI 301.

4.3.4 Fiberglass-Reinforced Panels

4.3.4.1 Fiberglass-reinforced panels (FRP): Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319. Fire-Rating per ASTM E 84: Class A. Nominal thickness: 0.09 inch.

4.3.5 Painting

4.3.5.1 Interior painting: Paint (P) and Epoxy Paint (EP): Paint surfaces with primer and two finish coats that are compatible with one another as demonstrated by manufacturer or field experience, unless otherwise indicated.

4.3.5.2 Materials: Use low VOC, low odor latex top coats where indicated. Paint the following items and surfaces:

- Ceilings: Flat latex.
- Walls - gypsum wallboard: Satin latex.
- Walls - concrete block: Semi-gloss latex with block filler.
- Hollow metal doors and frames: Semi-gloss latex over alkyd primer.

4.3.6 Wall Protection & Handrails

4.3.6.1 Rigid Wall Covering (RWC): Nominal thickness .060 inch, high-impact, PVC-free, standard texture, chemical and stain resistant, with vertical, inside and outside trims. To comply with ASTM E84, ASTM F476 and ASTM D543.

4.3.6.2 Corner Guard (CG): Surface mounted assembly for angled corner consisting of a continuous aluminum retainer and vinyl/alloy extrusion in standard texture with ¼ inch corner radius. Size to be 2” width each way from corner. Height to be 7’ from top of base.

- Location: Provide at all outside exposed corners in all clinic corridors outside of public areas as defined by FGI.

4.3.6.3 Corner Guard – Stainless Steel (CG-SS): Surface mounted stainless steel, 3-1/2” wing size, 7’ height, 16 gauge in Kitchen and/or Standard Grade, #4 satin finish.

- Location: Provide at all outside exposed corners in food service areas, loading dock area and heavy use equipment storage areas.

4.3.6.4 Handrails:

- Location: Provide on both walls in all patient corridors.

4.3.7 Window Shades

4.3.7.1 Manually operated window shade, chain driven, vertical roll-up, stainless steel bead chain with hold down clips, extruded aluminum rollers, and bottom slats. Aluminum headbox with endcaps and fascia with powder coat finish. Light gap reduction channels available for black out shades. PVC-free shades, Flame-Resistance Ratings: NFPA 701. Comply with WCMA A100.1. Window treatments should not compromise patient safety.

- Locations:

4.3.7.1..1 Semi-Transparent to be typical, unless otherwise noted.

4.3.7.1..2 Black-out at conference rooms, tele-medicine rooms, optometry exam rooms.

4.3.8 Privacy Curtains / Screens

4.3.8.1 Provide curtain tracks with carriers and hooks (curtains shall be provided by the VA). Tracks shall be of extruded aluminum, ASTM B221, alloy 6063, temper T5 or T6, channel shaped, with smooth inside raceway for curtain carriers. End stop connectors, ceiling flanges and other accessories shall be fabricated from the same material with the same finish as the tracks or from nylon.

4.3.8.2 Provide privacy curtains/screens to encompass adequate space for the healthcare provider to perform examination unencumbered by the curtain and provide a visually private patient changing area that allows the provider to remain in the room.

- Locations shall be per the room contents list.

4.3.9 Flooring, Carpet

4.3.9.1 Rooms specified to receive carpet and also contain a sink shall a minimum 4’ x 4’ area of LVT installed at the sink location.

4.3.10 Special Architectural Conditions for Surgical and Endovascular Services

4.3.10.1 Minimum corridor width shall be 8 feet in patient areas to accommodate passage of equipment or beds, non patient areas where gurneys are not utilized can be a minimum of 5 feet.

4.3.10.2 The Clean Core shall have a ceiling height minimum of 9 feet above finished floor and shall be monolithic and scrubbable.

Additional Architectural Requirements:

N/A

4.4 Mechanical

4.4.1 References

4.4.1.1 The following publications shall be referenced for applicable systems calculations and design information.

- ASHRAE Handbooks.

4.4.2 HVAC Design Basis

4.4.2.1 Indoor design conditions:

- Health care function design conditions shall be in compliance with the requirements of ASHRAE Standard 170, with the Room Data Matrix taking precedence and/or indicating required space design conditions when

ASHRAE 170 do not fully address a space or room type.

- Imaging Equipment Space Design Conditions

4.4.2.1..1 Equipment manufacturer requirements shall be followed.

4.4.2.1. .2 Provide a dedicated computer room and medication room AC unit to cool and control humidity.

4.4.2.1. .3 Provide a computer room type AC unit to cool UPS rooms when segregated from other spaces.

- Basic MEP Equipment Room Design Conditions:

4.7.2.1.5.1 Design conditions shall be as required to ensure tenant space design conditions are maintained.

- Loading Docks:

4.4.2.1..1 Space shall have provisions to limit the intrusion airborne particulate and insects through dock door openings.

4.4.2.2 Outdoor design conditions:

- ASHRAE 99.6% (winter) and 0.4% (summer) conditions associated with the site-specific location.

4.4.3 Air Handling Units (AHUs)

4.4.3.1 For overall building capacity needs greater than 50,000 cfm, multiple AHUs shall be provided.

4.4.4 Exhaust Systems

4.4.4.1 Provide exhaust fans to provide general exhaust for toilet rooms, janitor's closets, soiled utility rooms and similar spaces.

4.4.4.2 Dedicated exhaust fans shall be provided for specialized spaces.

4.4.5 Cooling System

4.4.5.1 Chillers shall employ multiple, independent refrigerant circuits, and shall have capacity control provisions to achieve at least 4 to 1 turndown.

4.4.5.2 Provide unit supported screen wall panels, if roof supported structural screen wall elements are not incorporated.

4.4.5.3 Variable Refrigerant Flow (VRF) systems shall not be considered for VA CBOC projects due to various concerns such as inappropriate system type for healthcare facility applications due to higher amounts of fresh air requirement as well as safety risk to building occupants due to use of high refrigerant volumes and associated potential leaks.

4.4.6 Humidification System

4.4.6.1 Centralized humidification shall be provided when necessary to maintain 30%-60% relative humidity in all seasons. Each air handling unit shall have a dedicated humidifier.

4.4.7 HVAC Piping Systems

4.4.7.1 Provide isolation valves on branch and lateral lines to reduce the amount of space that can be disrupted for maintenance and repair efforts. Provide isolation valves at each equipment connection.

4.4.7.2 For hydronic systems utilized in specific sites with freezing climate considerations, use of propylene glycol and/or proven freeze protection methodologies must be incorporated.

4.4.7.3 When propylene glycol is used, the freezing point of the glycol solution shall be at

least 5°F lower than the minimum annual extreme daily temperature, to prevent the formation of crystals.

4.4.8 Air Distribution and Duct Systems

4.4.8.1 Duct construction shall be as follows:

- Non-ducted Return Air Plenum is not allowed. Flexible duct is prohibited except for the last five feet to connect diffusers.
- Ductwork shall be rectangular, round or flat oval constructed to SMACNA standards.
- Ductwork shall be constructed and tested with leakage classifications and pressure ratings and based on at least 125% of the actual operating pressure of the duct system.

4.4.8.2 Grilles, registers and diffusers shall be steel, aluminum or extruded aluminum with factory finish.

4.4.9 HVAC Insulation Systems

4.4.9.1 All exposed (visible in space) supply and return ductwork in the occupied conditioned spaces shall be provided with rigid insulation with proper seals. Painting and finish requirements shall be coordinated with the finish schedule.

4.4.10 Testing, Adjusting and Balancing

4.4.10.1 An independent third-party NEBB, ABBC or TABB certified test and balance contractor shall be hired by the general contractor to balance and document all air and hydronic systems within project scope. All ductwork shall be constructed and properly sealed in accordance with applicable energy code requirements. All ducts operating at 2 inches water gauge (wg) or greater shall be pressure tested based on code requirements for 3 in wg or greater pressure classification.

4.4.10.2 The balance contractor shall review all plans, components, access, etc. to ensure balancing activities may be successfully performed.

4.4.11 Automatic Temperature Control Systems

4.4.11.1 The system shall provide control of the environment and other parameters and collect historical data on the performance and deviations (alarms).

4.4.11.2 Dedicated thermal control zoning (thermostats) shall be provided for the following:

- each corner space,
- each conference room (or similar),
- each Imaging room,
- each Procedure room (or similar dedicated spaces),
- For typical blocks of rooms arranged together, every 3 exterior offices or exam rooms, or every 4 interior offices or exam rooms shall be permitted on a single zone.

4.4.12 Temperature, Humidity and Pressure Monitoring

4.4.12.1 In addition to monitoring the temperature, humidity and pressure with the BAS, the following room types must have touchscreen local display units mounted on the outside of the room. Units must display the current temperature, humidity and pressure of the room and include visual/audible local alarms when the room is outside of the required parameters.

- Clean and Soiled Rooms (supply, utility, storage, workroom)

- All Decontaminations, Processing, Preparation and Assembly, Sterilization, Storage, Receiving and Dispatch areas withing SPS.
- Operating Rooms
- A-II Rooms

4.4.13 Special Conditions

4.4.13.1 Room Pressurization: Health care function design conditions shall be in compliance with the requirements of ASHRAE 170, with the Room Data Matrix taking precedence and/or indicating required space design conditions when ASHRAE 170 does not fully address a space or room type.

- Positive air balance is designated as (+)
- More positive air balance is designated as (++)
- Negative air balance is designated as (-)
- More negative air balance is designated as (--)
- If the room is not indicated with a specific pressure relationship (blank) or is indicated with NR then there is no requirement.

4.4.13.2 Imaging Areas:

- For HVAC ducts, pipes and devices penetrating shielded walls and ceilings, ensure coordination with the architectural discipline and provide treatment as specified by the equipment manufacturer and medical physicist.

4.4.13.3 Sterile Processing Services

- The SPS suite air system shall operate continuously to maintain required room pressurization requirements. Rooms requiring positive or negative pressurization shall be provided with room pressurization monitors and alarms to alert the SPS staff in the event the room pressure rises/falls above or below the room pressure requirements.
- EtO gas monitors and alarms shall be placed both inside and outside the EtO Gas Sterilization Room and EtO Gas Sterilization Abator Room to alert the occupants in the event of a leak of EtO gas, if provided.
- The decontamination area shall be provided with NFPA 99C-Level clean compressed air system that is separate from patient and other medical air systems provided at the facility.

Additional Special Mechanical Conditions:

N/A

Additional Mechanical Requirements:

N/A

4.5 Plumbing

4.5.1 References

4.5.1.1 The following publications shall be referenced for applicable systems calculations and design information:

- ASPE Handbooks

4.5.2 Plumbing Design Basis

4.5.2.1 Domestic Water Service

- Incoming service water pressure shall be ascertained to determine if adequate pressure is available on site to serve the facility without the use of booster pumps. Coordinate with the water supplier to provide and evaluate historical water data during all seasons.
- If booster pumps are required, they should utilize variable speed drives for pressure control.

4.5.2.2 Domestic Water Heating

- If storage type heaters are utilized, they shall be set to 140 degrees F and a thermostatic mixing valve incorporated to temper the water to 115 degrees for domestic use.
- Provide point of use mixing valves to ensure water temperature is no greater than 110F.
- A looped hot water recirculation system with a bronze in-line recirculation pump shall be provided.

4.5.2.3 Domestic Water Treatment

- The facility water system shall have a building program for risk assessment and Legionella mitigation provisions as needed to comply with ASHRAE Standard 188.
- Water systems suppling critical water for SPS, or water for Dialysis shall meet the requirements of AAMI.

4.5.2.4 Sump Pumps and Sewage Ejectors

- If required, 50/50 duplex submersible sump pump and/or sewage ejector systems shall be utilized.

4.5.3 Medical Gases

4.5.3.1 Central piped medical gases shall be provided where required by FGI or as required by the project specific requirements.

4.5.3.2 All Medical Gas piping shall be maintained and tested as outlined in VA Directive 7515(1). All Medical Gas and vacuum distribution systems and alarms shall be tested by a qualified third-party contractor annually for compliance with NFPA 99, and copies of these tests to be provided to the project COR.

4.5.4 Special Conditions

4.5.4.1 Imaging Areas: For pipes and devices penetrating shielded walls and ceilings, ensure coordination with the architectural discipline and provide treatment as specified by the equipment manufacturer and medical physicist.

Additional Special Plumbing Conditions:

N/A

Additional Plumbing Requirements:

N/A

~~4.6 Electrical~~

~~4.6.1 Standby Generator requirements in the absence of a code required Essential Electrical System~~

~~4.6.1.1 Packaged Engine Generator~~

- ~~An exterior diesel fuel generator, in weatherproof sound attenuated enclosure, kW/kVA size as determined for loads noted below, will be provided supplying emergency power for the facility.~~
- ~~Engine: NFPA 37 compliant.~~
- ~~Cooling System: Closed-loop, liquid-cooled, radiator mounted on generator set base.~~
- ~~Fuel Tanks: 24 hour run time at full load sub-base tank~~
- ~~Engine Exhaust System: Critical silencing muffler.~~
- ~~Combustion Air-Intake System: Filter type air intake silencer, intake duct and connections.~~
- ~~Starting System: Electric with negative ground.~~

~~4.6.1.2 Automatic Transfer Switches: 4-pole switches are required.~~

~~4.6.1.3 Loads shall be determined as per the requirements of the room data matrix. In addition to these:~~

- ~~all medical refrigerators/freezers and safes used to store medication,~~
- ~~laboratory refrigerators/freezers,~~
- ~~HVAC for clean rooms (RME storage),~~
- ~~SPS equipment (one piece of equipment required to maintain minimal operation),~~
- ~~the requirements specified in the OI&T appendix~~
- ~~MRI equipment listed in the PRCL~~
- ~~And any additional requirements listed in the project specific requirements.~~

Additional Electrical Requirements:

No generator requested.

4.7 Lighting

4.7.1 General: At a minimum, lighting systems design and installation shall be designed based on latest edition of the IESNA Handbook, as well as applicable IESNA standards.

4.7.2 Indoor Lighting Specifics

4.7.2.1 For specific room lighting requirements above and beyond IESNA's guidance, refer to Room Data Matrix.

4.7.3 Lighting Controls:

4.7.3.1 Local dual level switching or dimming will be provided in work and office areas to allow occupant selection of lighting level. Refer to room matrix for lighting control requirements.

4.7.3.2 Exterior lighting will be controlled by exterior photocell and astronomic timeclock input through the lighting control relay panel system.

4.7.4 LED Drivers

4.7.4.1 Minimum efficiency of 85%

4.7.4.2 20% THD or less

4.7.4.3 Dimmable in spaces where dimming controls are indicated in RDM.

4.7.5 Special Conditions

- The treatment rooms shall have CRI ≥ 85 and a color temperature between 5000- and 6000-degrees Kelvin (K).

Additional Special Lighting Conditions:
N/A

Additional Lighting Requirements:
N/A

4.8 Telecommunications

4.8.1 Scope of Work

4.8.1.1 The Lessor shall provide the following:

4.8.1.1.1 Telephone cabling, pathways (conduit and cable tray), outlets, faceplates, terminal blocks, backboards, cable terminations and cable testing.

4.8.1.1.2 Data cabling (fiber optic and copper), pathways (conduit and cable tray), outlets, faceplates, patch panels, network equipment racks, network equipment cabinets, cable terminations and cable testing.

4.8.1.2 The VA IT department will provide the following:

4.8.1.2.1 Telephone System hardware and electronics such as voice mail servers and telephone handsets.

4.8.1.2.2 Data network electronics such as concentrators, Ethernet switches, servers, PCs, Wireless Access Points and other electronic equipment.

4.8.2 Pathways

4.8.2.1 Boxes and Conduits

4.8.2.1.1 Voice and data outlets shall be provided with a 4” square by 2-1/8” deep box with a single gang, telecommunication rated work box with a minimum of a ¾” conduit routed up to an accessible ceiling space.

4.8.2.2 Sleeves

4.8.2.2.1 Where cables penetrate through walls, conduit sleeves with bushings on both ends, shall be provided. All penetrations through fire rated walls shall be fire stopped.

4.8.2.2.2 Where cables penetrate through floors of telecommunications rooms, a minimum of four (4) 4-inch conduit sleeves with bushings on both ends shall be provided. All penetrations through floors shall be fire stopped.

4.8.2.2.3 Conduit sleeves shall be sized to be filled with cables to no more than 40 percent of the cross-sectional area of the conduit.

4.8.2.3 Cable Support

4.8.2.3.1 Wire mesh cable tray a minimum of 4” deep x 12” wide shall be provided and supported from the structural steel or concrete structure with a minimum of 3/8” diameter threaded rods to support the horizontal and backbone communications cables along the main pathways above the suspended ceiling space. In finished spaces without a suspended ceiling, provide a minimum of 4” deep x 12” wide Solid Bottom cable tray instead of Wire Mesh cable tray along the main pathways. Cable trays shall be sized to be filled with cables to no more than 50% of the cross-sectional area of the cable tray. Where the cable tray fill ratio exceeds 50% of the cable tray cross-sectional area, provide a larger cable tray or two cable trays.

4.8.2.3.2 A minimum of 12 inches of free access shall be provided and maintained above the cable trays and along one side of the cable trays.

4.8.2.3.3 Where cables are routed in the open outside of the cable tray above the suspended ceiling space, adequate cable support via J-hooks shall be located at a maximum of 48" intervals.

4.8.2.3.4 As per National Electrical Code and TIA-569 standard, the suspended ceiling

support wires or support rods shall not be used as a means of cable support. Cables shall not be laid directly on the ceiling tile, ceiling grid rails, or on the structural steel (bar joists). An independent hanger system shall be used.

4.8.3 Spaces

4.8.3.1 Entrance Facility Room (AKA Demarcation Point- Demarc)

4.8.3.1.1 The Entrance Facility Room is the location where the Local Exchange Carriers and other communications Service Providers such as telephone, data, and MATV/CATV install their cabling and equipment to bring services into the building. It also establishes the physical point where the service provider's responsibilities for service and maintenance end.

4.8.3.1.2 The minimum size of the Entrance Facility Room shall be 80 sq. ft. with an additional 20 sq. ft. for every additional rack required.

4.8.3.1.3 The room shall not be located directly below or adjacent to laboratories, kitchens, laundry, rest rooms, showers, or other facilities where water service is provided.

4.8.3.1.4 Any pipe or duct system foreign to the room installation shall not enter or pass through the room. The design professional shall ensure that foreign piping such as water pipes, steam pipes, medical gas pipes, sanitary waste pipes, roof drains, AC ducts, and other unrelated piping containing liquids or gases are not installed or pass through the room. Sprinkler piping shall not be routed through the room, unless it serves to protect the installation.

4.8.3.1.5 A minimum of (2) 4" conduits shall be installed out to the property line to provide pathways for the services providers to install their cabling.

4.8.3.1.6 All the walls of the room shall be constructed from drywall deck to deck, not just from floor to suspended ceiling height. All the walls of the room shall be covered from the floor to a minimum height of 8'-0" above the floor with 3/4-inch exterior AC grade flame retardant plywood and painted a light color to reflect the room light and reduce dust.

4.8.3.1.7 The lighting shall be a minimum of 500 lux in the horizontal plane and 200 lux in the vertical plane when measured at 3 feet above the finished floor.

4.8.3.1.8 The door shall be a minimum of 36 inches wide and 96 inches high, hinged to open outward and fitted with a card reader security lock.

4.8.3.1.9 Protective cages shall be installed on all water-based fire protection sprinkler heads located within the room.

4.8.3.1.10 The Service Provider IT equipment installed in the Entrance Facility Room will be required to operate 24 hours a day and 365 days a year. The HVAC system shall be designed and installed to maintain a room temperature of 64-75 degrees Fahrenheit and relative humidity of 30-55 percent noncondensing on a 24-hour basis.

4.8.3.2 Main Computer Room (MCR)

4.8.3.2.1 The Main Computer Room is a centralized space for telecommunications and computer equipment that serves an entire building. Typical equipment includes phone switches, voice mail servers, file/application servers, video surveillance storage and Core Ethernet switches. The requirement for an MCR will be dependent upon the size and function of the CBOC.

4.8.3.2.2 The location of the Main Computer Room should be determined after careful consideration. Locations should be avoided that restrict expansion of the room due to building construction such as elevators, mechanical rooms, core

hallways, outside walls, or other fixed building walls. The location should consider accessibility requirements for the delivery of large equipment to the room and be located away from EMI sources that limit EMI field strength to no more than 3.0 V/m throughout the frequency spectrum.

4.8.3.2.3 The room shall not be located directly below or adjacent to laboratories, kitchens, laundries, restrooms, showers, or other facilities where water service is provided.

4.8.3.2.4 Any pipe or duct system foreign to the room installation shall not enter or pass through the room. The design professional shall ensure that foreign piping such as water pipes, steam pipes, medical gas pipes, sanitary waste pipes, roof drains, AC ducts, and other unrelated piping containing liquids or gases are not installed or pass through the room. Sprinkler piping shall not be routed through the room, unless it serves to protect the Main Computer room installation.

4.8.3.2.5 The Main Computer Room shall be dedicated to telecommunications and computer equipment. The room shall not be shared with electrical equipment, heating/ventilating and air conditioning equipment, fire detection systems, or other mechanical systems unless these systems are specifically needed and dedicated to support the computer room and its functions.

4.8.3.2.6 The minimum sizes of the Main Computer Room shall be as follows:

4.8.3.2.6.1 For VA-occupied space less than 25,000 sq. ft. the Telecommunications Enclosure (TE) or Telecommunications Room (TR) will serve as the Main Computer Room.

4.8.3.2.7 All the walls of the Main Computer Room shall be constructed of drywall deck to deck, not just from the floor to the suspended ceiling height. The floor, walls, and ceiling shall be sealed/painted to reduce dust and shall be light colored to reflect room light.

4.8.3.2.8 Flooring materials shall be used that have antistatic properties.

4.8.3.2.9 At least one of the walls of the room shall be covered from the floor to a minimum height of 8’-0” above the floor with 3/4-inch exterior AC grade flame retardant plywood and painted a light color to reflect the room light and reduce dust.

4.8.3.2.10 24” wide ladder racking cable tray shall be provided and supported from the structure above with a minimum of 3/8” diameter threaded rods over the rows of equipment racks/cabinets to support the horizontal and backbone communications cables through-out the Main Computer Room.

4.8.3.2.11 The lighting shall be a minimum of 500 lux in the horizontal plane and 200 lux in the vertical plane when measured at 3 feet above the finished floor in between all rows of equipment cabinets and equipment racks.

4.8.3.2.12 The door shall be 36 inches wide and 96 inches high and fitted with a card reader security lock. Where the *Generic Extra Small Campus Support Center (Data Center) Design Portfolio* has been specified, this shall be a double door 72 inches wide and 96 inches high, without a central mullion.

4.8.3.2.13 Protective cages shall be installed on all water-based fire protection sprinkler heads located within the Main Computer room.

4.8.3.2.14 The IT equipment installed in the Main Computer Room will be required to operate 24 hours a day and 365 days a year. The HVAC system shall be designed and installed to maintain a room temperature of 72-81 degrees

Fahrenheit and relative humidity of 6-60 percent non-condensing on a 24-hour basis.

4.8.3.2.14.1 Where a TE or TR is used as the Main Computer Room for the facility, the environmental condition requirements are 64-75 degrees Fahrenheit and relative humidity of 30-55 percent.

4.8.3.3 Telecommunications Room (TR)

4.8.3.3.1 There shall be at least one Telecommunications Room on each floor. Each work area shall be served by a Telecommunications Room that is located on the same floor that the work area is located. There shall be a minimum of one (1) Telecommunications Room in each building.

4.8.3.3.2 The Telecommunications Room shall not be located directly below or adjacent to laboratories, kitchens, laundries, restrooms, showers, or other facilities where water service is provided.

4.8.3.3.3 Any pipe or duct system foreign to the Telecommunications Room installation shall not enter or pass through the room. The design professional shall ensure that foreign piping such as water pipes, steam pipes, medical gas pipes, sanitary waste pipes, roof drains, AC ducts, and other unrelated piping containing liquids or gases are not installed or pass through the room. Sprinkler piping shall not be routed through the Telecommunications Rooms, unless it serves to protect the installation.

4.8.3.3.4 The location of the Telecommunications Rooms shall be as close as possible to the central core of the building floor to keep horizontal cable lengths to a minimum. Additional Telecommunications Rooms shall be provided where the horizontal cable length from the telecommunications room to the farthest workstation location exceeds 90 meters (295 feet).

4.8.3.3.5 Telecommunications Rooms located on the same floor shall be no farther than 150 meters (500 feet) apart to limit horizontal cable lengths to 90 meters (295 feet) or less.

4.8.3.3.6 The Telecommunications Room shall be dedicated to telecommunications facilities and function. The room shall not be shared with electrical equipment, heating/ventilating and air conditioning equipment, or other mechanical systems unless these systems are specifically needed and dedicated to support the Telecommunications Room and its functions.

4.8.3.3.7 The Telecommunications Rooms on each floor shall be vertically aligned between floors in a multistory building to allow for the ease of installing vertical backbone cabling.

4.8.3.3.8 The minimum sizes of the Telecommunications Rooms shall be as follows:

4.8.3.3.8.1 For facilities from 10,001 to 25,000 sq. ft., provide a 3-rack TR (120sf, 10’x12’ form factor). See sheet 6 of the *CBOC Inside Plant Information Transport Systems Specification*.

4.8.3.3.9 The above sizes should be confirmed with specific IT equipment sizes. The above sizes also assume there are no obstructions in the room such as columns and the rooms are a rectangular shape.

4.8.3.3.10 All of the walls of the Telecommunications Rooms shall be constructed from drywall deck to deck, not just from floor to suspended ceiling height. A minimum of 3 of the walls of the Telecommunications Room shall be covered from the floor to a minimum height of 8’-0” above the floor with 3/4-inch exterior AC grade flame retardant plywood and painted a high gloss white

with two coats of fire-resistant paint. Reserve a minimum of 12” dedicated space in front of the walls to accommodate equipment being mounted to the wall.

4.8.3.3.11 The floor shall be covered with light colored luxury vinyl floor tile to reflect the room light and reduce dust.

4.8.3.3.12 18” wide ladder racking cable tray shall be provided and supported from the structure above with 3/8” diameter threaded rods over the equipment racks and the side walls to support the horizontal and backbone communications cables through-out the Telecommunications Room.

4.8.3.3.13 The lighting shall be a minimum of 500 lux in the horizontal plane and 200 lux in the vertical plane when measured at 3 feet above the finished floor.

4.8.3.3.14 The door shall be a minimum of 36 inches wide and 96 inches high, hinged to open outward and fitted with a card reader security lock.

4.8.3.3.15 Protective cages shall be installed on all water-based fire protection sprinkler heads located within the telecommunications rooms.

4.8.3.3.16 The IT equipment installed in the Telecommunications Room will be required to operate 24 hours a day and 365 days a year. The HVAC system shall be designed and installed to maintain a room temperature of 64-75 degrees Fahrenheit and relative humidity of 30-55 percent non-condensing on a 24-hour basis.

4.8.4 Telecommunications Bonding and Grounding

4.8.4.1 Telecommunications Primary Bonding Busbar

4.8.4.1.1 Each Entrance Facility Room shall contain a Telecommunications Primary Bonding busbar for providing a central location for bonding all telecommunications equipment in the Entrance Facility Room per the TIA-607-D Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, local codes, the VA Electrical Design Manual, and National Electrical Safety Code.

4.8.4.1.2 The Telecommunications Primary Bonding busbar shall consist of a predrilled copper busbar with TIA-607 standard sizing and spacing. It shall have minimum dimensions of ¼ inch thick, 4 inches wide, and the length shall be a minimum of 23 inches. The bonding busbar shall be insulated from its support by a minimum of a 2-inch separation.

4.8.4.1.3 Building structural steel (beams and/or columns) within 6 feet of the bonding busbar shall be bonded to the bonding busbar with a minimum of a 6 AWG copper conductor.

4.8.4.2 Telecommunications Secondary Bonding Busbar

4.8.4.2.1 Each Main Computer Room and Telecommunications Room shall contain a Telecommunications Secondary Bonding Busbar for providing a central location for bonding all telecommunications equipment in the room per the TIA-607 standard.

4.8.4.2.2 The Telecommunications Secondary Bonding Busbar shall consist of a predrilled copper busbar with TIA-607 standard sizing and spacing. It shall have minimum dimensions of ¼ inch thick, 2 inches wide, and the length shall be a minimum of 12 inches. The bonding busbar shall be insulated from its support by a minimum of a 2-inch separation.

4.8.4.2.3 Building structural steel (beams and/or columns) within 6 feet of the bonding

busbar shall be bonded to the bonding busbar with a minimum of a 6 AWG copper conductor.

4.8.4.3 Telecommunications Rack Bonding Busbar

4.8.4.3.1 Racks located in the Entrance Facility Room, Main Computer Room and the Telecommunications Rooms, as well as Telecommunications Enclosures (TEs) shall have a horizontal Rack Bonding Busbar installed in the top of the rack/cabinet in RU 45 (install in the top rear position in TEs) to provide effective bonding of the rack/TE to the Primary bonding busbar or Secondary Bonding Busbar and provide a central location for the bonding of all telecommunications equipment located in the rack/TE per the TIA-607 standard. The busbar shall consist of a pre-drilled copper busbar with TIA-607 standard sizing and spacing.

4.8.4.3.2 The Rack Bonding Busbar shall be bonded to the Telecommunications Primary Bonding busbar or Telecommunications Secondary Bonding busbar in the room with a minimum of a 6 AWG copper conductor.

4.8.4.3.3 Rack mounted IT equipment with integral bonding terminals shall be bonded to the Rack Bonding Conductor (RBC) or to a vertical/horizontal Rack Bonding Busbar (RBB). An RBC is a bonding conductor from the rack or RBB to the TEBC. Each cabinet or equipment rack will have a suitable connection point to which the bonding conductor can be terminated. Properly sized listed two-hole compression lugs or listed terminal blocks with two internal hex screw or equivalent torque characteristics shall be used at the connection point.

4.8.4.4 Telecommunications Bonding Backbone Cable

4.8.4.4.1 The Telecommunications Primary Bonding Busbar in the Entrance Facility room and Telecommunications Secondary Bonding Busbars in the Main Computer room and Telecommunications Rooms shall be bonded to the building grounding electrode system with a bonding backbone cable that is a minimum of a 3/0 AWG stranded copper conductor.

4.8.4.4.2 The building structural steel shall not be used as a replacement for the bonding backbone cable.

4.8.4.5 Bonding of Cable Tray and Equipment

4.8.4.5.1 Cable tray and/or Ladder racking shall be bonded to the Primary Bonding Busbar or Secondary Bonding Busbar with a minimum of an insulated #6 AWG stranded copper conductor and connectors designed for the specific purpose.

4.8.4.5.2 Bonding of other telecommunications equipment in the Telecommunications Rooms or Main Computer Room to the bonding busbars shall be executed as required by the equipment manufacturer.

4.8.5 Equipment Racks and Equipment Cabinets

4.8.5.1 Ensure that IT equipment racks are installed flush to one another without air gaps between the racks. Use appropriate materials to fill gaps between the racks to prevent recirculation of exhaust air to the cold aisle. Meet the following requirements:

4.8.5.1.1 Style: Channel

4.8.5.1.2 Height: 84 inches, Width: 24 inches, Depth: 30 inches minimum.

4.8.5.1.3 Equipment Mounting Width: 19 inches.

4.8.5.1.4 Equipment Mounting Height: 45 RUs.
4.8.5.1.5 Front and Rear rails: EIA threaded or Square Holes for cage nuts.
4.8.5.1.6 Rail Marking: Rack unit markings present on front and rear rails starting at one RU at the bottom.
4.8.5.1.7 Weight Capacity: 2,500 lbs. minimum.
4.8.5.1.8 Cable Management: Built-in overhead water fall and cable management strap attachment points.
4.8.5.1.9 Seismic bracing where required by Code.
4.8.5.1.10 Provide rack PDU brackets.
4.8.5.1.11 Color: White.

4.8.5.2 Equipment Cabinets shall be installed in the Main Computer Room for the housing of the Server equipment meeting the following requirements:

4.8.5.2.1 Style: Enclosed equipment cabinet with side panels and front and rear doors.
4.8.5.2.2 Height: 84 inches, Width: 24 inches, Depth: 48 inches maximum with all doors and accessories installed.
4.8.5.2.3 Equipment Mounting Width: 19 inches.
4.8.5.2.4 Equipment Mounting Height: 45 RUs.
4.8.5.2.5 Front and Rear rails: Square Holes for cage nuts. Toolless adjustable.
4.8.5.2.6 Rail Marking: Rack unit markings present on front and rear rails starting at one RU at the bottom.
4.8.5.2.7 Weight Capacity: 2,500 lbs. minimum.
4.8.5.2.8 Front Door: Single perforated, minimum of 63% open.
4.8.5.2.9 Rear Door: Single solid OR Split, perforated where vertical exhaust ducts cannot be implemented.
4.8.5.2.10 Latches: Keyed lock upgradeable to keyless system compression latch.
4.8.5.2.11 Top panel: Vertical exhaust duct (heat containment) and high-capacity cable access with brush grommets.
4.8.5.2.12 Side Panel: Solid, Locking.
4.8.5.2.13 Bottom Panel: Solid with high-capacity cable access with brush grommets or air dam foam.
4.8.5.2.14 Seismic bracing where required by Code.
4.8.5.2.15 Accessories: Zero U vertical single mount PDU brackets, castors for safe movement of cabinet, leveling legs, and air dam/sealing kit.
4.8.5.2.16 Color: White.

4.8.5.3 Telecommunications Enclosures (TEs) installed shall meet the following requirements:

4.8.5.3.1 NEMA-12 or equivalent construction. Dust seals and replaceable inlet/outlet filters for vents/airflow openings/fans provided. This is required regardless of planned installation environment.
4.8.5.3.2 Filters shall be commercially widely available and initially provided with the TE.
4.8.5.3.3 Environmentally controlled enclosures are acceptable.
4.8.5.3.4 24” minimum width to allow for power and telecommunications cabling management to the sides of rack-mounted equipment.
4.8.5.3.5 24RU in height or larger.
4.8.5.3.6 Unit mounts to ¾” plywood backboard via 16” OC mounting for standard stud construction.
4.8.5.3.7 Unit opens in rear (swings open) for access to rear of installed equipment.

Unit opens in front (swinging front door) for access to front of installed equipment. Both sections are able to be physically locked.

4.8.5.3.8 Adjustable 19” EIA/TIA rack rails. Rear rail kits are required.

4.8.5.3.9 Top and bottom knockouts for cable/conduit entry. All knockouts must be sealable and sealed for liquid and dust entry resistance. The use of a knockout kit to create larger penetrations is acceptable.

4.8.5.3.10 115V fans to remove heat generated in TE are required. Whether these are used as exhaust, intake, or both is not specified.

4.8.5.3.11 Provide TEs with fiber distribution cabinets, fiber cassettes, UTP patch panels, horizontal cable management units, and shelves as required for the specific implementation.

4.8.6 Power Distribution Units (PDUs) and Uninterruptable Power Supplies (UPSs)

4.8.6.1 Equipment Rack and Equipment Cabinet 120/208 Volt PDUs for TRs

4.8.6.1.1 Input: 20 Amp Three-phase; 120/208V, L21-20P Plug.

4.8.6.1.2 Circuit Breakers: 3 x 2 Pole 20 Amp Hydraulic Magnetic breakers.

4.8.6.1.3 Receptacles: (30) C13 receptacles 208 Volt, (6) C19 receptacles 208 Volt, (2) 5-20 receptacles 120 Volt.

4.8.6.1.4 IP and Serial monitoring.

4.8.6.1.5 Ethernet, USB, and Environmental sensor ports.

4.8.6.1.6 Mounting: Vertically on the rear rails of the rack.

4.8.6.1.7 Quantity: Provide two (2) PDUs in each equipment rack in Telecommunications Rooms.

4.8.6.2 Equipment Rack and Equipment Cabinet 120/208 Volt PDUs for MCRs

4.8.6.2.1 Input: 20 Amp Three-phase; 120/208V, L21-20P Plug.

4.8.6.2.2 Circuit Breakers: 3 x 2 Pole 20 Amp Hydraulic Magnetic breakers.

4.8.6.2.3 Receptacles: (30) C13 receptacles and (6) C19 receptacles, 208 Volt.

4.8.6.2.4 IP and Serial monitoring.

4.8.6.2.5 Ethernet, USB, and Environmental sensor ports.

4.8.6.2.6 Mounting: Vertically on the rear rails of the rack.

4.8.6.2.7 Quantity: Provide two (2) PDUs in each equipment rack and each equipment cabinet in Main Computer Room.

4.8.6.3 Equipment Rack and Equipment/Cabinet UPSs for TRs and MCRs

4.8.6.3.1 Input: 20 Amp Three-Phase; L21-20P Plug.

4.8.6.3.2 Output: One (1) L21-20R receptacle

4.8.6.3.3 Capacity: 5 kW

4.8.6.3.4 Run time at full capacity: Minimum of 10 minutes.

4.8.6.3.5 Mounting: Rack or Cabinet 19-inch TIA-310 mounting width.

4.8.6.3.6 Quantity: Provide one (1) UPS in each equipment rack and each equipment cabinet in Main Computer Room and Telecommunications Rooms. (No rack-mounted UPSs are installed in the Extra Small Campus Support Center (Data Center) specified for VA-occupied spaces greater than 50,000 sq. ft.)

4.8.6.4 Equipment Rack and Equipment/Cabinet UPSs for TEs

4.8.6.4.1 Input: 20 Amp single-phase L5-20P Plug.

4.8.6.4.2 Output: One (1) L5-20R receptacle

4.8.6.4.3 Capacity: 2 KW

4.8.6.4.4 Run time at full capacity: Minimum of 10 minutes.

4.8.6.4.5 Mounting: Rack or Cabinet 19-inch TIA-310 mounting width.

4.8.6.4.6 Quantity: Provide one (1) UPS in each Telecommunications Enclosure (TE).

4.8.6.5 Zone Power Distribution Units (PDUs)

4.8.6.5.1 Telecommunications Rooms and Main Computer Rooms with more than one equipment rack and/or more than one equipment cabinet, shall be provided with Zone PDUs used for power distribution to the rack mounted and cabinet mounted PDUs and UPSs.

4.8.6.5.2 Input: Two (2) 30 Amp Three-Phase L21-30P plugs. Power cords on the Zone PDU shall be of sufficient length to reach the supply branch circuit receptacles suspended over the rack or cabinet.

4.8.6.5.3 Output: Four (4) L21-20R receptacles.

4.8.6.5.4 Quantity: One (1) Zone PDU for every two (2) equipment racks. One (1) Zone PDU for every two (2) equipment cabinets.

4.8.6.5.5 Supply Branch Circuits: Provide two (2) 30 amp 3-phase 120/208 Volt (Wye) circuits with L21-30R receptacles for each Zone PDU. If a Generator is installed at the site, connect the branch circuits to a Panelboard connected to the Generator. Suspend the receptacles over the equipment racks/cabinets from the ceiling for each Zone PDU.

4.8.6.6 Equipment Rack and Equipment Cabinet 120 Volt PDUs for TEs

4.8.6.6.1 Input: 20 Amp 120 Volt, NEMA L5-20P Plug.

4.8.6.6.2 Receptacles: Minimum of eight (8) 5-15/20R receptacles.

4.8.6.6.3 Mounting: Horizontal in Rack or Cabinet 19-inch TIA-310 mounting width.

4.8.6.6.4 Quantity: Provide 2 horizontal rackmount PDUs when a Telecommunications Enclosure (TE) is specified.

4.8.7 Telecommunications Infrastructure Plant (TIP)

4.8.7.1 Horizontal Cabling

4.8.7.1.1 Cable

4.8.7.1.1.1 The horizontal cabling shall consist of a minimum of two (2) Category 6A UTP LP rated cables to each work area outlet for voice and/or data. The color of the cable jacket shall be blue.

4.8.7.1.1.2 The horizontal cabling shall consist of a minimum of two (2) Category 6A UTP LP rated cables to each wireless LAN outlet. The color of the cable jacket shall be blue.

4.8.7.1.1.3 The length of the horizontal cables shall not exceed 90 meters (295 feet) from the telecommunications room to the work area outlet or the wireless LAN outlet.

4.8.7.1.1.4 Provide plenum rated cable above ceilings used as a return air plenum.

4.8.7.1.2 Workstation Outlets

4.8.7.1.2.1 Each Category 6A horizontal cable shall be connected to category 6A RJ45 jacks at work area outlets.

4.8.7.1.2.2 Each Category 6A horizontal cable shall be connected to category 6A RJ45 plugs at wireless LAN outlets.

4.8.7.1.2.3 The pin configuration for each RJ45 jack shall conform to the TIA/EIA T568B standard.

4.8.7.1.2.4 Refer to room matrix for work area outlet locations/quantities.

4.8.7.1.2.5 One (1) wireless LAN outlet shall be provided for each 625 square feet of floor space.

4.8.7.1.2.6 The typical standard density work area outlets will consist of two RJ45 interfaces. This provided connectivity for one IP telephone and one workstation.

4.8.7.1.3 Patch Cords

4.8.7.1.3.1 Patch cords shall be factory terminated and shall match the category of the associated patch panel, work area outlet, and horizontal cable.

4.8.7.1.4 Cable Termination Hardware

4.8.7.1.4.1 The Category 6A UTP horizontal cables shall be connected, in the Telecommunications Room, to Category 6A RJ45 48 port rack mounted angled patch panels. Angled patch panels containing more than 48 ports shall not be used. The pin configuration for each RJ45 jack shall conform to the TIA/EIA T568B standard.

4.8.7.1.4.2 The horizontal cables shall be continuous from the angled patch panels to the work area outlet jacks and wireless LAN outlet plugs.

4.8.7.1.4.3 The 48 port angled patch panels shall be mounted in 19-inch floor mounted equipment racks that are 84 inches tall. Wall mounted racks shall not be used except in facilities under 3,000 sq. ft.

4.8.7.1.4.4 Front and rear six (6) inch wide vertical cable managers shall be installed on each side of the 19-inch equipment racks on the end of the row of racks and ten (10) inch wide vertical cable managers shall be installed between each rack.

4.8.7.1.4.5 No more than eight (8) 48 port angled patch panels shall be installed in a single 84-inch-tall equipment rack. This allows for the lower half of the equipment rack to be used to mount Ethernet switches, UPS equipment and other network electronics. If more than eight (8) 48 port angled patch panels are required to terminate the horizontal cabling, then another equipment rack shall be installed.

4.8.7.2 Backbone Cabling

4.8.7.2.1 Cable

4.8.7.2.2 The backbone cable from the Main Computer Room to each Telecommunications Room shall consist of a minimum of one 25-pair Category 5e UTP copper cable and 24 strands of 850 nm laser-optimized (OM4) 50/125 multimode fiber optic cable.

4.8.7.2.3 The backbone cable from the Entrance Facility Room to the Main Computer Room shall consist of a minimum of 100 pairs of Category 5e UTP copper cable and 24 strands of 850 nm laser optimized (OM4) 50/125 multimode fiber optic cabling and terminations.

4.8.7.2.4 For VA-occupied space greater than 50,000 sq. ft and for space between 25,001 sq. ft. and 50,000 sq. ft. where there are clinical services requiring dedicated medical equipment (e.g., radiology, dental, or other imaging functions), two redundant, diversely routed paths for the fiber optic backbone between the Main Computer Room and the Entrance Facility Room and the Telecommunications Rooms are required.

4.8.7.2.5 Provide plenum rated cable above ceilings used as a return air plenum.

4.8.7.2.6 Provide indoor armored fiber optic backbone cable or provide unarmored fiber optic backbone cable installed in inner duct.

4.8.7.2.7 Copper Backbone Cable Termination Hardware

4.8.7.2.7.1 The Category 5e UTP copper backbone cable shall be connected, in

the Telecommunications Rooms, to 24-port rack mounted angled patch panels. (48-port angled patch panels are acceptable if more than one 25-pair backbone cable is specified.) Patch panels containing more than 48 ports shall not be used. One pairs of the backbone cable shall be terminated on each patch panel port (two pairs on port 24).

4.8.7.2.7.2 The RJ45 angled patch panels shall be mounted in 19-inch floor mounted equipment channel racks that are 84 inches tall. Wall mounted racks (TEs) shall not be used except in facilities under 3,000 sq. ft.

4.8.7.2.7.3 Front and rear six (6) inch wide vertical cable managers shall be installed on each side of the 19-inch equipment racks on the end of the row of racks and ten (10) inch wide vertical cable managers shall be installed between each rack.

4.8.7.2.7.4 No more than eight (8) 48 port angled patch panels shall be installed in a single 84-inch-tall equipment rack. This allows for the lower half of the equipment rack to be used to mount Ethernet switches, UPS equipment and other network electronics. If more than eight (8) 48 port angled patch panels are required to terminate the backbone cabling, then another equipment rack shall be installed.

4.8.7.2.8 Fiber Optic Backbone Cable Termination Hardware

4.8.7.2.8.1 The multimode fiber optic backbone cables shall be connected at each end to fiber optic cable connectors in one rack position height angled high density fiber distribution panels located in the Telecommunications Room, Main Computer Room, or Entrance Facility room. The high-density patch panels shall have the capacity to terminate a minimum of 144 strands of fiber optic cabling.

4.8.7.2.8.2 All fiber optic backbone cable strands shall be terminated on fiber optic connectors. No fiber strands shall be left unterminated.

4.8.7.2.8.3 All multimode fiber optic cables shall be factory pre-terminated with Multi-Fiber Push On (MPO) connectors in the Method A (straight through) polarity configuration. The MPO connector at each end of the cable shall be connected to a fiber optic cassette to provide duplex-LC connectors at both ends that will support one or two 12-strand cable assembles or one 24-strand cable assembly for a total of 6 or 12 duplex-LC connectors. Cassettes can also be used, if directed by the VA IT department, to breakout a 24-strand backbone trunk into 3 MPO connectors of 8 fiber strands each to support 40 Gigabit Ethernet parallel transmission capabilities.

4.8.7.2.8.4 The fiber distribution panels shall be mounted in 19-inch floor mounted equipment racks that are 84 inches tall. Wall mounted racks and/or wall mounted fiber distribution panels shall not be used.

4.8.7.2.8.5 Front and rear six (6) inch wide vertical cable managers shall be installed on each side of the 19-inch equipment racks on the end of the row of racks and ten (10) inch wide vertical cable managers shall be installed between each rack.

4.8.7.2.8.6 No more than twelve (12) one rack position height angled high density fiber distribution panels shall be installed in a single 84-inch-

tall equipment rack. This allows for the lower half of the equipment rack to be used to mount Ethernet switches, UPS equipment and other network electronics. If more than twelve (12) one rack position height fiber distribution panels are required, then another equipment rack shall be installed.

4.8.7.3 Installation Requirements

4.8.7.3.1 All cabling shall be installed without twists and kinks. Cables should not be looped around themselves or other objects.

4.8.7.3.2 Use cable management components and techniques to maintain clean, clear, and safe work environment. Do not mount cabling in locations that block access to other equipment inside and outside of equipment racks and cabinets.

4.8.7.3.3 Route cables with gentle loops to avoid damage due to exceeding bend radius limitations. Fiber optic cabling can be easily broken with rough handling or tight bends.

4.8.7.3.4 Cable slack should be concealed within the equipment racks and cabinets either vertically or within cable managers. Slack should not be looped. With the use of correct length cables, there should not be enough slack to require looping.

4.8.7.3.5 Patch cables should follow the side of the IT equipment rack closest to the assigned Network Interface Connection (NIC). Use correct length patch cables.

4.8.7.3.6 Label the cables, equipment cabinets and equipment racks as indicated in the VA Infrastructure Standard for Telecommunications Spaces.

4.8.7.4 Cable Testing

4.8.7.4.1 Horizontal Cable

4.8.7.4.1.1 Prior to the cut-over of the equipment, test 100% of the UTP category 6A horizontal cables for performance to TIA-568-C.2, category 6A, permanent link requirements. The test instrument shall conform to the TIA-1152 Level III-e, measurement accuracy.

4.8.7.4.1.2 Replace and retest any cables that fail to pass the performance requirements.

4.8.7.4.1.3 Record the results of each test with cable identification. The test results shall be given to the VA Office of Information Technology (OIT) for each horizontal cable in electronic format.

4.8.7.4.1.4 The VA Project Manager shall be immediately notified if any horizontal cable fails due to link length.

4.8.7.4.2 Backbone cable

4.8.7.4.2.1 Copper cable

4.8.7.4.2.1.1 Prior to the cut-over of the equipment, test 100% of backbone copper cable pairs for: DC loop resistance, opens, shorts between conductors, reversed pairs, split pairs, and transposed pairs.

4.8.7.4.2.1.2 Replace and retest any cables that fail to pass the performance requirements.

4.8.7.4.2.1.3 Record the results of each test with cable identification. The test results shall be given to the VA Office of Information Technology (OIT) for each backbone cable.

4.8.7.4.2.2 Fiber Optic cable

4.8.7.4.2.2.1 Prior to the cut-over of equipment, test one hundred percent (100 percent) of all terminated backbone fiber strands in both directions with an Optical Power Meter and Light source to ensure the fiber strands meet or exceed the cable performance requirements of TIA/EIA-568.3-D.

4.8.7.4.2.2.2 Test instruments shall meet or exceed applicable requirements in TIA-568.1-D. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

4.8.7.4.2.2.3 Test multimode backbone links in both directions at both operating wavelengths of 850 nm and 1300 nm in accordance with TIA/EIA-526-14-C, Annex A, One Cord Reference Method. The tester shall be encircled flux compliant. The Channel loss shall be 2.5 dB or less for each fiber strand.

4.8.7.4.2.2.4 Replace and retest any cables with fiber strand(s) that fail to pass the performance requirements.

4.8.7.4.2.2.5 Record the results of each test with cable identification. The test results shall be given to the VA Office of Information Technology (OIT) for each backbone cable in electronic format.

4.8.8 Special Systems

4.8.8.4 TV Distribution System

4.8.8.4.2 The Lessor will provide the following: Video cabling, pathways (conduit and cable tray), outlets, faceplates, amplifiers, splitters, backboards, cable terminations, cable testing, basic monthly cable service.

4.8.8.4.3 The VA will provide Monitors.

4.8.8.4.4 A wired television distribution system connected to an antenna system or cable TV utility will be provided. Cabling will consist of 0.50” hardline or RG-11 trunk distribution cabling and RG6 horizontal cabling. Splitters and line amplifiers shall support 750 MHz minimum video bandwidth.

4.8.8.4.4.1 Splitters and amplifiers shall be located in the Main Computer Room and Telecommunications Rooms.

4.8.8.4.4.2 Locations: Waiting Rooms, Conference Rooms, Breakrooms, Police Operations.

4.8.8.5 Nurse Call System

4.8.8.5.2 Provide tone/light nurse call system, including local audible alarm, with patient stations, toilet stations, emergency call stations, staff/duty stations, master station/annunciator, dome lights and area indicators, power supplies and additional accessories as required.

4.8.8.5.3 Nurse Call equipment shall be located in Main Computer Room and Telecommunications Rooms.

Additional Nurse Call Requirements:

Located in Low Voltage space outlined in ASR.

4.8.8.6 Access Control System

4.8.8.6.2 The Lessor shall design, install, and maintain an Access Control System for the facility IAW the Facility Security Level. The system will be compatible with the current GLA Hirsch Velocity system. GLA will be responsible for determining and programing access.

4.8.8.6.3 Access Control equipment shall be located in Main Computer Room and Telecommunications Rooms.

4.8.8.7 Video Surveillance System (VSS)

4.8.8.7.2 The Lessor shall design, install, and maintain an VSS system for the facility IAW the Facility Security Level.

4.8.8.7.3 VSS equipment shall be located in Main Computer Room and Telecommunications Rooms.

4.8.8.8 Intrusion Detection System (IDS)

4.8.8.8.2 The Lessor shall design, install, and maintain an Intrusion Detection System for the facility IAW the Facility Security Level. This includes applicable monthly fees.

4.8.8.8.3 IDS equipment shall be located in Main Computer Room and Telecommunications Rooms. The system will be compatible with the current GLA remote viewing system.

4.8.8.9 Duress Alarm

4.8.8.9.2 The Lessor shall design, install, and maintain a Duress Alarm System for the facility IAW the Facility Security Level.

4.8.8.9.3 Duress Alarm equipment shall be located in Main Computer Room and Telecommunications Rooms.

4.8.8.10 Public Address (PA):

4.8.8.10.2 Provide public address and mass notification (PA) system(s) covering the full VA space. Ceiling mounted speakers shall be located a maximum of 20 linear foot center to center throughout the clinic. The system shall be capable of being dialed into from any telephone for paging. System shall have the capability of paging each zone of the building separately, or to page the entire building. The minimum number of zones shall be equivalent to the number of functional areas listed in the PFD. Review zones with the government during design. The head-end equipment for the public address system shall reside within the Main Computer Room and Telecommunications rooms.

4.8.8.11 Intercommunication System

4.8.8.11.2 Provide intercommunications system(s) and cabling as required. Intercom system shall be located at the loading dock in view of VSS camera. The intercom shall communicate with another intercom and be capable of dialing the front desk. The security office shall have a door release button for the loading dock entrance.

4.8.8.12 Wireless Communications

4.8.8.12.2 The VA space shall be served by two (2) separate wireless networks. The Guest Wi-Fi and VA Wi-Fi networks are separate

4.8.8.12.3 The Lessor shall provide and install the cabling infrastructure for the VA Wi-Fi

network. The final location of the access points will be determined by the VA prior to the installation of said access point devices by the VA. The lessor shall provide one (1) Cat6a cable per 625 SF of ceiling space, one (1) cable in each corner (interior corners of exterior walls) and one (1) cable every 40 linear feet along the interior perimeter of the building. These cables shall be evenly spaced and distributed throughout the ceiling to provide adequate points of connections for the access points. Each cable shall be terminated in a biscuit jack. The VA may develop and provide a coverage area map noting where the Wi-Fi access points will go. In these cases, use the area map provided.

4.8.8.12.4 The Lessor shall provide Guest Wi-Fi access including installation, design, service, and operational costs (including applicable monthly fees). The Guest Wi-Fi system shall be designed to provide 100% coverage with established signal strength and through heat maps as identified by a wireless pre and post area coverage survey and frequency coordination study. Ensure sufficient signal strength to provide "Excellent" signal strength in the Waiting and Reception areas, and "High" signal strength throughout the rest of the Clinic Proper. Guest Wi-Fi may be unsecured and may be from common or adjacent multi-tenant space, provided the system is managed by the Lessor and is not another tenant's signal. The guest Wi-Fi system should be separated from and with no access to VA network.

Additional Special Systems Requirements:

Located in Low Voltage space outlined in ASR.

SECTION 5 - HARDWARE GROUPS AND MODIFIERS

General Notes:

A. Refer to the Room Data Matrix – Doors and Hardware for hardware group and modifier(s) assigned to each door opening. Hardware group modifiers added to numeric hardware group assignments indicate a variation to the group.

B. Refer to Design Narrative for door hardware general notes and product information.

Notes to detailer:

A. Add hardware group modifiers to hardware groups as required to meet program requirements.

B. Add closers and kickplates (push side) at fire rated openings to assigned hardware group.

C. Add overhead stops where stop conditions do not allow for a wall stop.

HARDWARE MODIFIERS

"A" Add armor plate to push side of door(s) and edge guards to hinge and latch edges (both leaves of pairs and both sides of double-acting doors). Omit kickplate if previously scheduled. Confirm compliance with any/all fire-ratings.

"B" Add mop plate to pull side of door. (both leaves of pairs and both sides of double-acting doors)

"C" Add coat hook behind door. Note: Omit coat hook where glass lite prevents installation.

"D" Add delayed-action feature to specified closer(s), if required to attain specified delay time. Set delay for specified closer(s) to 5 – 7 seconds, unless indicated otherwise. DO NOT exceed 10-second delay, unless specifically indicated otherwise.

"E" Add Privacy deadbolt with thumb throws and occupancy indicators on both sides of door. (This is used on exam rooms with a staff entrance and a patient entrance. This additional deadbolt is on the staff entrance door.)

"G" Add perimeter adjustable seals at jambs and head (self-adhesive).

"H" Hospital paddles (facing down)

"J" Add latch protector to specified opening.

"K" Add kick plate to push side of door. (both leaves of pairs and both sides of double-acting doors)

"L" Add lead-lining to all mortise hardware, including roses/escutcheons on locks. Substitute for previously specified hinges, heavy-duty pivot set and intermediate pivots spaced per manufacturers' recommendations. Lead-lined astragal at pairs is provided by door supplier. Refer to Radiation Protection specification section. Provide adequate blocking in wall for wall stops where applicable. NOTE: Installation of hardware must not compromise/penetrate lead-lining in door(s) or frame. (Use appropriate fasteners.)

"M" Add closer holder arm at non-rated openings only.

"P" Add door position switch/contact for doors being monitored/alarmed (both leaves of pairs). Connection by Electrical.

"S" Add perimeter adjustable seals at jambs and head, automatic door bottom (semi -mortised).

"V" Add one-way door viewer at Mental Health rooms if vision lite/glazing is not provided in door.

"W" Add weatherstrip, sweep(s) and rain drip (where applicable). For pairs with fixed astragal by door supplier, furnish/apply gasket strip. For pairs with both doors active, provide split astragal for each leaf. At aluminum assemblies, add rain drips (where applicable and not part of aluminum frame assembly – match door & frame finish), add thermally broken thresholds and sweep(s), integral weatherstrip is provided by door manufacturer.

HARDWARE SETS

GROUP 1 – Hardware Included with Door/Frame Assembly

Door(s)/frame/ hardware is provided as part of complete assembly, unless indicated otherwise. Refer to applicable specification section(s) as indicated for door type on door detail sheet.

Also apply hardware group ”modifier” when/if specifically assigned.

GROUP 11 – Privacy Function Mortise with Occupancy Indicator

Hinges as required

Spring Hinge

Note: Adjust spring hinge to partially close door without latching.

1 each Privacy Lockset w/occ. indicator

Function: Latchbolt is retracted by lever on either side unless inside thumb turn lever locks outside lever.

Operating inside lever or closing door unlocks outside lever. Outside indicator indicates occupancy when door is locked. Outside emergency release unlocks outside lever.

1 each Wall Stop

GROUP 12 – Office Function

Hinges as required

1 each Office Lockset

Function: Latchbolt is retracted by lever on either side unless outside lever is locked by inside turn button.

Key outside retracts latch bolt. Deadlocking latch

bolt. 1 each Wall Stop

GROUP 13 – Classroom Function

Hinges as required

1 each Classroom Lockset

Function: Latchbolt is retracted by lever on either side unless outside lever is locked by key. Key outside locks or unlocks outside lever. Deadlocking latch bolt.

1 each Wall Stop

GROUP 14 – Storeroom Function

Hinges as required

1 each Storeroom Lockset

Function: Latchbolt is retracted by inside lever only. Outside lever is always LOCKED. Key outside retracts latch bolt. Deadlocking latch bolt.

1 each Wall Stop

GROUP 18 – Single Holding Cell, Deadbolt with Outside Key & Pull Plate, No Closer

1 each Continuous hinge

NOTE: Provide hospital tips for doors swinging into detention room.

1 each Deadlock (single-cylinder)

Function: Deadbolt is operated by outside key (no inside operation). Use only at compliant detention/holding cells.

1 each Pull Plate (3/4-in diam with 8-in ctrs and 4-in x 16-in plate, secured with Torx screws

1 each Overhead Stop (adjustable) secured with Torx screws

Note: Verify applicable building codes for impeding exit.

GROUP 33 – Classroom Function

Hinges as required

1 each Classroom Lockset

Function: Latchbolt is retracted by lever on either side unless outside lever is locked by key. Key outside locks or unlocks outside lever. Deadlocking latch bolt.

1 each Closer

1 each Kickplate

1 each Wall Stop

GROUP 34 – Storeroom Function, with Closer

Hinges as required

1 each Storeroom Lockset

Function: Latchbolt is retracted by inside lever only. Outside lever is always LOCKED. Key outside retracts latch bolt. Deadlocking latch bolt.

1 each Closer

1 each Kickplate

1 each Wall Stop

GROUP 44 – Active/Inactive Pair with Automatic Flush bolts & Coordinator, Storeroom Lock with Closers

Hinges as required

1 set Flush bolts (automatic)

1 each Lockset Storeroom Function

Function: Latchbolt is retracted by lever inside only. Outside lever is always LOCKED. Key outside retracts latch bolt. Deadlocking latch bolt.

1 each Coordinator

2 each Closers

2 each Kickplates

2 each Wall Stops

Surface astragal provided by Door Manufacturer/Supplier (matching wood at wood doors, primed flat steel at hollow metal doors), unless indicated otherwise.

GROUP 96.01 – Pair Concealed Vertical Rod Exits/Panics (Metal Doors) with Locked Lever x Exit Only

Hinges

1 each Exit Device

Function: Latch bolts are retracted by inside push rail. No outside

operation. 1 each Exit Device

Function: Latch bolts are retracted by inside push rail and outside lever only when key is in cylinder and turned. Outside access by lever/pull when device is dogged. (at non-rated devices only)

2 each Closers

2 each Kickplates

2 each Wall Stops

1 each Split Astragal Set (if indicated or required by door manufacturer for label requirements)

GROUP 121 – Pushbutton Access Control (Mechanical) with Closer

Hinges as required

1 each Mechanical Pushbutton Lock (storeroom function)

Function: Latchbolt is retracted by inside lever at all times. Key outside retracts latch bolt. Outside lever is LOCKED except when valid user code is entered.

1 each Closer

1 each Kickplate

1 each Wall Stop

GROUP 200 – Electric Lock (Fail-Secure Entry with Integral Request-to-Exit Switch) Via Electronic Access Control System (Refer to Security Documents), with Closer

Hinges as required

1 each Electric Hinge

1 each Electric Lockset (fail-secure)

Function: Latchbolt is retracted by lever inside, key outside, and lever outside when unlocked electronically. Outside lever is LOCKED, unless unlocked electrically. Power off locks outside lever. Rotating inside lever connects/contacts signal switch.

1 each closer

1 each kickplate

1 each Wall Stop

1 each Door Position Switch/Contact Electronic access control system/device(s), power supplies, and monitoring/alarm(s) are provided with Security System. Contractor to coordinate the provision and installation of products. Refer to documents with Security information for location(s) and type(s) of control(s).

Connection by Electrical.

OPERATIONAL DESCRIPTION: Door is normally closed and latched. Manual exit is allowed at all times by rotating inside lever, though signal will be sent. Entry is controlled by electronic access control system which secures/locks and releases/unlocks outside lever for predetermined periods of time. When secured/locked, presenting authorization temporarily unlocks outside lever to allow entry. Interruption of power secures/locks outside lever requiring key for entry. (fail-secure entry)

GROUP 404 – Storeroom Lock (with Integral Request-to-Exit Switch) Automatic Operator and Electric Strike (Fail-Secure Entry) via Electronic Access Control System (Refer to Security Documents)

Hinges as required

1 each Electric Hinge

1 each Lockset Storeroom Function (with request-to-exit signal in lever)

Function: Latchbolt is retracted by inside lever only. Outside lever is always locked. Key outside retracts latch bolt. Deadlocking latch bolt. Rotating inside lever connects/contacts signal switch.

1 each Electric Strike (fail-secure)

1 each Automatic Operator

2 each Actuators

1 each Power Supply (for electric strike, if not included with automatic operator)

1 each Kickplate

1 each Wall Stop

1 each Door Position Switch/Contact Electronic access control system/device(s), and monitoring/alarm(s) are provided with Security System. Contractor to coordinate the provision and installation of products. Refer to documents with Security information for location(s) and type(s) of control(s).

Connection by Electrical.

OPERATIONAL DESCRIPTION: Door is normally closed. Exit is possible at all times – manually by rotating inside lever and automatically by depressing inside wall actuator switch. Electronic access control system/device(s) secures (locks) and releases (unlocks) electric strike and connects & disconnects outside wall actuator to control entry. When secured (locked), presenting authorization

temporarily releases electric strike and connects outside actuator switch to allow manual entry by outside lever and automatic entry by depressing outside wall actuator switch. Mechanical entry is also possible by outside key in lockset, but opening door will alert monitoring. Interruption of power (or fire alarm event at rated openings) disables automatic operator and secures electric strike to close and positively-latch door, resulting in door being locked for entry, requiring key.

GROUP 710.02 – Aluminum pair push bars & pulls with automatic operators (both doors)

2 each Continuous Geared Hinges (match door/frame finish)

2 each Push Bars 1-inch dia. ANSI J501

2 each Offset Pulls - 1-inch dia., 10-inch CTC ANSI J504

2 each Automatic Operators

2 each Actuators

2 each Heavy-Duty Concealed Overhead Stops

Connection by Electrical.

OPERATIONAL DESCRIPTION: Doors are normally closed (no latching). Manual passage through either door is possible at all times. Depressing either actuator will open both doors automatically.

GROUP 850 – Interlocking Automatic Sliding Door System (with Break-Away) via Electronic Access Control System

All mechanical and electrified door hardware is provided by door assembly supplier/manufacturer.

Electronic access control system, request-to-exit device(s), and monitoring/alarm(s) are provided by Security Contractor. Refer to security documents for locations and types of controls.

Connection by Electrical.

OPERATIONAL DESCRIPTION: Doors are normally closed. Manual exit is possible at all times by “breakaway” feature on operable door panel(s). Whenever any door in the system is opened, the remaining doors are automatically and electronically locked in the closed position until the original door is again closed. Consequently, only one door of the system may be open at any one time. Interruption of power and/or fire alarm event immediately releases locks to allow passage through any door.