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EHRM Infrastructure Upgrade

620A4-22-700

VA Hudson Valley Health Care System (VAHVHCS)
Castle Point Campus, Wappingers Falls
Castle Point, NY

BASIS OF DESIGN

100% Submittal

CONSTRUCTION DOCUMENTS 2

SPEESDESIGNBUILD

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EXECUTIVE SUMMARY

The overall intent of this project is to upgrade and improve the Electronic Health Record Modernization (EHRM) Infrastructure of the VA Hudson Valley Medical Center (VAHVMC) campus in Castle Point, New York in support of the ongoing national VA EHRM initiative. This report details the initial site investigation findings and further defines the intended scope of work for the EHRM Infrastructure Upgrades project.

CAMPUS IMPACT

Per the original project SOW and VA-provided Healthcare Environmental and Facilities Management (HEFP) Readiness Assessment of Telecommunications Rooms (TR) locations, 19 existing TR and Telecommunications Enclosures (TEs) and 1 Data Center (DC) of the VAHVMC are within the scope of the project. These locations served as the basis for the A/E 10% Diamond Drawings submittal and subsequent TR and TE location discussions with VA.

TR/TE MODIFICATIONS

VA preferences and A/E recommendations for upgrades, relocations, expansions, and addition of new TR/TEs were based on the 10% SD1 Diamond Drawings study and the VA-provided EHRM Readiness Assessment and as-built documentation. Finalized TR/TE location confirmations were provided by the VA to the A/E on 05/16/2023, which include 33 final TR/TE locations and 1 new construction standalone Data Center facility.

- **09/13/24 UPDATE**

  Upon further field investigation, it was determined that the planned TR location in Building 17, Level 00 (G-014) has a 6'' fire main running overhead through the planned space. The A/E team worked with the VA station to request shifting this planned TR to the adjacent space, G-014A. This request was approved prior to the 95% CD1 submittal.

TR/TE MASTER LIST

Please see the **Appendices** at the end of this document for a Procore link to the **TR Master List** spreadsheet including a full table noting existing TR/TE locations, the above VA and A/E modifications (relocations, consolidations, and new TR/TE locations), and all final TR/TE counts and locations.

VARIANCES AND EXCEPTIONS

Variances:

- Prior to the 95% CD1 submittal, an architectural variance request was submitted (9/12/24) and later approved to account for TRs serving multiple floors and one instance of an existing undersized TR in a healthcare facility. The following TRs serve multiple floors:
  - B.15E – TRs 011A and TR 315
  - B.16 – TR F100
  - B.17 – TR G-203

The ground-level TR in Building 18 (TR 39) is an existing telecommunications space, which does not meet ISTS space programming requirements (10'x10', 100 square feet (SF)). Due to the extremely limited programming space for Sterile Processing Services and Radiology, it was determined by the VA that the existing 2-post rack shall remain, and the A/E will upgrade the HVAC to ensure that cooling is ISTS-compliant.

- Prior to the 95% CD1 submittal, a mechanical variance request was submitted (9/12/24) and later approved requesting a non-standard (environmentally conditioned) TE. This request was made for Building 35 (Boiler Plant), Room 104. The space meets requirements 1 and 2 of Design Alert 7, and was therefore approved.
- Prior to the 95% CD1 submittal, an electrical variance was submitted (9/12/24) and rejected. This variance request relates to existing FPE distribution panels located Buildings 17, 19, 20, and 21. After several breakout meetings involving the A/E electrical team, the VA station, and HEFP leadership, the VA's VISN 2 engineering representative provided direction to the A/E design team, via RFI #038 (Procore), concurring with the A/E's proposed design solution.

Exceptions:

- The updated 100% CD2 Exceptions Memo is included in the **Appendices**, which can be located at the end of this document, and contains a link to the Procore location for this document.

DESIGN ALERT 15

The A/E and VA station discussed the options related to Design Alert 15 prior to the 95% CD1 submittal. The A/E documented this discussion as part of RFI #032 (Procore), noting that the preferred direction is to proceed with use of DX / VRV cooling for TRs. The A/E originally provided the draft Abeyance Form as part of this RFI response, but also sent a revised and updated form to the VA COR on 10/29/25, prior to the 100% CD2 submittal.

DESIGN ALERT 16

The A/E design team conducted a comprehensive existing telecommunications infrastructure survey during the design development phase, which detailed the existing Work Area Outlet (WAO) locations and densities to the greatest extent possible. Additionally, this survey noted existing Wireless Access Points (WAPs), fire alarm panels, access control panels, and other related systems and equipment, along with spot-checks of existing cable trays and conduits for capacity and location. The A/E's design intent from the outset of the EHRM design has been to utilize Standard Density (SD) 2-port WAOs (no 1-for-1 replacement of existing) and High Density (HD) 4-port WAOs with discretion and at the direction of the VA station. The VA provided the SEP-generated Active Port Counts document (RFI #033), which the A/E reviewed in conjunction with the previously conducted telecommunications infrastructure survey and review comments from the VA station. These documents informed the A/E's current telecommunications plans, which are included with the 100% CD2 design drawings.

DATA CENTER – DESIGN NARRATIVE & TIMELINE

Details of the Data Center design narrative and timeline prior to the 95% design phase can be found in both the 35% SD2 and 65% DD1 Basis of Design documents. For sake of brevity, this narrative update focuses specifically on the design updates that occurred during the 95% design phase.

95% CD1 R1:
Upon review of the most recent version of the VA's Physical Security Resilience Design Manual, the A/E determined that moving the generator's fuel tank from the basement level Generator Enclosure room to an exterior location would be the most prudent design to meet all PSRDM and NFPA code requirements. The A/E design team has relocated the fuel tank in a blast-resistant enclosure roughly 25' feet east of the planned Data Center, adjacent to B.111. This location has been vetted to meet the 50' blast standoff requirements, which will be enforced with the blast-resistant enclosure and bollards restricting access to the upper paved parking area. This design is updated across all discipline sheets.

DESIGN PARAMETERS

U.S. Department of Veterans Affairs, Office of Construction & Facilities Management Design and Construction Standards, latest version
VA Infrastructure Standards for Telecommunications Spaces v3.1, July 1, 2021
VA Telecommunications and Special Telecommunications Communications Design Manual, February 2016
VA Standards Alert 017 OIT Infrastructure Standards for Telecommunications Spaces, August 1, 2021
ANSI/TIA-526: Standard Test Procedures for Fiber Optic Systems.
VA Office of Information and Technology Design Guide
VA Security and Law Enforcement Handbook
VA HVAC Design Manual
VA Master Construction Specifications (PG-18-1)
VA Design & Construction Procedures (PG-18-3)
Standard Details & CAD Standards (PG-18-4)
Equipment Guide List (PG-18-5)
Space Planning Criteria, & VA-Space & equipment Planning Systems (VA-SEPS) (PG-18-9)
Design Manuals (by discipline) (PG-18-10)
Design Guides (graphical, by function) (PG-18-12)
Barrier-Free Design Guide (PG-18-13)
Room Finishes, Door, and Hardware Schedules (PG-18-14)
Minimum Requirements for A/E Submissions (PG-18-15, vol. C&F)
Environmental Planning Guide (PG-18-17)
Physical Security Design Manual for VA Mission Critical Facilities
VA Handbook 0730/4 Security and Law Enforcement
VA Interior Design Manual for New Construction & Renovations of Hospitals/Clinics
VA Signage Design Guide
VA Sustainable Design Manual
TIL Alerts: A/E Quality, Design, & Standards Alerts
Homeland Security Presidential Directive 12 (VA Directive 0735)

Federal Information Processing Standards Pub. (FIPS-201-1)
Federal Information Processing Standards Pub. (FIPS-140-2)
Government Smart Card Interoperability (GSC-IS) (IR 6887 V2.1)
Electronic Authentication Guideline (Special Pub 800-63)
Security Controls for Federal Information Systems (NIST Sp. Pub. 800-53)
Equipment Guide List (H-7610)
Hardware (Equipment Symbols) (H-08-6)
VAMC Approved Hardware Locking Standards (H-08-6)
Seismic Design Requirements (H-18-8)
International Building Code (IBC) Latest Edition
International Mechanical Code (IMC) Latest Edition
National Fire Protection Agency (NFPA) Latest Edition
OSHA Standards
National Electric Code Latest Edition
HEFP SEP Design Alerts 1-9, 10-16
Other codes and standards as indicated in the project SOW.

ARCHITECTURAL NARRATIVE

EXISTING SPACES

Existing IT closets/rooms are typically unfinished spaces (in some cases spaces with painted Gypsum Wall Board [GWB]) with plywood walls, unfinished concrete flooring or vinyl composite tile (VCT), and ceilings open to structure.

Existing corridors typically include resilient base and VCT. Healthcare spaces may also include handrails or bumpers for beds/carts.

*Design note: The ideal design goal in selecting viable TRs is identifying spaces no smaller than 10'x10' (clinical spaces) or 8'x10' (admin spaces), which allow for the appropriate 3-foot clearance around each side of the IT racks. These criteria most closely align with VA standards, and the A/E understands that it may not be possible, in certain circumstances, to meet these exact dimensions. In situations where TRs are smaller than the ideal, and where there are no viable alternatives, the A/E has worked closely with the VA to find solutions that best met the design criteria intent. Any spaces that do not meet the intended form-factor space requirements have been submitted to the VA station for further review via formal Exception Memo.

SPACE MODIFICATIONS

Existing finished spaces that will be repurposed for IT spaces will have walls painted white, ceilings open to structure, and anti-static coated exposed concrete floors. Wall finishes will remain and fire-retardant-treated plywood will be installed around the room to allow mounting of equipment and panels. All walls and plywood will be painted white (*fire rating markings left unpainted), and ceilings will be left open to structure. If there are any walls which do not extend to interstitial/structure, such walls will be extended to meet the structure above. Concrete floors that exist shall remain, and any finished flooring (carpet, VCT, sheet flooring, tile, etc.) will be removed – surface material and adhesive/mastic included – leaving exposed concrete flooring, which will be treated with anti-static coating. Spaces that do not have concrete subfloors will have anti-static VCT installed instead. Cutting and patching of walls will be made as necessary to add new conduits, data outlets, patch panels and any other modifications within the TR. Any wall penetrations in the interstitial space will be patched/sealed for space environmental control. Where existing doors/frames are to be replaced, new doors/frames shall fit within the existing conditions. Other doors/frames being replaced will have new wall infills. These walls will also be repainted to the next natural break to ensure an even paint color.

The A/E team prefers not to locate or expand TRs into existing exit access corridors / hallways due to the NFPA 101 requirement for full occupancy egress analysis and to reduce any incidental construction costs associated with changing the use or altering occupant egress. When no alternatives are reasonable, corridors are modified to create new direct access to TRs. All modified corridors have been adjusted/modified to maintain the existing appearance and all features will be terminated appropriately to ensure a clean, finished look is maintained throughout the campus. In some specific areas, the VA's

request for 8' doors may not be feasible due to existing conditions. The A/E will maintain standard-height doors in these areas due to conflicting ceiling heights within corridors and among other elements. The A/E provided appropriate Exceptions Memorandums noting any design deviations, which have been submitted for approval through the formal Station Inquiry process.

EXTERIOR DIMENSIONS/TOTAL BUILDING GROSS AREA

This project consists of renovations to existing structures as well as the creation of a new, standalone Data Center and TR tower (B.15E/H). The new Data Center will be constructed on campus, and the total gross SF area added is approximately 4500 SF. The TR tower serving floors 1-3 of Buildings 15E and 15H adds a total gross SF area of approximately 100SF.

EXTERIOR BUILDING ELEVATIONS

Exterior elevations are provided for the new Data Center building and TR Tower for Buildings 15E and 15H. Otherwise, exterior elevations will only be utilized if needed to depict any vertical fiber runs planned to provide the building secondary fiber lines. At this point all fiber runs are anticipated to be located in building interiors and therefore elevations will not be required.

FIRE AND SMOKE RATED PARTITIONS

Life safety sheets include all fire rated assemblies and smoke barriers within the facilities to assist the contractor in identifying fire stopping requirements. Cable runs throughout the facility that disrupt these barriers are noted, and it is imperative for the contractor to recognize the specific number of fire sleeves that will be required for the project. All doors that are replaced during this project to ensure appropriate physical security requirements are met are replaced by assemblies that meet all current building codes and VA design requirements.

LEAD / ASBESTOS ABATEMENT

An Asbestos and Lead-Based Paint Good Faith Survey has been completed and is included with the 100% submittal appendices to identify the presence, location, quantity, and condition of all asbestos-containing materials (ACMs), lead-based paint (LBP), and/or mold impacted building materials present within areas defined in the project SOW.

Given the nature of renovation schedule for TR rooms, each room listed in the Executive Summary was subjected to a detailed assessment of asbestos, lead, and/or mold-impacted building components. Bulk sampling was collected to ensure that all suspected hazardous building materials likely impacted by the project are identified, quantified, and assessed.

The site survey was completed by an environmental professional carrying all necessary New York State licensing and certifications required by law and/or by the Contract Documents. The survey was performed in accordance with all applicable local, State, and Federal laws and regulations pertaining to asbestos and lead building inspections. All asbestos bulk samples were collected and analyzed in accordance with EPA-approved polarized light microscopy (PLM) methods only. Lead-based paint testing was performed using standard x-ray fluorescence (XRF) direct reading instruments.

*Please see **Appendices** which provides a Procore link to the Good Faith Survey Asbestos and Lead Report in full.

100% DESIGN UPDATES

- Building1, Level 00B: Relocation of the telecommunications enclosure to a nearby column. Metal furring is provided around this column per structural recommendations to provide a full-width backing for TE mounting, and to provide space for plywood on walls to mount any accessory equipment.
- Data Center Generator Fuel Tank Enclosure (Outside of B.111): Footings have been updated to match structural footings, and the equipment pads have been expanded to be slightly larger than the supported equipment, per mechanical recommendations. Doors to the enclosure have been modified slightly to avoid conflicts with the expanded pads.
- Data Center Mechanical Room (B.115): Floor drains have been added, per mechanical recommendations, and floor sloped to the appropriate drains.
- Data Center Generator Room (B.115): Sump pit has been shifted and detailed per mechanical requirements. One of the louvers has been resized (~2' taller) per mechanical request.
- Data Center Restroom: Enlarged plans and interior elevations added to the drawing set. The equipment schedule for equipment is also included along with updates to the finish schedule.
- Signage: Updated signage schedule includes new signs for the new fire extinguisher cabinets.
- TRs: Some doors opening into existing corridors were deemed to open too far into the corridor and have been revised to swing inwards. Locations include Building 7, Level 1 and 2; and Building 8, Level 1.
- Data Center Fire Extinguisher Cabinets (FECs): Cabinets have been relocated to just outside of the doors entering the Main Computer Room (MCR).

INFECTION CONTROL RISK ASSESSMENT (ICRA) NARRATIVE

See specification 01 35 26 – Safety Requirements for specific ICRA class requirements.

ICRA barrier details are provided including ICRA construction type, risk, and class requirements; all information is implemented within the aforementioned Safety Requirements specifications. The A/E's ICRA plans are preliminary and based upon meetings with the VA COR, Infection Controls Staff, and/or Industrial Hygienist (CIH) / Epidemiologist pertaining to local VA standards and document-specific controls necessary at the Castle Point VAMC. The A/E design team understands that the preliminary plans provided by the A/E for Phasing and ICRA recommended barriers require the VA COR and Infection Controls Staff to coordinate and update these "means and methods" preliminary designs with the contractor during construction. The A/E has included specific requirements for the contractor to coordinate with the VA prior to work to ensure higher risk areas are addressed properly. It is the responsibility of the contractor to verify all ICRA details and requirements with the COR and related VA staff prior to construction activities.

CONSTRUCTION TYPE – Type B / C / D

TYPE B: The majority of the construction work outlined in the SOW that can be isolated and contained to individual rooms will be **TYPE B** – General maintenance and repair work. For this specific project, activities classified as TYPE B can be quantified as the major re-cabling efforts needed to bring new Cat 6a cables from TEs/TRs to Work Area Outlets (WAOs) as well as running condensate line piping from TR/TEs to condenser units. The construction activities can generally be defined as follows:

- **Prolonged inspection and work that may take longer than a single shift but not exceeding a week.**
- **Patients and employees are not to be in the area until activity is completed.**
- **Work that creates minimal dust a debris.**
- **Interior finish or surface repairs**, updates, or modifications such as repair of firewalls and barriers, and new flooring that produces minimal dust and debris. Controlled sanding activities (e.g. wet or dry sanding) that produce minimal dust and debris.
- Plumbing work such as installation or replacement of a single fixture or **piping for a single fixture**. Any work on sanitary plumbing including snaking of drains.
- Electrical work such as **installation of cabling/wiring/conduit for a single device**, installation of new device such as a light fixture that produces minimal dust and debris.
- Air Handler and/or fan shutdown/startup and HVAC work such as replacement of a single diffuser, single terminal unit or a single device that produces minimal dust and debris.

To the greatest extent feasible, all existing conduit will be reused, greatly limiting the amount of dust/debris created during construction activities.

TYPE C: Some of the construction work as indicated by the SOW will likely be **TYPE C** – Small-scale construction, renovation, or maintenance. This work can be quantified as the TR renovation activities that can be isolated to the individual TR/TEs. This work includes, but is not limited to, the following activities:

- **Work requiring longer than a single week to complete but not exceeding 6 months.**
- **Patients and employees are not to be in the area until activity is completed.**
- **Demolition/removal of preexisting floor covering, casework, lay-in ceiling, or other architectural elements.**
- Demolition/removal of more than 32 ft^2 of drywall/framing, hard ceilings, and doors/framing and minimal infrastructure such as electrical circuits and branch piping.
- **Installation of new walls, ceilings, and doors including framing, drywall/plaster, and associated work.**
- Plumbing work such as the installation of new sinks, showers and toilets, and associated plumbing.
- Shut down of sections of potable water systems.
- **Electrical work such as installation of conduit and wire for lighting, receptacles and switches for an area**, the installation of conduit and wire for new devices such as terminal units, fans, etc.
- **Modification of existing fire alarm and suppression systems**.
- Mechanical work such as the installation of ductwork, diffusers, and terminal units for an area.

TYPE D: The construction work involved in the creation of the standalone Data Center will likely be **Type D** – Large-scall construction, renovation, or maintenance. This includes, but is not limited to, the following activities:

- Work exceeding 6 months in duration
- **Patients and employees are not to be in the area until activity is completed**
- Large-scale demolition of building components and infrastructure including removal of multiple doors, walls, framing, ceilings, flooring, piping, electrical and HVAC.
- **The installation of building components such as new walls, ceilings and doors, including framing, drywall,** and associated plaster work.
- **Plumbing work such as the installation of**:
  - New medical gas systems
  - Steam/heating hot water, **condensate systems**
  - Multiple sinks, showers, and toilets including associated plumbing
- Shutdown of potable water, steam/heating hot water, condensate, and medical gas systems
- **Electrical work such as installation of electrical feeders, distribution panels, conduit and wire for lighting, receptacles and switches for an area, the installation of conduit and wire for new devises such as terminal units, fans, etc**.
- **Installation of fire alarm and suppression systems**
- Electrical shutdown of multiple panels
- **Mechanical work such as the installation of air handling equipment, associated ductwork, diffusers, heat exchangers, terminal units and controls**.

RISK LEVEL: LOW / MEDIUM / HIGH

Construction activities take place across several distinct programming areas of the VAMC, and the risk levels vary depending on the nature of the VAMC programming where TR/TEs are located.

Risk Level	Low	Medium	High	Highest
Patient Risk Groups	• Office areas • Non-patient care areas • Prosthetics	• Cardiology • Echocardiography • Nuclear Medicine • Physical Therapy • Primary Care • Radiology • Respiratory Therapy • Mental Hygiene • Ultrasound Domiciliary	• Urgent Care • Emergency Room • Endoscopy • Laboratories (Specimen) • Outpatient Surgery • Pharmacy • Surgical Inpatient • Medical Inpatient • Psychiatry Inpatient • Surgical Units • Nutrition and Food • Canteen Service	• Any area caring for Immunocompromised Patients • Central Sterile Supply • Intensive Care Units • Negative Pressure Isolation Rooms • Oncology • Operating Rooms • Any Invasive Treatment/Procedure Room • Pharmacy Admixture

ICRA CLASS REQUIREMENTS: CLASS II / III / IV

VHA ICRA Matrix - 2023		Activity Category			
		A	B	C	D
Patient Risk Category	Low Risk	I	II	II	III
	Medium Risk	I	II	III	IV
	High Risk	I	II	IV	IV
	Highest Risk	II	III	IV	IV

Per the Infection Controls Matrix (above), all TR/TEs (Construction Type C) located in Low-Risk Group areas will be considered Class II ICRA, TR/TEs located in Medium-Risk Group areas will be considered Class III ICRA, and TR/TEs located in the High- and Highest-Risk Group areas will be considered Class IV ICRA.

Rooms that will be re-cabled (Construction Type B) will span Classes II, III, and IV ICRA precautions. While this construction work creates minimal dust/debris which can be isolated within individual rooms, due to the nature of sensitive patient care areas, stringent precautions will be taken to ensure no dust/debris enters corridors and or HVAC ducting. The Contractor shall take great care in adhering to VA

standards and shall work closely with the VA COR and Infection Control Staff / Station Epidemiologist during construction to ensure phasing areas are worked on in alignment with all ICRA standards.

See the below chart which outlines ICRA precautions for each ICRA class:

ICRA CLASS II REQUIREMENTS
Before and During Construction: 1. Perform work activity in a manner that creates minimal dust. 2. Immediately replace any ceiling tile, close access panels, etc., upon completion of work. 3. Any materials and equipment being brought into the facility must be free of contaminants and loose material. 4. Provide active means to control airborne dust from dispersing into occupied areas and/or water mist surface to control dust (e.g., Mobile Dust Containment Cart or some other system). 5. Ensure worker clothing is clean and free of visible dust before leaving the work area. 6. Remove or isolate air diffusers (supply and return) to protect the HVAC system from dust and reduce air turbulence. Rebalance system to address diffuser isolation. 7. When the work involves or impacts potable water systems including stagnation due to reduced usage, the piping shall be flushed twice a week or isolated from the main system. 8. Seal doors to prevent dust migration. 9. Contain all trash and debris in the work area. Perform daily cleaning and disposal of trash (covered) from work area using an identified exit route. 10. Any equipment, tools, or materials removed from the work area must be in sealed containers and/or cleaned of dust and debris prior to removal from the area. 11. Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. 12. Install a sticky (dust collection) mat at entrance of contained work area based on facility policy. Sticky mats must be changed routinely and when visibly soiled. 13. Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces at least daily. **Upon Completion of Project:** **Cleaning:** 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. **HVAC Systems:** 1. Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. 2. Verify the HVAC systems meet original airflow and air exchange design specifications.

Water systems:

1. Until the potable water system is activated and in use, flushing shall continue at least twice per week in accordance with VHA Directive 1061.

ICRA CLASS III REQUIREMENTS

Before and During Construction:

1. **All control measures listed above and the following in addition:**
2. Ensure availability of equipment for cleaning hands.
3. Construct and complete critical barriers meeting NFPA 241 requirements. Barriers must extend to the ceiling or if ceiling tile is removed, to the deck above.
4. All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to floor and ceiling (or floor/roof deck above) and secure from movement or damage.
5. Seal all penetrations in containment barriers, including floors and ceiling, using approved materials (UL schedule firestop if applicable for barrier type).
6. Maintain .01 inches /water gauge negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors (unless a work specific waiver is approved by VHA's Office of Healthcare Engineering); this must be maintained continuously 24/7 for the duration of the project. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows is not required to be HEPA-filtered. Exhausting discharged air into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is prohibited.
7. Install a differential pressure sensing device (e.g., magnehelic, manometer, or digital monitoring) on exterior of work containment to continually monitor and document negative pressurization. The "ball in the wall" or similar apparatus are not acceptable.

Upon Completion of Project:

***Construction areas must be inspected by an infection preventionist and engineering representative (and others as determined by the facility) for final activity/project close out and removal of infection prevention and control measures.**

Work Area Cleaning:

1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials.
2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces.

Removal of Critical Barriers:

1. Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed. Additional cleaning may be needed after removal of barrier.
2. All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust

release. Use the following precautions when removing hard barriers:

i. Carefully remove screws and painter tape.
ii. If dust will be generated during screw removal, use hand-held HEPA vacuum.
iii. Drywall cutting is prohibited during removal process.
iv. Clean all stud tracks with HEPA vacuum before removing outer hard barrier.
v. Use a plastic barrier to enclose area if dust could be generated.

Negative Air Requirements:

1. The use of negative air must be designed to remove contaminants from the work area.
2. Negative air devices (fans, filters, monitoring and documentation equipment) must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers.

HVAC systems:

1. Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed.
2. Verify that HVAC systems are clean and operational.
3. Verify and document through a TAB the HVAC systems meets original airflow and air exchange design specifications.

Water systems:

1. Until the potable water system is activated and in use, flushing shall continue at least twice per week in accordance with VHA Directive 1061.

ICRA CLASS IV REQUIREMENTS

Before and During Construction:

1. **All control measures listed in Class II and Class III in addition to the following:**
2. Barriers must be hard barriers unless temporary to install final barrier.
3. Containment must include an anteroom to ensure pressure control. Anteroom must be large enough for equipment staging, cart cleaning, workers' PPE and cleaning.
4. Worker clothing and/or PPE must be removed or clean and free of visible dust before leaving the work area anteroom. HEPA vacuuming of clothing or use of cover suits is acceptable.
5. Workers must wear shoe covers or have a method to clean shoes in anteroom. Shoe covers must be removed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be changed immediately.

Upon Completion of Project:

6. ***See Class III above**

PHASING PLAN

A/E worked with the VA COR and station personnel to create a comprehensive phasing plan focused on minimizing disruption to staff functioning and patient care, as well as accounting for the planned construction of the new Data Center facility. Per the SOW, the construction schedule determined should ensure the least disruption to VAMC operations, limiting simultaneous construction of IT closets and any associated downtimes. A/E provided the detailed phasing plan included in drawing notes (AS sheets) as well as in the **General Requirements specification 01 00 00** (Section 1.6.J) to ensure the least disruption to station functioning. With VA direction, phasing plan provides suggested appropriate construction sequence (by building, floor, programming, etc.), including the maximum number of TRs that may be under construction simultaneously.

A/E recommends the following sequence of construction activity:

Phase 1 Overview – Campus Infrastructure

**Same-numbered items can be performed concurrently*

1a. Civil duct-banks system installed.
1b. Build new telecom rooms at new locations and/or expand existing TRs as required.
2a. Pull New A/B fiber backbone cables through duct-banks and buildings to existing, expanded, or new TRs~~.~~
2b. Install any ties from old TRs to new TRs. *Please see **Reference #2**
2c. For new MCR construction, once commissioning is complete and approved by the VA, Contractor to install Fiber ties from old MCR to new MCR. Once fiber tested and certified, Contractor to notify VA to commence with equipment migration from old MCR to new MCR – 3-6 months
2d. Unbolt existing racks and shift locations for installation of new grounded racks in existing/expanded TRs. *Please see **Reference #3**
2e. Install new racks, cable managers and pathways in new (and expanded/existing) TRs.
2f. Install new cabinets in new Data Center.
2g. In Building TRs, Terminate new fiber in new fiber housings in new racks.
2h. In Data Center, terminate fiber in new fiber housings in new fiber distribution cabinets.
3. Test / new fiber and get approval from station.

Phase 2 Overview – Work Area Outlet (WAO) Replacement and TR Cutovers

**VA to provide ONLY (10) new switches to OIT for TRs to maintain existing switches in existing racks*

4 VA to activate OR relocate Core B switch to new Core B cabinet in new MCR. Patch new fiber backbones to new or relocated core switch to each TR to be fed. VA to connect B side Core Router to A side Core Router via 288 strand Umbilical cable between existing MCR and New MCR.

5a Activate fiber in new TRs through B Side.

- Existing/Expanded TRs - Provide new fiber jumpers from new fiber panels back to existing switch(es), disconnect existing fiber.
- New TRs - Provide temporary fiber backfeed to existing TR location and patch into existing switch(es), disconnect existing fiber.

5b Submit cutover plan for VA Approval and schedule the installation of new Cat 6A cables on a room/department by room/department basis from new TR racks to existing devices WAOs and cutover outlets the same night. *Please see **References #4, #5, #6,** & **#7**

- Identify any buildings requiring after hours work for VA Support
- See phasing sheets and Specification 01 00 00 for specific Building and phasing area work requirements.
- End users, service lines, COR and OIT are notified and ready.
- See WAO cutover steps below for detailed action plan

6 VA to relocate existing Core A switch to new Core A cabinet in New MCR. Patch new fiber backbones to new or relocated core switch to each TR to be fed.

7 Activate fiber in new TRs through the A Side.

8 Relocate any fiber backbones and complete the Data Center server migration.

9 Once re-cabling is complete, remove all old racks, patch panels, switches, fiber backbones and data station cabling. (Unless there are other systems or devices requiring it to stay live)

REFERENCE #1 – REMODELED MCR CUTOVER

1. Step 1
    a. Prepare new TR space
        i. Construct ICRA / phasing barriers
        ii. Demo floors, walls/doors/windows, ceilings, as appropriate
    b. Build new TR space
        i. Construct new walls and doors; prepare floor (anti-static VCT or coating)
2. Step 2
    a. Install new A-side and B-side panelboards, as appropriate
    b. Install new lighting and receptacles
    c. Install physical security equipment
3. Step 3
    a. Install new cooling (DX/VRV) unit, as appropriate
4. Step 4
    a. Install new server rack(s), cable management (tray, ladder, etc.)
        i. *If drawings indicate, contractor to install a backbone cable from old TR to new TR
    b. Install backbone cabling and terminate in racks

REFERENCE #2 – NEW TR CONSTRUCTION

1. Step 1
    a. Prepare new TR space.
        i. Construct ICRA / phasing barriers.
        ii. Demo floors, walls / doors / windows, ceilings, as appropriate.
    b. Build new TR space.
        i. Construct new walls and doors; prepare floor (anti-static VCT or coating)

2. Step 2
    a. Install new A-side and B-side panelboards, as appropriate.
    b. Install new lighting and receptacles.
    c. Install physical security equipment.
3. Step 3
    a. Install new cooling (DX / VRV) unit, as appropriate.
4. Step 4
    a. Install new server rack(s), cable management (tray, ladder, etc.)
        i. *if drawings indicate, contractor to install a backbone cable from old TR to new TR.
        ii. Install backbone cabling and terminate in racks.

REFERENCE #3 - REMODELED EXISTING TR CUTOVER

1. Step 1
    a. Prepare renovation of existing TR space
        i. Ensure coordination with VA for temporarily disabling existing alarm(s)
        ii. Construct ICRA / phasing barriers
        iii. ***MEP/IT & VA**
            1. Coordinate with VA prior to existing equipment movement
            2. Unmount and protect existing wall-mounted equipment to remain operational during renovation
        iv. Demo walls/doors, flooring (as necessary) and ceilings
    b. Finalize layout of new TR space
        i. Construct all new walls & doors
        ii. Prepare and install new backboards and anti-static flooring (VCT or coating)
        iii. ***MEP/IT & VA**
            1. Re-mount existing equipment to new backboards
2. Step 2
    a. Install new HVAC (DX / VRV) system
3. Step 3
    a. Ensure that existing equipment remains powered during A-side electrical infrastructure upgrade / replacement
    b. Install new A-side electrical infrastructure (panelboard)
    c. Move existing and new equipment to A-side power
    d. Install new B-side electrical infrastructure (panelboard)
    e. Install new receptacles and lighting
4. Step 4
    a. Prior to potential existing rack movement, ensure equipment can remain fully operational during temporary positioning
    b. Unbolt existing rack(s) to accommodate shift within room, as necessary
    c. Place the new (4) post rack(s) in the TR space
    d. Install new cable management system reflecting final location of new (4) post rack installation

5. Step 5
    a. Install new UPS units in new (4) post rack(s)
    b. Finalize bonding/grounding to new (4) post rack(s)

* **Contractor to notify VA to commence equipment migration from existing racks to new racks.**

REFERENCE #4 – WORK AREA OUTLET (WAO) CUTOVER STEPS

1. Pathways from hallway to room are identified for re-use or installed if new are needed
2. WAOs are installed if new, located, and accessible if existing (furniture moves if needed)
3. VA Clears room if needed (Patients moved to swing space)
4. VA OIT disconnects equipment from old WAO
5. Contractor removes old UTP cable from WAO (if reusing existing boxes / conduit). Contractor to remove cable completely from room into corridor and stores it in ceiling space for final removal.
6. Contractor installed new Cat 6A UTP cable, terminates and tests
7. Contractor labels UTP, patch panel and WAO
8. VA OIT connects patch cables from patch panel to new edge switch
9. VA OIT validates proper connectivity, PoE and VLAN assignment at WAO
10. Room is cleaned if needed
11. VA OIT connects equipment to WAO
12. Room is re-occupied by staff / patient
13. Devices in old TR are patched over to the new TR if on OIT network
14. Edge switches from old TR are moved to next TR for next TR cutover by VA OIT if empty
15. Contractor demos old TR, UTP, wall mounted 110 blocks, patch panels, rack (if empty), etc.

EXISTING SYSTEMS:

REFERENCE #5 – ACCESS CONTROLS

1. New and renovated TRs:
    a. Install 2-door controller in each TR
    b. Install cat 6A cable from Patch panel to new access control panel and terminate with RJ 45 male end. Test and label cable.
    c. Plug cat 6A cable into access control panel and test network connection is active.
        i. If panel is not a PoE then provide battery back-up
    d. Refer to drawings for equipment installation requirements (card reader w/ pin pad, door closer, room motion sensor, PIR REX)

REFERENCE #6 – CAMERAS & CCTVs

1. New & existing cameras (interior/exterior) to be re-cabled with new Cat6A cabling.
    a. Contractor to install new Cat6A cable from camera (new or existing location) to new TR, terminate on patch panel, and place a male RJ-45 on end of Cat6A cable at the camera location. Test Cat6A cable, coil spare cable at camera end for existing camera locations. New cameras can be plugged into new cat 6A cables.
    b. At cutover, Contractor to coordinate with VA OIT and campus police to relocate active electronics supporting CCTV and plug in new Cat6A cable to existing cameras.

c. Label devices and pathways.
d. Test all devices and provide test results to owner.
e. Document all work, devices, equipment locations, pathways, j-boxes, and provide as-built documentation to owner in format of their choosing.

REFRENCE #7 – FIRE PROTECTION / ALARM

1. New MCR will require a connection from the existing head end equipment to the new MCR panel.
    a. Install new fire alarm panel in new MCR.
    b. Connect backbone cable to nearest existing alarm panel.
    c. Install devices (smoke detectors, heat risers, etc.) and connect to the new fire alarm panel.
    d. Label devices and pathways.
    e. Test all devices and provide test results to owner.
    f. Document all work, devices, panel locations, pathways, j-boxes, and provide as-built documentation to owner in format of their choosing.

LIFE SAFETY NARRATIVE

As stated in the SOW, an independent life safety code review will be conducted by a certified, third-party Fire Protection Engineer. Design follows the latest edition of the following codes: NFPA 101 Life Safety Code, NFPA 75 Standard for the Fire Protection of Information Technology Equipment, VA Fire Protection Design Manual, and International Building Code (IBC).

New cable trays for supporting data cable are routed as needed throughout each facility. Any cables that pass through a rated wall have cable trays terminate on each side of the rated wall. If not already in place, HLTI Speed Sleeves (or similarly related assembly) will be provided at rated walls to allow passage of data cable while maintaining the appropriate wall rating. Locations of rated walls are shown on the overall plans of the design.

Per the VA Fire Protection Design Manual, all TRs have a clean agent fire extinguisher within 75’ of the door, exterior to the TR.

FIRE PROTECTION NARRATIVE

TELECOMMUNICATIONS ROOMS

All TRs with existing fire sprinklers have existing quick-response heads replaced with FM-approved, upright, standard response sprinklers with fusible links and listed mechanical guards in the same location. These modifications to existing sprinklers must be made at the time of ceiling removal and are noted on the Mechanical drawings. TRs are considered light hazard for sprinkler head density. The fire sprinkler branch lines and head locations are modified to accommodate TR space reconfigurations in accordance with NFPA 13. New fire protection piping will be painted red. Buildings which are not currently fully sprinklered will not have fire sprinkler systems added.

NEW DATA CENTER FACILITY

The Data Center Main Computer Room (MCR) shall be protected by a wet pipe sprinkler system as indicated on the plans. The MCR is provided with FM approved, upright, standard response sprinklers with fusible links and listed mechanical guards. The MCR is considered “Light Hazard” for sprinkler head density. The MCR sprinklers are fed by a single main equipped with a supervised control valve. The Data Center is furnished with a pre-action gaseous fire suppression system interlocked with the space smoke detectors. Detection details, pre-discharge alarms, abort switches, manual discharge switches, maintenance lock-outs, suppression system alarm panels and the interface with the new building fire alarm system are all addressed in specification section 21 22 00 – Clean Agent Fire Suppression Systems. The new MCR fire protection system is designed to meet all applicable requirements of NFPA 75, which include, but are not limited to, the following:

- Provision of clean agent extinguishing system in the data center
- Detection in the data center for early detection and system discharge
- 1-hour separation of the data center
- Provision of a supervised control valve on the main supplying the sprinklers in the data center
- Provision of fire dampers and/or combination fire/smoke dampers in duct penetrations of the data center boundaries
- Provision of emergency lighting
- Provision of emergency power off switches for electrical power
- Emergency off switches for HVAC equipment

The Generator Enclosure space is considered “Extra Hazard Group 1”. A second wet pipe sprinkler system zone is used to serve this space.

For the rest of the new Data Center facility, a third wet pipe sprinkler system zone serves the various spaces. Entrance Room #1, Entrance Room #2, and Bathroom “Light Hazard”. The Transformer Room, Electrical Room (Level 01), and Mechanical Room are classified as “Ordinary Hazard Group 1”. Storage and Secure Storage are classified as “Ordinary Hazard Group 2”. The Electrical Room and Generator Enclosure on the basement level are classified as “Extra Hazard Group 1”. These spaces will have sprinkler head densities based on NFPA 13 requirements per their designated hazard classifications.

TECHNICAL SECURITY ANALYSIS

TELECOMMUNICATIONS ROOMS:

For the expanded or relocated TRs and new Data Center facility, each are provided with new security provisions as required, including, but not limited to, the following: PIV-enabled two-factor authorization access control card reader with keypad, door position switch, request to exit motion sensor, intrusion detection sensors, siren, and surveillance camera.

Physical access control and intrusion detection systems associated with the project have been reviewed for compliance with the VA's Physical Security and Resiliency Design Manual. Systems have been expanded and/or modified to accommodate the new Data Center facility and new or expanded TRs in accordance with the current VA design standards.

PHYSICAL SECURITY NARRATIVE

The new Data Center at the Castle Point VA campus in Castle Point, NY is located on a sloped site, and is a standalone, two-story structure with one story partially below grade. It is reinforced masonry, load bearing construction with a flat steel frame roof. To support the new emergency generator within the Data Center, a new Fuel Tank Yard of reinforced masonry construction will be located roughly 23-ft east of the new Data Center. The project site is within the main campus, east of the VA Medical Center Building, adjacent to Buildings 18 and 111, as shown in .

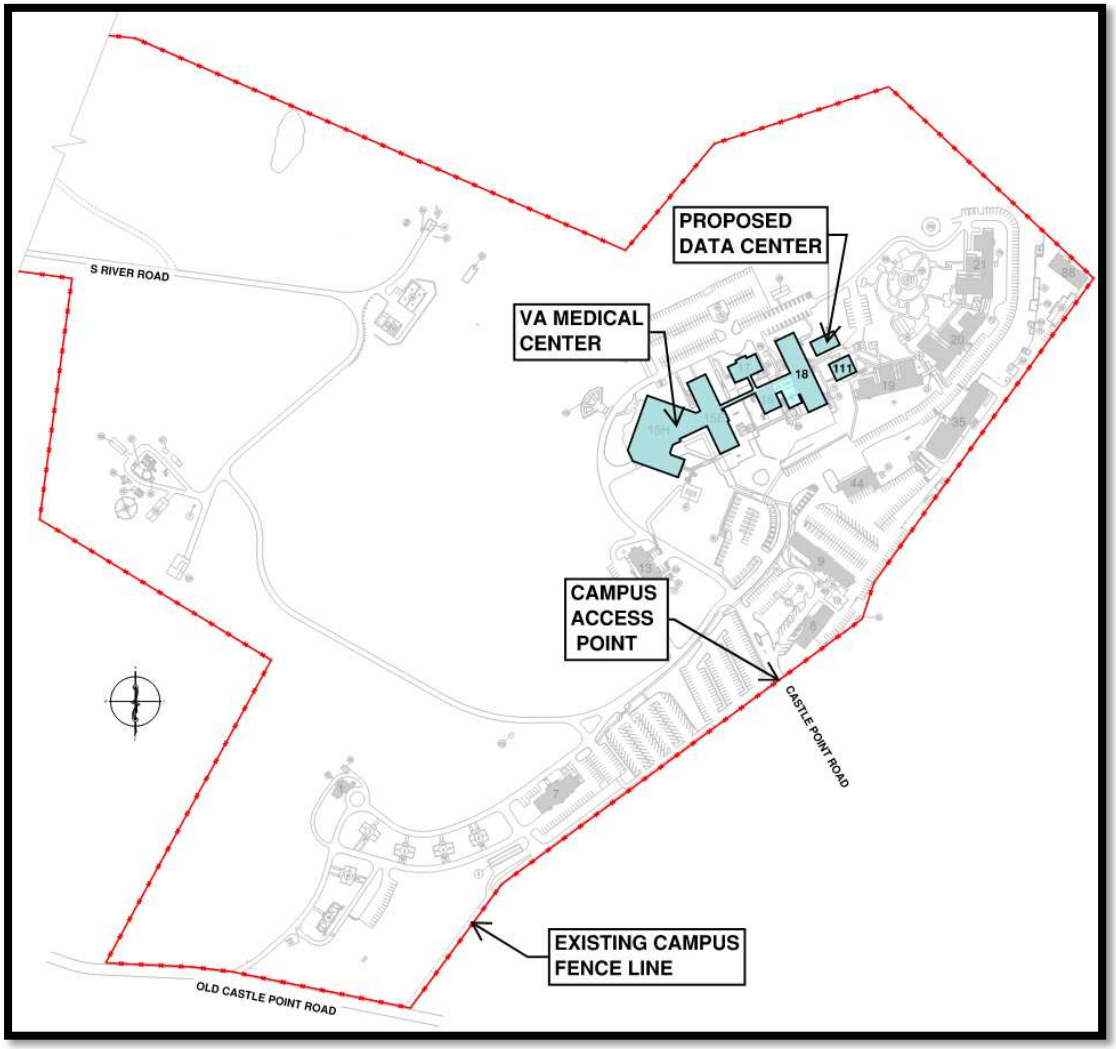


Figure 1: Castle Point VA Healthcare Campus Site Plan

The new structures are designated as a critical facilities designed in accordance with the *2020 Physical Security Resiliency Design Manual (PSRDM), Revised June 1, 2023,* as required in Chapter 1, Section 1.4, Table 1-2. Facility compliance with the PSRDM-CF criteria is substantially implemented including air-blast loading effects, utility redundancy and separation and critical equipment protection as specifically addressed in the following chapters of the PSRDM:

- Chapter 3 – Site Considerations

- Chapter 4 – Building Entrances and Exits
- Chapter 5 – Functional Areas
- Chapter 6 – Building Envelope
- Chapter 7 – Structural System
- Chapter 8 – Utilities and Building Services
- Chapter 9 – Building Systems
- *Chapter 10, Electronic Security Requirements, is covered in Technical Security.

As identified in Chapter 2, Section 2.4, Table 2-1, campus-wide improvements for a new building on an existing campus does not trigger campus level requirements as follows:

> *Comply with requirements for new construction for the new building(s). Campus level requirements, such as those associated with entrance to the campus, campus perimeter barrier, utilities, etc., are not required, except when included during planning of the project. Stand-off distance requirements are applicable for the new building(s).*

However, we have documented the status of the campus and noted where future campus upgrades are needed. The following sections are presented in the same order as applicable PSRDM chapters.

SITE CONSIDERATION

Standoff Distance: In accordance with the PSRDM, the Data Center building and Fuel Tank Yard are sited such that a 50-foot standoff is maintained from unscreened vehicles traveling on public and campus roadways as well as at adjacent parking lots as shown in . The standoff distance is measured from the face of the building façade to the roadway and parking curb edge. Architectural appurtenances (i.e., sunshades, canopies, etc.) are permitted to encroach on this area given that they do not serve to enclose interior occupied spaces.

The Data Center and supporting equipment are located within the main hospital campus where the existing campus roadway curb, new vehicle swing gate, non-rated bollards, and wheel stops will serve to enforce the 50-foot standoff to unscreened vehicles. The site design layout is based on the expectation that only VA controlled vehicles (i.e., screened for explosives) will be provided access within the standoff. Within the 50-ft standoff, signage will be provided to indicate that only VA-controlled vehicles (i.e., screened for explosives) are permitted, with the expectation that the VA will enforce these parking restrictions. Additionally, VA controlled vehicles are not permitted closer than 5-ft from the building, which is enforced by a concrete sidewalk paving strip around the building.

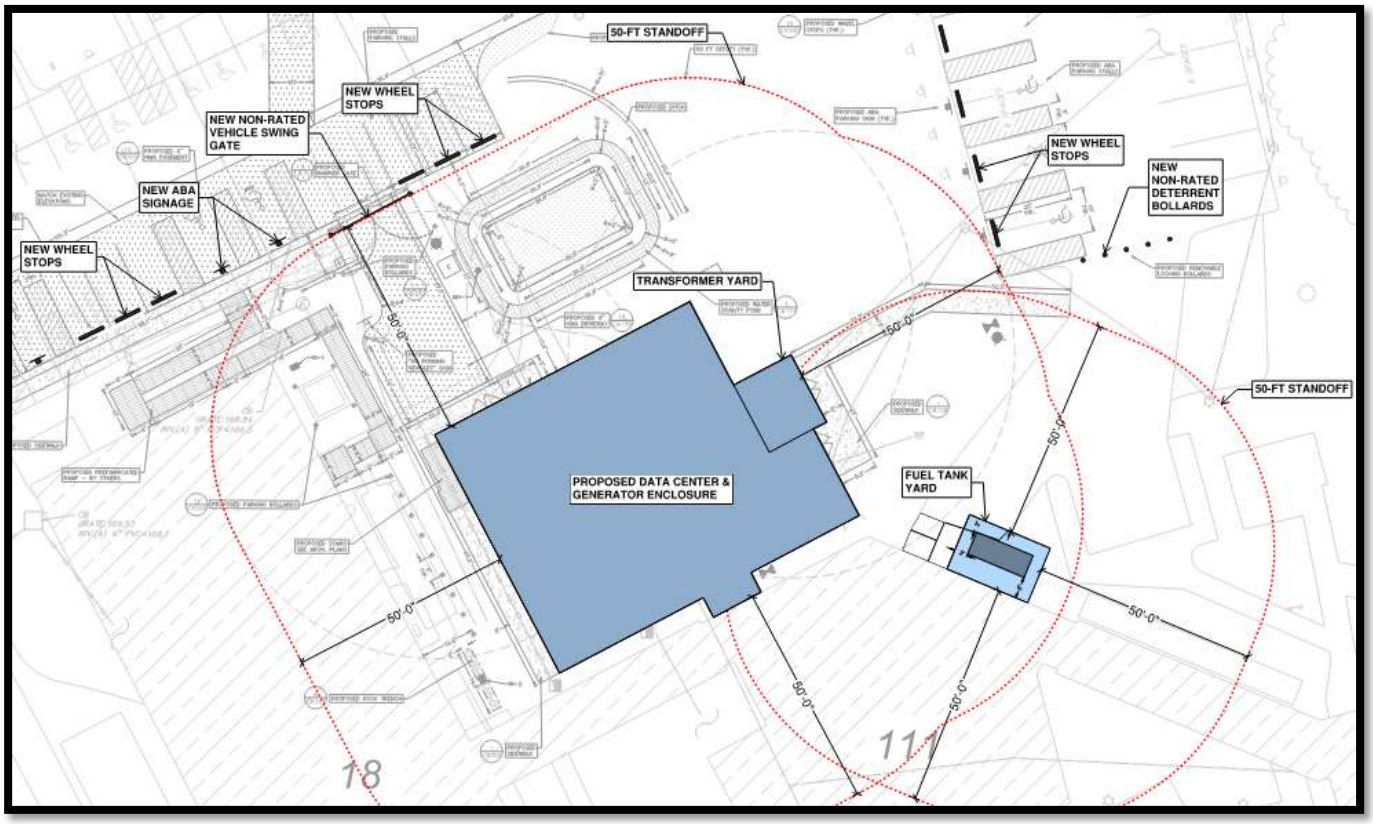
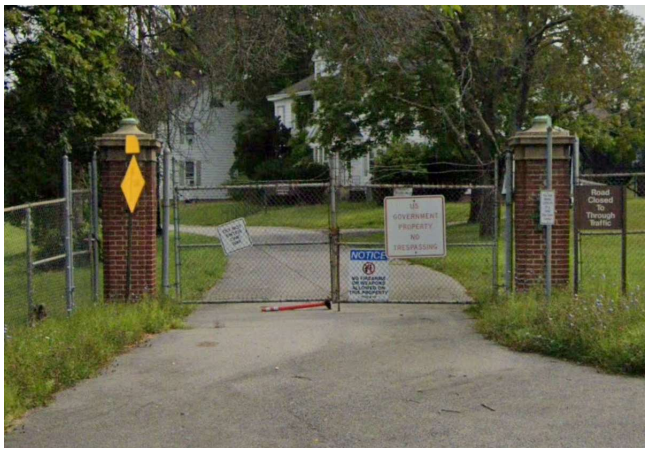


Figure 2: Proposed Data Center Site Plan

Perimeter Fences: The Data Center is enclosed within an existing campus fence line as shown in . The campus has one main entrance at Castle Point Rd, and locked swing gates at all other entrances. The existing campus fence and gates are constructed of chain-link, and the campus main entrance has a small, manned guard booth and drop-arm vehicle barrier, as shown in . Vehicle screening is expected to be provided at this entrance.

Gate at S River Rd.



Gate at Castleland Dr.

Main Entrance at Castle Point Rd.

Figure 3: Existing Fence and Access Controls at the VA Castle Point Campus

Anti-ram Rated Vehicle Barriers: Anti-ram vehicle barriers, such as bollards, are not required as the Data Center is located within an existing security fence, which is only accessed by authorized personnel and VA controlled and prescreened vehicles.

Parking: Per the PSRDM, all surface/above-ground vehicle parking for unscreened vehicles shall be located at least 50-ft from the building, and at least 5-ft for screened vehicles. Only screened vehicles are permitted within the existing campus fence line and no unscreened public or patient parking is allowed in the parking spaces within the 50-ft standoff. In the current 95% design, a new vehicle swing gate, non-rated bollards, and wheel stops are provided to prevent unscreened vehicles within the 50-ft setback.

BUILDING ENTRANCE & EXITS

The Data Center entrance and exit doors have controlled access limited to authorized personnel, therefore, many of the requirements in Chapter 4 do not apply. In accordance with the PSRDM, staff entrances as well as exit-only egress doors are monitored by CCTV and prohibit unauthorized entry. Reference the Technical Security Analysis section for additional information.

FUNCTION AREAS

- Compliance with the requirements of Chapter 5 is met for Computer Rooms, Section 5.4 in the following ways:
    - The Data Center is more than 50-ft away from unscreened vehicles and unauthorized personnel. Any parking within 50-ft will be limited to VA controlled vehicles.
    - Building entrances limit access to authorized personnel only.
- Compliance with the requirements of Chapter 5 is met for Emergency and/or Standby Generator Room, Section 5.6 in the following ways:
    - The generator is enclosed in a blast-hardened structure that is part of the Data Center building.
    - The Generator Enclosure is protected as a critical asset because it serves the Data Center, which is also critical.
    - The entrance to the Generator Enclosure limits access to authorized personnel only. No interior doors are provided between the Generator Enclosure and other building spaces.
- PSRDM requirements for loading docks, service entrances, and mailrooms do not apply as all deliveries will be prescreened at another VA campus facility prior to delivery.

BUILDING ENVELOPE

The Data Center building envelope consists of structural load bearing CMU walls above level 01 and concrete walls below level 01, steel roof framing, concrete topped metal deck, non-structural doors, and air intakes/exhausts; there are no glazing systems (i.e., windows, storefront, etc.). Because the concrete topped metal deck and infill beams contribute to the overall stability of the structure, these elements are subject to the requirements of Chapter 7 and are addressed in the Structural System section of this report. Doors and air intakes and exhausts are hardened for the lesser blast loading from the W1 threat at a 50-foot standoff or the GP2 capped load. The design and performance of these systems meet the following requirements:

- Door panels are not required to be designed explicitly for blast but shall be heavy gage metal (14-GA min.), and open outwards toward a potential blast.
- All double doors shall have a center mullion providing support on three sides. Door center mullion deformations are limited to L/40 (approx. 3-degrees). Door anchorage to be designed for the distributed door panel reaction plus the concentrated center mullion load.

<u>Critical Equipment</u>: All equipment that is identified by the VA to be critical is located in a blast resistant enclosure per section 6.6.1 and 7.2.4 of the PSRDM. All critical equipment is either located in the main building structure or in a Mechanical or Fuel Tank Yard which is open above but enclosed with screen walls. Both the main building structure and screen walls are blast-resistant construction for a W2 threat at 50-ft. All exterior air intakes and exhausts openings that lead to critical equipment spaces have blast dampers which close during a blast event to protect critical equipment beyond. Dampers are specified to

resist the blast over-pressures due to the W1 threat located at 50 feet standoff distance, but no greater than the maximum GP2 blast loading. Dampers are designed to remain operable in response to a blast event and therefore meet or exceed the Superficial Damage response limits per Blast Protection of Buildings, ASCE/SEI 59-11. All damper blast performance requirements are provided in specification section 23 31 00, with the detailed damper design the responsibility of the vendor.

Calculation Methods: Blast analysis is performed using non-linear dynamic single-degree-of-freedom (SDOF) analysis in accordance with UFC 3-340-02. KPFF's internal software, Analysis Programs for Explosive Effects (APEX) incorporates methodology and formulas directly from UFC 3-340-02 and is used for determination of SDOF properties, including resistance, stiffness, and transformation factors and to solve SDOF equations utilizing an explicit solver. Material behavior is modeled using idealized elastic, perfectly plastic stress-deformation functions and is based on actual structural support conditions and material properties.

STRUCTURAL SYSTEM

The structural system consists of load-bearing masonry walls and steel roof framing, which are designed in accordance with the requirements of Chapter 7.

Blast Resistance: In addition to the non-structural building envelope, building structures are required to resist the minimum design level threats. Perimeter walls and roof girders are designed to resist the air-blast loading effects due to the W2 VBIED at 50-ft. Since these elements are essential parts of the building resistance to catastrophic failure, deformations are limited to Superficial Damage in accordance with ASCE 59-11. Critical elements designed in accordance with these structural design requirements include:

- 12-in exterior load-bearing CMU walls (e.g., typical walls, piers, lintels, sills, and jambs).
- 12-in exterior load-bearing concrete walls (e.g. typical walls, piers, lintels, sills, and jambs below level 01).
- Primary structural roof girders at the main roof.

Secondary structural elements are designed to resist blast loading from an unscreened vehicle threat, W2, at a 50-foot standoff and meet the Moderate Damage level in accordance with ASCE 59-11. Secondary structural elements designed in accordance with these requirements include:

- Secondary steel infill roof beams.
- Concrete-topped metal deck on the roof.

Additionally, the global lateral system is designed for a blast base shear force determined in accordance with Section 7.3. In coordination with the structural team, it was determined that the blast base shear governs the design of the lateral force resisting systems of this facility.

In addition to the structural systems, non-structural elements that are essential to life-safety systems or those that could pose a significant hazard to occupants if failure occurs are braced for the lateral loading due to the blast base shear. This requirement includes overhead suspended equipment and fixtures weighing more than 31 pounds.

Screen Walls and Penthouse Structure: Equipment located within the rooftop Mechanical Yard and Fuel Tank Yard have been provided with a blast resistant, non-load bearing screen wall. The wall structure providing lateral resistance was designed for the calculated blast loads resulting from an unscreened vehicle threat, W2, located at a 50-ft standoff to a Moderate Damage level.

Progressive Collapse: This requirement does not apply since the building is less than 3-stories.

Interior Column and Wall Protection: There are no interior high-risk areas, therefore, hardening of interior columns and walls is not required.

UTILITIES & BUILDING SERVICES

Utility services for the new Data Center building that are compliant with the PSRDM requirements are discussed in the following sections. Note that upgrades to campus-wide systems are outside of the scope of this project and should be addressed in a separate project. Refer to the Civil, Mechanical, Electrical, and Telecommunications sections for additional information.

Utility Entrances: PSRDM requirements for utility entrances that are incorporated in the new Data Center project include:

- Electric service feeders are located underground, away from other utility services, and separated by at least 50-ft.
- Telecommunications cable pathways are located underground, away from other utility services, and are separated at least 66-ft as shown on sheet CS101.
- Redundant service pathways to Entrance Rooms for telecommunications are provided as shown on sheet CS101.

The following requirements from the PSRDM for utility entrances are not included in the new Data Center project:

- The requirement to provide two full demand water service connections is outside the scope of this project, which does not include campus-wide upgrades. This requirement should be addressed in a future campus-wide project.
- The requirement to provide two electrical utility services is outside the scope of this project, which does not include campus-wide upgrades. This requirement should be addressed in a future campus-wide project.

Site Distribution: PSRDM requirements for site distribution that are incorporated in the new Data Center project include:

- The chilled water and steam systems are looped in from Building 35 to the Data Center. The fuel tank system piping is located within the Enclosed Generator room.
- Electrical feeders are located underground and are separated by at least 50-ft.
- The electrical vault and the telecommunications handholes are secured with a lockable cover.

- Telecommunications pathways are separated by at least 50-ft, enter the building at different locations, and are not exposed on the building exterior, as shown on Sheet CS101. These pathways are located at least 50-ft from high-risk areas.

Water and Fuel Storage: PSRDM requirements for water and fuel storage that are incorporated in the new Data Center project include:

- A minimum volume of storage water is provided by existing campus services to fight a worst-case scenario fire on the campus.
- 3,000 gallons of fuel are provided to meet the generator fuel storage requirements.
- The electrical equipment necessary to operate the stored water and fuel systems is backed by the standby electrical system, as required by the PSRDM.

Protection of Utilities and Equipment: All utilities and equipment are protected as required by Table 8-3 in the PSRDM. Utilities are located above grade and are enclosed in a blast-resistant enclosure as discussed in previous sections.

BUILDING SYSTEMS

Building system separation distances per the 2023 PSRDM are summarized at the end of this section in Table 1.

HVAC Systems: The following protective measures are provided per the PSRDM requirements for air condition systems:

- CRAC systems are located above grade and in an area that is not prone to flooding.
- Individual CRAC units may be bypassed as needed, and in the event that chilled water is not operational, the CRAC units are equipped with a DX system. Emergency connections for steam are provided.
- Intakes and exhausts that serve critical spaces, such as those located on the generator enclosure walls, are blast hardened using blast dampers, reference Spec Section 23 31 00. Air intakes/exhausts at the roof are located behind a parapet or screen wall such that blast pressures are minimized.

Electrical Systems: The following protective measures are provided per the PSRDM requirements for electrical systems:

- Diesel compression engine generators, switchgear, fuel storage, and distribution equipment with sufficient capacity to provide standby power for the entire Data Center are included in the project. Reference the Mechanical and Electrical sections and drawings for additional information regarding the generator.
- Generators and associated electrical equipment are not within a flood zone nor are they within 50 feet of a high-risk space (i.e., public lobby, loading dock, etc.) as shown in .
- An exterior emergency quick connection is provided.
- Two uninterruptible power supplies are provided inside the Data Center room, each with a battery run time greater than 10 minutes.

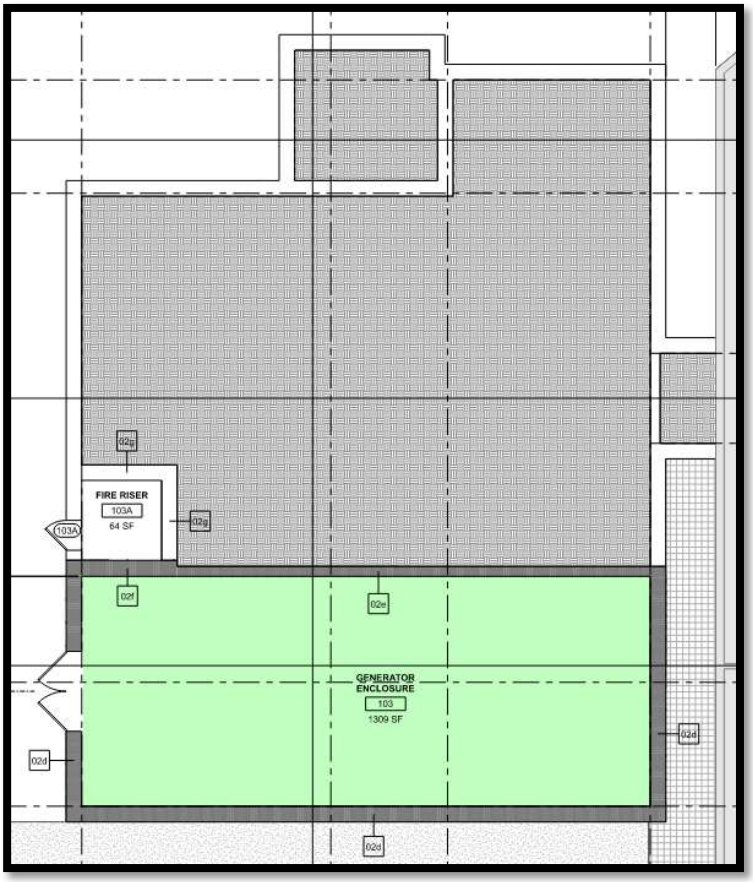


Figure 4: Proposed Data Center Basement Plan

Telecommunications Systems: The following protective measures are provided per the PSRDM requirements for telecommunications systems:

- Two entrance rooms, one for each ISP, are provided in the Data Center building, as shown in . Each entrance room is provided with generator-backed HVAC service.
- Equipment in each entrance room is powered by UPS equipment that can provide a minimum of 10 minutes of service.
- A computer room (noted as Data Center in the drawings) is provided in the new Data Center building, as shown in . The computer room contains all the main telephone switching and data processing equipment for the Data Center. This room is located within the blast-hardened building envelope and is at least 50-ft from high-risk areas, as discussed in previous sections. The room is provided with generator-backed HVAC service and is powered from UPS equipment.

The required separation of 66-ft between telecommunication entrance rooms is not achievable given the size of the Data Center building. The actual separation distance between entrance rooms is 43’-10” as shown in .

Fire Protection Systems: The new Data Center is sprinkler-protected throughout, as discussed in the Life Safety and Fire Protection section.

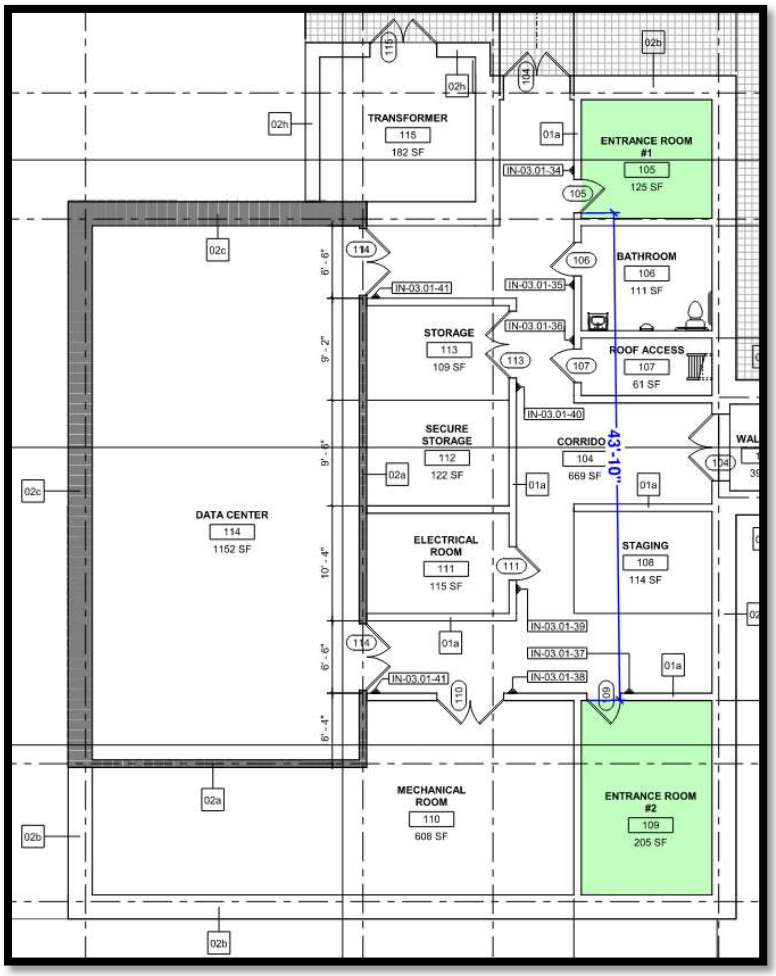


Figure 5: Proposed Data Center Floor Plan

Table 1: Building System Separation Distance Requirements

PSRDM Section	System	Building System Separation Distances			
		Exterior Grade	Exterior Wall	High-Risk Areas1	Other standoff distances
9.2	**HVAC Systems**				
	Equipment	above grade/flood elev.	NA	NA	
	Outdoor Air Intakes	30 feet above or on roof	NA	NA	50-ft from noxious discharges (e.g., bldg.

PSRDM Section	System	Building System Separation Distances			
		Exterior Grade	Exterior Wall	High-Risk Areas1	Other standoff distances
					exhaust, idle vehicles, etc.)
9.3	**Electrical Systems**				
	Generators, paralleling equp., fuel & elect. components for standby system, and EES	above grade/flood elev.	NA	50 feet	Not below rooms with water services (i.e., kitchen, bathrooms, etc.)
9.4	**Telecommunication Systems**				
	Entrance Room (where all Telecom services are delivered to building, separation points between utility-owned & VA-Owned)	above grade/flood elev.	25 feet	50 feet	Entrance rooms separated by 66 feet Not below rooms with water services (i.e., kitchen, bathrooms, etc.)
	Computer Room	above grade/flood elev.	NA	50 feet	Not below rooms with water services (i.e., kitchen, bathrooms, etc.)
	Telecommunication Rooms where telecom (i.e., voice, date, etc.) is distributed	NA	NA	NA	Not below rooms with water services (i.e., kitchen, bathrooms, etc.)
	Other system requirements - refer to Telecommunications Design Manual				
9.5	**Plumbing Systems**	NA	NA	NA	
9.6	**Fire Protection Systems**	NA	NA	NA	

STRUCTURAL NARRATIVE

Data racks and trays are seismically rated. Structural details are provided as needed to ensure adequate information is available for proper installation of equipment. For expanded and upgraded rooms, no walls being removed are load-bearing walls. The A/E has reviewed all walls during site investigations to verify this assumption.

Structural analysis and design have been provided for the two areas of new construction on the campus: the TR tower in building 15H and the new data center. In addition, reinforcement has been provided in other localized areas in support of mechanical upgrades required for the project. The new TR tower is framed of steel beams and columns supporting a concrete slab on metal deck. The tower utilizes the existing columns and foundations of building 15H. Analysis has been performed to confirm no extension of the existing footings are required for the foundations. The TR tower will be tied laterally into the existing building and utilize the existing lateral system to resist wind and seismic loads.

The new data center is located in an open area immediately adjacent to existing buildings 111 and 18. The data center is constructed of concrete and masonry bearing walls supporting steel beams and concrete slabs on metal deck. New foundations will be constructed using the recommendations provided by the geotechnical investigation on the site. The lateral system of this structure is CMU shear walls. This structure will be designed for blast forces.

DESIGN LOADS

A summary of the criteria upon which the structural design is based is outlined below:

Live Loads
TR Tower: 125 psf
Data Center: 150 psf

Wind Loads
V = 126 mph

Snow Loads
Ground Snow Load = 30psf

Seismic Loads
The anchorage of the mechanical equipment will be checked for seismic loads, but no seismic evaluation will be made for the entire building.

Seismic Site Class: D
Ss = 0.226
S1 = 0.057
Sms = 0.361
Sm1 = 0.136
Sds = 0.241

Sd1 = 0.091

Special Inspections
Special inspections, testing, and observations are as required per IBC Chapter 17 for structural steel.

100% CD2 DESIGN UPDATES

- (Near B.111): Added concrete wall and foundations around the fuel tank enclosure.
- Data Center: Moved basement wall of generator room to accommodate electrical and mechanical equipment placements in the generator room.
- Data Center: revised reinforcing in concrete wall around transformer enclosure.
- Data Center: added sump pit in generator room
- Added sleeper beams and steel or wood framing / reinforcing underneath mechanical units in Buildings 15, 16, and 18.

CIVIL NARRATIVE

SITE DISTRIBUTION

The existing communications infrastructure includes conduits and vaults throughout the campus that route the existing fiber optic cable to each of the buildings. A limited amount of linear footage of these routes are available for reuse for new fiber optic runs. The intent of this project is to trench new duct banks throughout the campus for the primary and secondary fiber runs to each building. The planned duct bank will create a Ring Network Topology which will be used to provide network redundancy across the campus. Non-patient buildings are serviced by a single ductbank, which will help reduce construction costs due to the long distances some buildings have from the main loop. Many of the buildings being serviced in this project will be connected through existing building corridors in order to reduce site disturbance and construction costs.

A new fiber optic utility network and data center building will be constructed on the VA Castle Point Medical Center. The proposed 2-way conduit bank loops around the campus, serving mission critical healthcare buildings determined by the facility. The layout and profile of the fiber network was created using as-built plans of past projects on the site, site visits to the campus, topographic survey, and information from staff. Utility manholes and handholes are placed at bends in the route and at important access junctions to buildings within the scope. The duct bank avoids interference with existing utilities and structures as much as possible, and also meets the requirements of specification section 26 05 41 - Underground Electrical Construction and the VA PSRDM. Key points from 26 05 41 include drainage and separation guidelines, while the PSRDM outlines required bury depths. In summary, the duct bank needs to maintain a 0.33% slope for drainage, a minimum of 12” separation from existing utilities, and 30” of cover.

The fiber network route runs along open greenspace in order to reduce project costs and minimize disturbance to the site and its operations. No major roadway work is being proposed, but consequent impacts to the roadway pavement, sidewalk, and landscape from the excavation for the proposed fiber network and data center are noted for repair and restoration in the demolitions plans with proper mitigation for erosion control in the grading plans. The network avoids areas and items of dedication to the facility as well as other crucial pathways for employee parking, fire access route, medical vehicles, and building access to maintain safety and logistics. The site design follows the specifications outlined in the Physical Security and Resiliency Design Manual, namely for buried utility cover and layout, as well as building standoff distances. Any alterations to the site to accommodate these requirements are included in the scope of work. All trenching and fiber runs are designed in compliance with VA standards including Design Alert 6.

DATA CENTER

A new data center will be built north of Bldg. 111 and east of Bldg. 18. Two soil borings were performed to determine soil types under the proposed building and inform the foundation types incorporated into the design. The new data center requires chilled water, steam, and sanitary service lines. These utilities are internally routed within the data center through a crawlspace and connect to existing infrastructure.

Existing utility lines, including storm sewer and water, have proposed relocations due to the footprint of the data center work. The proposed water lines will be routed around the east side of the data center and connecting to the existing main between the proposed data center and existing building. The existing medium voltage electric lines that feed the adjacent buildings are maintained to propagate proposed 3'' conduits. The existing condenser and air-handling units that sit alongside Bldg. 18 are preserved as well. A proposed driveway and sidewalk lie adjacent to the data center for roadway and pedestrian access. A proposed prefabricated ramp connects the east entrance of Building 18 to the parking lot and follows the VA Barrier Free Design Standard for slopes and dimensions. Consequently, the parking lot is adjusted to accommodate a proposed 5' sidewalk and will be restriped for standard parking stalls and ABA parking stalls.

SITE INVESTIGATION

Topographic survey was used to define the alignment and profile of the fiber network from the preliminary plans. The existing conditions show utility rim and invert elevations and the existing contours of the site. The survey also developed the design and detailed grading for the placement of the new data center, noting finished floor elevations and restoration of the surrounding ground with proposed contours and grading limits. Sidewalk access is provided to the data center, existing parking lot, and existing buildings, and utility lines are routed to service the building.

- Topographic, utility, and landscape survey: The fiber optic route was laid out using survey completed for this project.
- Demolition Plan: Shows areas, landscape features, utilities, and structures that either need to be replaced or relocated due to the proposed duct bank or data center placement.
- Locations of bldg., roads, fire access, parking, accessible spaces, van spaces, mechanical/electrical equipment, off-site roads, off-site utilities, service areas, entrance exits, walks, inlets, contractor's staging area, road alignments, jointing: Included based from the surveys completed for this project.
- Existing contours: Included from the surveys completed for this project.
- Proposed contours: Proposed grading around the data center and its two floors ties into the adjacent parking lots, buildings, and existing ground.
- Spot elevations: Spot elevations are provided for driveway, sidewalk, and ramp to maintain storm water drainage and ABA standards.
- FFE: The FFE for the data center is 170.00'.
- Rim and invert elevations of drainage fixtures: The proposed data center is above the 5000 SF value outlined by the EPA for requiring stormwater detention. Best management practices will be designed as part of this project. The VA staff states the current campus storm system discharges without control measures to the wooded area surrounding the campus. Due to the small footprint of the proposed building, a large change in the storm runoff is not expected.
- Erosion control: Silt fence will be installed on the downstream side of disturbance for proposed work surrounding the data center and along the fiber optic network. Inlet protection is also noted for nearby storm sewer structures.
- Rock Excavation: To be lump sum based on geotechnical report.

- Plantings: No change to plantings expected. Site will be returned to existing conditions after project is completed.
- Site details: Replaced site features consists of restoration due to the fiber optic construction. Proposed site features are based on impacts from the data center, such as driveway and sidewalk.
- Landscaping details: N/A
- Signage: Parking lot signage noting ABA stalls are placed along the adjusted parking lot, and signage noting “No Running Vehicles” will be needed to protect the existing air-handling unit.

100% CD2 DESIGN UPDATES

- (Near B.111): Minor updates to parking / sidewalks near generator fuel tank enclosure.

MECHANICAL NARRATIVE

CODES AND STANDARDS

ASHRAE 90.1 – 2013 will be used as the basis for thermal envelope requirements (U-values) per the VA HVAC design manual, selection 1.2.1 and section 2.2.3.4.

TELECOMMUNICATIONS ROOMS

Telecom rooms receiving new mechanical cooling are cooled with either a ductless split DX system or a VRF system.

Ductless split DX systems require one indoor head to provide cooling to the IT room, and an outdoor condensing unit to reject the heat to the exterior ambient air. Refrigerant piping is routed from the exterior condensing unit to the interior unit. Condensate is created when air temperatures drop below the dew point, so condensate piping will be routed from the interior unit to the nearest indirect drain. Ductless split DX systems cannot use outside air for free cooling, but they are efficient compared to other cooling systems.

VRF systems are used in lieu of ductless split DX systems in all buildings with multiple stacked Telecom rooms. In these cases the VRF system uses an architecture of one outdoor condensing unit serving multiple telecom rooms. Refrigerant piping is routed from the roof or ground mounted condensing unit to the group of indoor units served by the condensing unit. Condensate is created when air temperatures are dropped below the dew point, so condensate piping is routed from the interior unit to the nearest indirect drain. VRF systems cannot use outside air for free cooling, but they are efficient compared to other cooling systems.

The ductless split DX systems and VRF/VRV systems are tied into the campus building management system with points monitoring equipment operation, run time and space temperature.

All telecom rooms have temperature and humidity wall sensors and a floor mounted moisture sensor that is tied into the campus BMS.

MECHANICAL COOLING REQUIREMENTS – TELECOMMUNICATIONS ROOMS

Mechanical cooling was evaluated for 33 Telecom rooms, in 15 different buildings throughout the Castle Point VAMC campus. Some telecom rooms are being upgraded, while other telecom rooms are combined or relocated. Rack counts have been assessed for each TR and the appropriate sensible cooling supply has been provided to each space. Additional mechanical cost considerations are as follows:

1. Each system estimated with 90 LF refrigerant length

2. Each system estimated with condensate pump and 30 LF condensate piping.
3. Each roof mounted condensing unit will have roof stand secured to structure and roofing cut/patch.

The standard which was used for determining the cooling requirements for each telecom room was provided by VA guidance as follows.

A. Dedicated cooling for anticipated active critical load is specified. Each network rack has 5Kw of electrical capacity. Each installed enclosure requires 5Kw (17,000 BTU/h) of cooling capacity to be available, but in aggregate, 5Kw per enclosure is not required. Design heat rejection capacity in these telecommunications spaces as follows:
    i. 1 rack TR = 5Kw (e.g., single 5Kw cooling unit).
    ii. 2 rack TR = 7Kw (e.g., 3.5Kw x2 cooling units).
    iii. 3 rack TR = 8.5 Kw (e.g., 3.5Kw + 2.5Kw x2 cooling units).
    iv. 4 rack TR =10Kw (e.g., 2.5Kw x4 or 5Kw x2 cooling units).
B. Other designs meeting these maximum expected aggregated load levels are acceptable. Multiple smaller units will assist in avoiding equipment freeze-up in some types of equipment.

DATA CENTER

This project includes a new data center. The mechanical cooling for the new data center includes four dedicated Computer Room Air Conditioning (CRAC) units, each providing a third of full capacity cooling load requirements and a fourth unit for N+1 redundancy. The CRAC units are equipped with both a DX cooling coil and a chilled water propylene glycol mix coil. Each CRAC system consists of an indoor downflow system with plug fans and a ground mounted condensing unit coupled to the indoor DX cooling coil. The chilled water coil is served with a dedicated chilled water-propylene glycol loop that rejects heat to the outside air in the winter via fluid coolers, and, when in operation, via a chilled water supply line from the campus chilled water plant. The combination of DX and chilled-water-propylene-glycol mix coils provides redundant sources of cooling plus meets the mission critical requirements. The supply air is distributed out of the bottom front of the CRAC unit grilles directly into the data center to cool the entire room in a cold aisle configuration. Hot return air is ducted directly from the top of each individual rack to an overhead ducted return system to the CRAC units.

The CRAC units are tied into the campus building management system with points monitoring equipment operation, run time and space temperatures & humidity levels. A floor mounted moisture sensor will be installed adjacent to a CRAC unit that will also be tied into the campus BMS. The space temperature setpoint will initially be set to 72°F and will adjust based on rack face inlet temperature. Controls for Data Center will be installed per the Infrastructure Standard for Telecommunications Spaces with standalone controller that monitors at the BMS. The return temperature from the overhead ductwork is designed to be 92 °F to provide a 20 °F temperature differential between the supply and return air paths.

MECHANICAL COOLING REQUIREMENTS – DATA CENTER

Mechanical cooling calculations for the new data center have been completed. The calculations follow a total load of 79.6 KW (256,000 BTU/h) per the "Generic Small Campus Support Data Center" document provided by DCIE. Each CRAC unit will be sized with a nominal 10-ton cooling capacity with the basis of design being dual-cooled Liebert PX029DD1.

With the Data Center location finalized with respect to equipment updates to accommodate the chilled water-propylene glycol fluid cooler loop, a Computational Fluid Dynamics (CFD) analysis of the conditions has been completed via a third-party subcontractor. This report details the space point temperature profiles, pressure differentials, and velocity profiles at key locations within the Data Center envelope. Please see the **Appendices** at the end of this document for the full report in its entirety.

MECHANICAL FUEL OIL DESIGN

The design for the fuel oil storage, fuel oil piping and the associated mechanical equipment will be in keeping with all applicable standards referenced below:

- NFPA 30
- NFPA 37
- NFPA 110

Design decisions were made following these code requirements. Some design considerations resulting from code interpretation include main tank / day tank configurations, fuel heating, fuel polishing, tank ratings, secondary containment requirements, fuel storage capacities, fuel storage limits, and controls and alarm requirements.

FUEL STORAGE FOR STANDBY GENERATOR

The design for the fuel storage tank supporting the emergency standby generator has changed from the previous 95% CD1 R1 design. The following changes are noted below:

- Main storage tank relocated to an exterior location (adjacent to B.111) in the vicinity of the new Data Center.
- Main storage piping is routed sub-grade to accommodate the relocation of the main fuel tank.
- Inclusion of a sub-base tank to facilitate movement of fuel between the main tank and the generator.
- Inclusion of a supply and return pump to ensure fuel flow can be maintained and prevent overspilling given the main tank is located above the day tank.
- Fuel polishing system relocated to same location as the main tank and NEMA-rated enclosures specified.
- Fuel fill port box incorporated into the design to allow ease of refilling the main tank.

100% CD2 DESIGN UPDATES

Outlined below is a list of changes made to the design between the 95% CD1 R1 and 100% CD2 design submissions:

- Fuel tank relocated to Building 111 exterior. All design considerations for this change to include, but not limited to, additional pumping, piping, and controls are implemented into the drawing package. Additionally, a manufacturer-provided sub-base day tank is specified to meet additional requirements regarding fuel pumping and storage.
- Valving for Chilled Water Building side connection is updated.
- Calling out PICV valves on details and at the majority of mechanical equipment.
- Additional controls indicated for the booster pump and grinder pump shown on plumbing drawings.
- Relocation of Fire Protection department connection to be closer to existing site hydrant than previous design was showing.
- Additional language about spare condensers for VRF systems serving multiple TRs in the schedules.

PLUMBING NARRATIVE

DOMESTIC WATER SYSTEMS ANALYSIS

Existing Plumbing Systems & Modifications:

The existing 10” domestic water line that runs in the vicinity of the Data Center has modified routing to pass through the lower level mechanical space. This entry point will be utilized for the new plumbing fixtures that will go into the Data Center bathroom. The domestic water will also be used for makeup water for the chilled water-propylene glycol mix loop as well as the hot water loop being used by various pieces of mechanical equipment located in the new Data Center Building. Additionally, the domestic water will also tie into a Reverse Osmosis (RO) unit, which will soften the water before it is used to humidify. Additionally, this water will be utilized for the clean steam generator.

New Plumbing Systems:

A new bathroom is designed within the Data Center which will be furnished with a new water closet, urinal, and lavatory. A new emergency eye wash station shall be located in the mechanical room nearby the new chemical feeder pots and glycol feeder pump unit. The emergency eye wash as well as the lavatory will receive hot water via point of use hot water heaters that are located locally to the respective fixtures. On the roof top of the new Data Center a roof mounted hydrant is provided for the necessary maintenance of the mechanical units on the roof. In the standby generator room, a fuel tank and fuel connection shall be provided for the generator to operate. The generator tank utilizes a gravity fed line from an exterior fuel port connection. This connection will be accessible via a stairway and platform.

SANITARY SYSTEMS ANALYSIS

New Sanitary Systems:

Sanitary lines will be installed to properly remove the waste from the Data Center footprint. Ventilation lines will be installed as necessary. P-traps will be utilized for all drainage plumbing fixtures. The drainage from the Data Center footprint will utilize existing ceiling space to move the waste from the Data Center to an existing sanitary waste connection in the nearby building 111 mechanical room by way of a grinder pump.

ELECTRICAL NARRATIVE

NARRATIVE

This project shall upgrade the existing IT infrastructure and equipment to comply with the new VA Electronic Health Record Modernization (EHRM) system requirements. The design complies with applicable VA design guides.

Selected telecommunications rooms (TRs) are expanded, renovated, or relocated to meet VA Infrastructure Standards for Telecommunications Spaces (Version 3.1, July 1, 2021). The VA has provided recommended actions for each TR (expansion, renovation, or relocation) as indicated in the SOW and associated Readiness Assessment; further general requirements for each TR have been provided in the SOW and associated Readiness Assessment (power, UPS, cabling, etc). The project scope includes the following locations: Buildings and site per executive summary.

- Design:
    - All existing electrical distribution equipment to be reused and that are being provided additional loading will be required to have 30-day demand power monitoring per NEC 220.87, unless demand power data is available for said equipment. For the 100% submission, all existing panelboards being used to power additional loads have load calculations per NEC 220.87 and are incorporated into the design.
    - All data rooms will be revised to meet proper grounding and bonding installations per VA telecom standards and NEC.
    - Telecommunication rack power connections (source A and B) are provided as required.

- Life cycle analysis for electrical systems:
    - All existing electrical equipment that requires a life cycle analysis will be evaluated. Where it is determined that the existing equipment is past its time of use or shows signs of possible future failure due to wear and tear, the equipment will be replaced as required.

LOCATION AND SIZE OF:

The VA provided all building/site drawings and information regarding existing utilities. The A/E reviewed and analyzed provided documentation from the station. Additional site visits were performed so that each building and floor were analyzed and verified for the existing conditions and the required improvements for each of the following items as they fall in the SOW:

- Electrical equipment
- Electric closets
- Telephone closets
- Signal closets
- Electrical distribution equipment

EXISTING EMERGENCY GENERATOR SYSTEM CAPACITY:

The VA provided generator testing data for the existing emergency generator systems on campus. The existing emergency generator systems have been analyzed to estimate the anticipated generator loading with the added EHRM load as shown below in Figure 1.

EXISTING GENERATOR CAPACITY AND LOAD INFORMATION SCHEDULE

GENERATOR NAME	GENERATOR VOLTAGE (V)	GENERATOR PHASE	GENERATOR RATING (KW)	TEST REPORT DATE	PEAK RECORDED DEMAND (kW)	PEAK RECORDED AMPS	ADDED LOAD (kW)	TOTAL DEMAND LOAD (kW)	ESTIMATED GENERATOR PERCENT LOADING (%)	NOTES
BLDG 7 GEN	208	3	300	Jan-23	64.8	180	16.25	81.1	27.0%	1, 11
BLDG 9 GEN	208	3	200	Mar-22	93.7	260	42.38	136.0	68.0%	2, 11
BLDG 13 GEN	208	3	125	Feb-23	3.6	10	9.20	12.8	10.2%	3, 11
BLDG 15H	208	3	350	Aug-22	239.9	666	62.49	302.4	86.4%	4, 11, 12
BLDG 18	208	3	300	Oct-22	241.4	670	38.50	279.9	93.3%	6, 11, 12
BLDG 20	208	3	250	Mar-22	130.4	362	71.33	201.7	80.7%	7, 11
BLDG 35	480	3	800	July-22	271.9	327	7.00	278.9	34.9%	8, 11
BLDG 44	208	3	80	May-22	23.1	64	9.31	32.4	40.5%	9, 11
BLDG 59	208	3	600	Nov-22	335.8	932	81.63	417.4	69.6%	5, 11
BLDG 88	208	3	40	Mar-22	18.0	50	9.31	27.3	68.3%	10, 11

NOTES:
1. ADDED LOAD IS COMPRISED OF BUILDING 7.
2. ADDED LOAD IS COMPRISED OF BUILDINGS: 8 AND 9.
3. ADDED LOAD IS COMRPSIDED OF BUILDING 13.
4. ADDED LOAD IS COMPRISED OF BUILDINGS: 15E AND 15H.
5. ADDED LOAD IS COMPRISED OF BUILDINGS: 16 AND 17.
6. ADDED LOAD IS COMRPISED OF BUILDINGS: 18 AND 111.
7. ADDED LOAD IS COMPRISED OF BUILDINGS: 19, 20, AND 21.
8. ADDED LOAD IS COMPRISED OF BUILDING 35.
9. ADDED LOAD IS COMPRISED OF BUILDING 41.
10. ADDED LOAD IS COMPRISED OF BUILDING 88.
11. ALL TEST REPORT DATA WAS CONDUCTED AND PROVIDED FROM VA.
12. EXISTING GENERATOR IS STANDBY RATED. GENERATOR % LOADING SHALL BE MONITORED TO ACKNOWLEDGE WHEN GENERATOR LOADING IS OVER 70%; OPERATIONAL STAFF SHALL MAKE OPERATIONAL CHANGES AS REQUIRED TO ENSURE GENERATOR LOADING DOES NOT EXCEED ISO 8528-1 RATINGS.

Figure 1: Estimated Generator Loading Percentage Utilizing Peak Demand from Existing Test Data and Added EHRM Loads with Demand Reductions.

LIST OF SPECIALTY AREAS:

No specialty areas are included in the subject project.

METHOD OF SHORT-CIRCUIT CALCULATIONS:

Short-circuit calculations will be based off existing short-circuit study results; where those results are not available, calculations will be based off of infinite bus calculations. Where appropriate, short-circuit values will be included on one-line diagrams and will be coordinated with all electrical distribution equipment as required.

METHOD OF VOLTAGE DROP AND DEMAND CALCULATIONS:

Voltage drop and power demand calculations were conducted per the NEC. Calculators and panel schedules provide NEC based calculations for both voltage drop analysis and power demand

calculations. This information was used to size electrical distribution equipment including, but not limited to, cables/conductors, raceways, and panelboards.

UTILITY COMPANY CORRESPONDENCE:

Not required for the subject project.

SCOPE OF WORK BY TASK:

Telecommunications Rooms (TR) - Each Telecommunications Room requires both source A and source B power. Providing source A and source B power provides increased power reliability and enables zero downtime when maintenance is required on one of the sourcing circuits. Preferably, both source A and B should have backup generator power; however, this is not possible or feasible for all installations.

New, Relocated, or Expanded TRs:

- For all new and most relocated or expanded TRs, A/E is providing each of the TRs with (2) new panelboards, (1) for source A and (1) for source B power. The A/E is proposing to provide power to each new panelboard via the main distribution equipment at each building. Where existing gear has the circuit breaker capacity to provide new feeder circuit breakers for each new panelboard, it has been utilized as such. Otherwise, (1) feeder breaker will be added to the existing distribution equipment to power a new distribution panel; this new distribution panel will be specified to provide enough feeder circuit breakers to provide circuits to all new source A and source B panels in that building.
    - In some cases, the above narrative was not feasible due to the individual building's power topology and/or equipment capacity. Due to this fact, different solutions were provided as needed. In these cases, a full building shutdown may be required.
    - Per RFI response from VA, AE will not be providing a 'B' side panelboard for non-healthcare buildings where a single transfer switch provides full standby power to building.
    - Per RFI response from VA, AE will avoid utilizing existing FPE switchboards where feasible; if not feasible, existing spare circuit breakers can be used but no circuit breakers should be added to the FPE switchboards. Smaller obsolete panelboards may be demolished and replaced as required.
- Notes 4 and 5 in Figure 2 below indicate the source A and B panelboards. Each new panelboard would be 120/208V, 3-Phase, 4-wire.

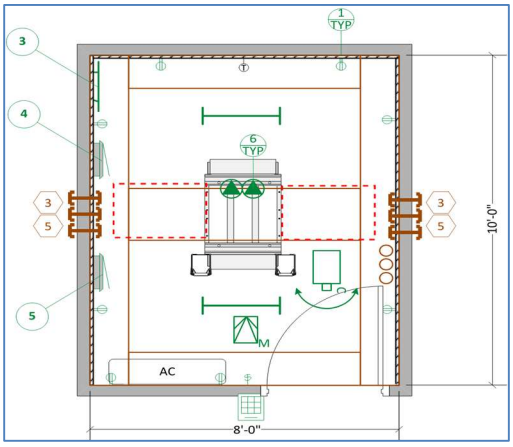


Figure 2: Telecommunications Room – (1) Rack Layout *(OIT Design Guide Template, V3.1)*

- The schematic in Figure 2 below shows how source A and B power is distributed to the rack. Each source (or panelboard) provides power to one of the 20A receptacles which in turn provides power to the rack equipment.
- TR rack mounted UPS systems shall be 5kW, 3-phase with L21-20 input/output connections as shown below in figure 3.
- TR rack bonding and grounding elevation is shown in figure 4; example “B” will be used in this project.

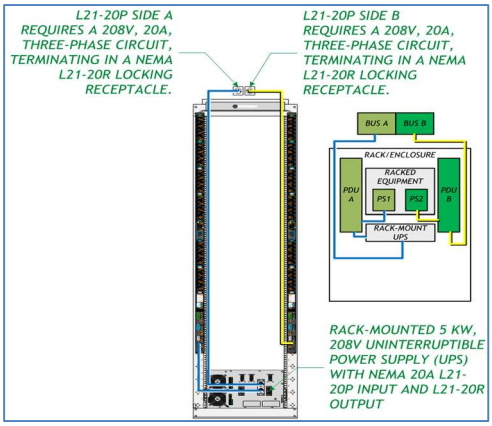


Figure 3: TR Single Rack Elevation and Power Schematic *(OIT Design Guide Template, V3.1)*

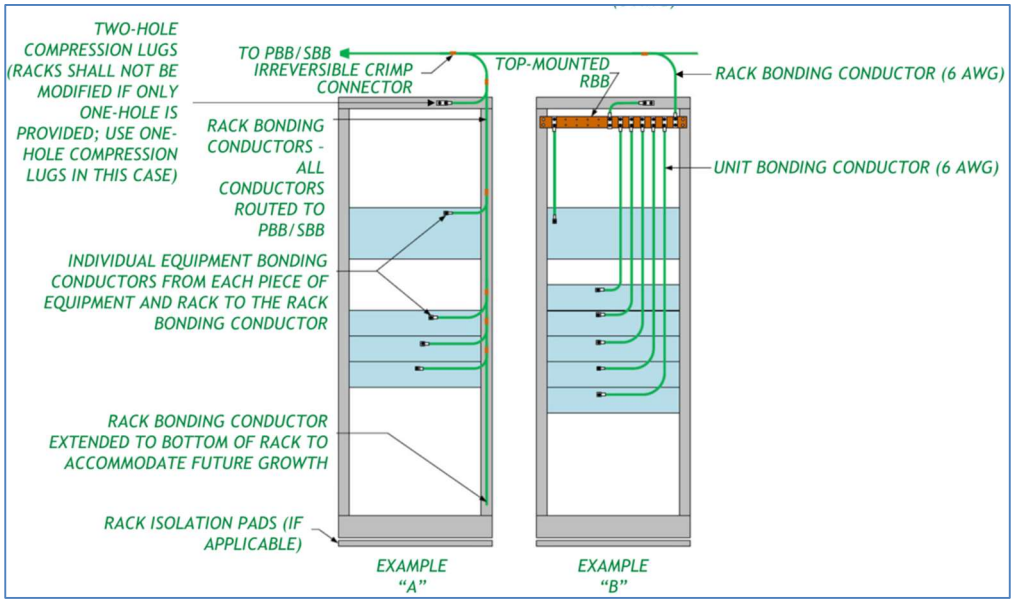


Figure 4: TR Single Rack Grounding and Bonding Detail *(OIT Design Guide Template, V3.1)*

Telecommunications Enclosures (TEs) will be provided per design alerts, Telecommunications Enclosure Design Guide, and based on direct VA coordination. Each TE will be designed to the below OIT TE design template as shown in figures 5 and 6. All TE and TR locations can be found in schedule "TELECOMMUNICATIONS WAO AND CABLE TRAY SCHEDULE", column "TOTAL DATA RACKS PER TR", sheet ET701.

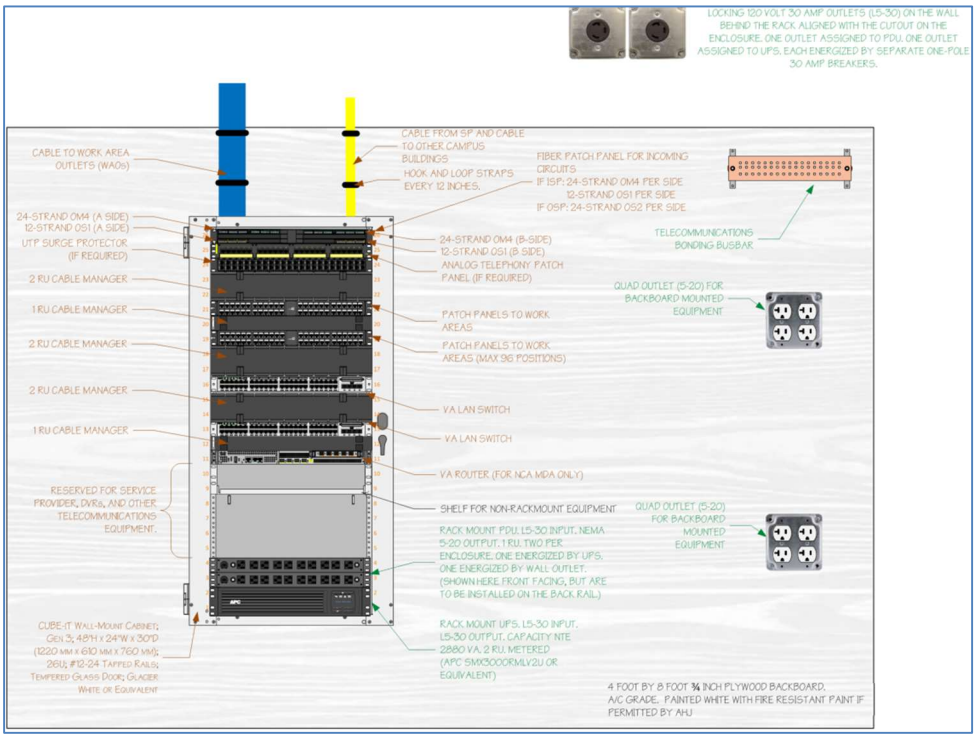


Figure 5: TE Installation Elevation *(OIT Design Guide Template)*

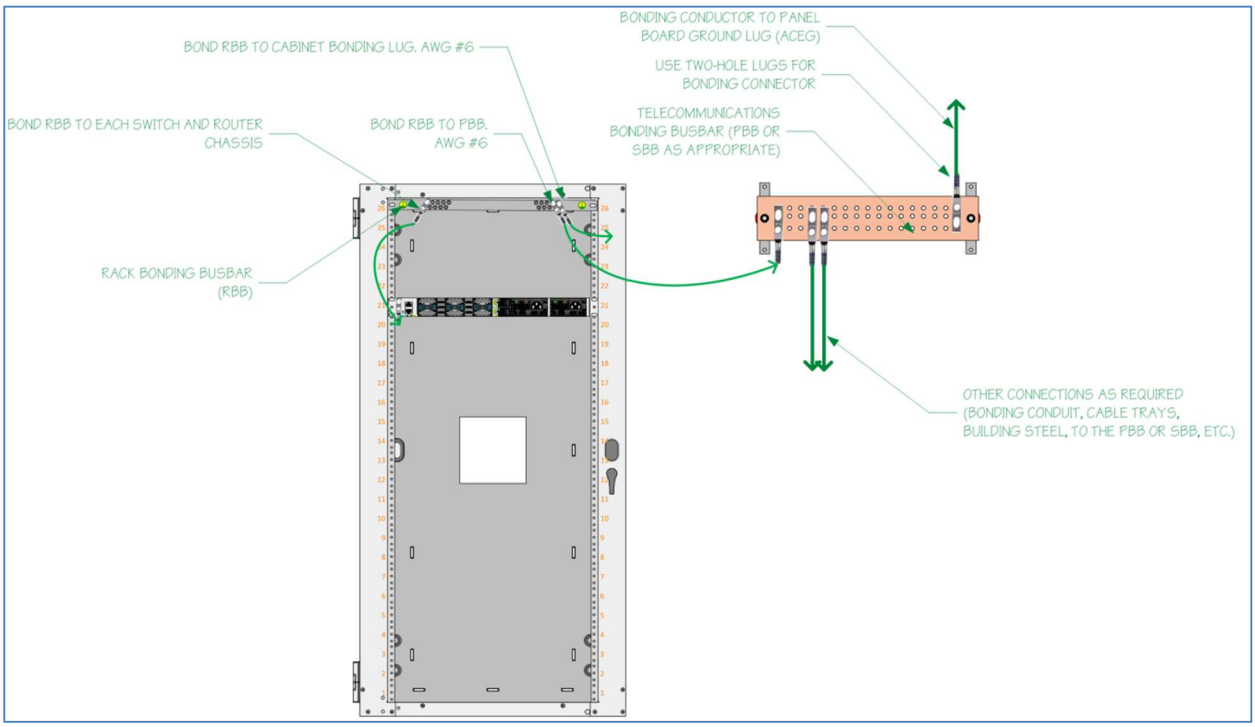


Figure 6: TE Grounding Elevation *(OIT Design Guide Template)*

All other TRs:

- All other existing or relocated/expanded TRs that are not being provided with new panels utilize the local existing panels as needed for the new TR equipment installation.
- All panelboards are provided with power metering equipment.

The following indicates the power and lighting requirements laid out by VA standards that we are utilizing for our basis of design.

- Power Equipment:
  - Source A and Source B panelboards.
  - Source A and Source B twist-lock receptacles and/or 60A power junction box(es).
  - Two duplex receptacles on each wall.
  - Secondary bonding busbar.
- Lighting:
  - LED linear lighting (50 Foot-candles, minimum average)
  - Motion Sensor light switch.

All existing power distribution equipment being used to power additional loads are required to be load monitored for peak demand power for 30-days per NEC 220.87, unless existing demand power data currently exists for said equipment. Load monitoring has been performed by the A/E for all identified power distribution equipment where loads are being added, and has been used to validate the current design.

Data Center/Main Computer Room (MCR) - The existing Data Center will be relocated to a standalone new building, which is rated mission critical and adheres to the VA's Physical Security and Resiliency Design Manual. The following indicates the general electrical requirements for the new Data Center:

1. Two diversly routed and redundant power feeds with at least one feed backed by generator power.
2. A redundant UPS system to backup the entire Data Center IT equipment has been provided. This UPS is modular and batteries are sized to provide a minimum runtime of 10-minutes at full load. UPS system is sized to provide 100% of the anticipated load (known and future projections). The UPS is sized to 80kW to support the 79.6kW load; the frame size of the unit is 120kW. The EATON 93PM is the Basis-of-Design for the UPS.
3. UPS emergency power off (EPO) and associated data center HVAC shutdown switches are provided at each MCR exit and are NFPA 75 compliant.
4. UPS batteries are monitored per the ISTS. Additionally, battery off-gassing is calculated to ensure proper ventilation is provided. Lithium-ion batteries are not permitted. UPS emergency power off (EPO) switches are provided at each MCR exit and shall be NFPA 75 compliant.
5. The new Data Center MCR shall be NFPA 75 and 2001 compliant and shall include the following clean agent / fire alarm systems:
    a. Detection in the data center for early detection and system discharge; early detection via smoke detectors, manual detection / actuation via Information Technology Equipment (ITE) EPOs, HVAC Shutdown switches, and manual release.
    b. Valve on the main supplying the sprinklers in the data center is monitored via tamper and flow switches.
    c. Fire dampers and/or combination fire/smoke dampers in duct penetrations of the data center boundaries are tied into the Fire alarm system and power is provided as required.
    d. Provided emergency lighting.
    e. Clean agent system includes detection, pre-discharge alarms, abort switch, manual discharge switch, maintenance lock-out, suppression system alarm panel; it also interfaces with the existing building fire alarm system.
6. All cabinets receive A-source and B-source power from respective A/B-source UPSs through separate A/B-source powered busways with metered headends. Powered busways shall be installed overhead with adequate single circuit breakers (208V, 20A) feeding L21-20R busway tap receptacles. See the figure below for additional information:

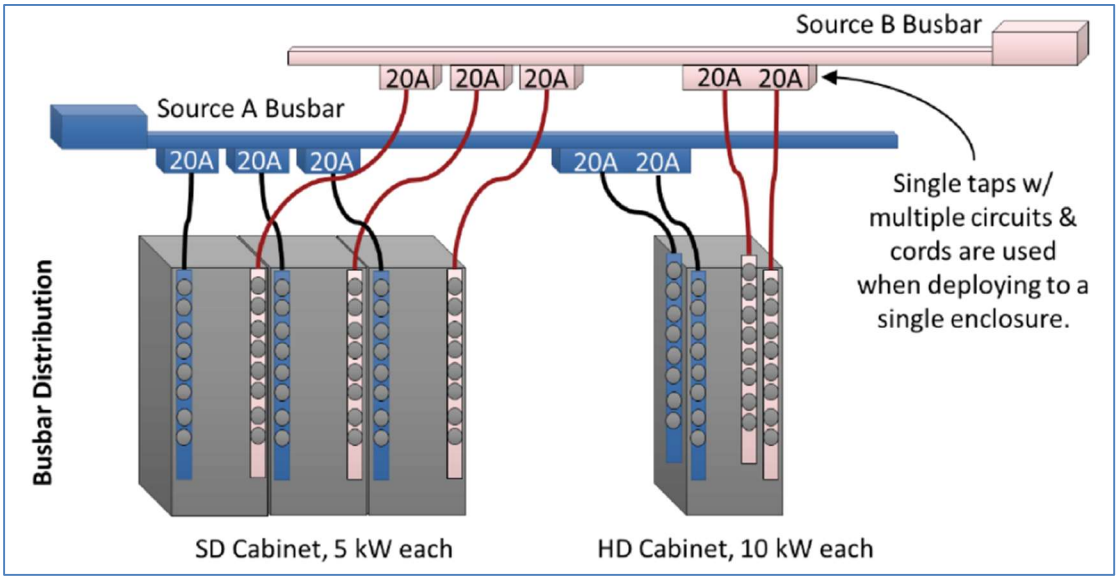


Figure 1: A/B-Source Cabinet Power Distribution

7. General wall mounted convenience receptacles shall be mounted throughout the space.
8. Grounding and Bonding: Data center is fully grounded and bonded per the ISTS standard. This includes providing and bonding the following: Telecommunications Bonding Backbone (TBB), Primary Bonding Busbar (PBB), Secondary Bonding Busbar (SBB), Telecommunications Equipment Bonding Conductor (TEBC), Supplementary Bonding Grid (SBG), Rack Bonding Busbar (RBB), and electrode grounding system (EGS). All bonding conductors, including the TBB, follows sizing requirements specified in ANSI/TIA-607-D. Bonding equipment consists of exothermic connectors and/or irreversible crimp connectors. The building EGS should obtain a resistance-to-earth of 5 Ω or less as measured by the four-point fall-of-potential method according to IEEE 81.
9. A Lightning Protection System (LPS) is provided for the data center; LPS adheres to NFPA 780 and VA Electrical Design Manual requirements. LPS equipment shall be roof mounted and properly bonded and extended to ground.
10. Lighting has been designed to a minimum average of 50-FC utilizing LED fixtures and adheres to the following ISTS requirements:
    a. Level 1: IT support space unoccupied - lighting should be sufficient to allow effective use of video surveillance equipment. Level 1 shall be provided in all IT support spaces.
    b. Level 2: Initial entry into the IT support space - motion sensors should be used to activate lights in the immediate area of entry and be programmed to illuminate aisles and passageways. Sufficient lighting should be provided to allow safe passage through the space and to permit identification via security cameras. Level 2 shall be provided in all IT support spaces.
    c. Level 3: Occupied space - when the IT support space is occupied for purposes of maintenance or interaction with equipment, lighting shall be 500 lux in the horizontal plane and 200 lux in the vertical plane, measured 3 ft above the finished floor in the middle of all

aisles between cabinets. Level 3 is a requirement in all IT support spaces except for entrance rooms and TRs.

11. The data center houses an Automated Energy Metering system to monitor and report all data required by the ISTS.
12. Redundant HVAC equipment is circuited to separate generator-backed distribution equipment to ensure proper cooling during prolonged power events and maintenance. This N+1 topology removes a single point of failure.

100% CD2 DESIGN UPDATES

- General
  - Metering Data was incorporated into the design.
  - Comment pickups from the 95% R1 review comments were captured.
  - EF Fire alarm sheets were reviewed and stamped by FPE.
- Building 15E/15H
  - Reducing conduits provided to A-side and B-side TR panelboards by using a conduit riser.
- Building 18:
  - Section ‘1’ of Switchboard “Little Room DP” is being replaced to accommodate a 1200A Frame, 100% rated main circuit breaker. Existing Section cannot support the revised circuit breaker, and was confirmed with manufacturer.
  - Pulling A / B power from (2) spaces on "Building 18 ICU Main" distribution equipment downstream Switchboard "Little Room DP".
  - Reducing conduits provided to A-side TR panelboards by using conduit riser.
- Building 19:
  - No longer replacing Panel "Bldg 19 1st"; re-feeding from a new panel.
- Building 115:
  - Providing a life safety ATS and panelboard (100A).
  - Replacing visual only Fire alarm equipment with audio/visual fire alarm equipment throughout building.

TELECOMMUNICATIONS NARRATIVE

NARRATIVE

This project shall upgrade the existing IT infrastructure and equipment to comply with the new VA Electronic Health Record Modernization (EHRM) system requirements. The design complies with applicable VA design guides.

Selected telecommunications rooms (TRs) were designed to be expanded, renovated, or relocated to meet VA Infrastructure Standards for Telecommunications Spaces (Version 3.1, July 1, 2021). The VA provided recommended actions for each TR (expansion, renovation, or relocation) as indicated in the SOW and associated Readiness Assessment; further general requirements for each TR have been provided in the SOW and associated Readiness Assessment (power, ups, cabling, etc). The project scope includes the following locations: Buildings and site per executive summary.

Design of new Telecommunications rooms include equipment racks, patch panels, grounding, and new cabling as required. Telecommunications cabling rated Category 6 and below will be replaced with Category 6A cabling. New data outlet locations require a conduit size of 1-1/4" minimum to accommodate a maximum of 4 cables (due to the larger cable diameter); this is necessary to comply with conduit fill ratios. Existing conduit, assumed to be ¾" EMT, may be re-used for replacing existing cabling for up to (2) CAT 6A cables but all conduit and cable tray fill will need to be verified prior to reuse; if required, existing raceways will be demolished and new raceways will be provided for increased cable size. If a new CAT 6A data outlet is being added, a 4" square box with a single gang reducing mud ring will be provided for cabling bend radius requirements. Each work area outlet (WAO) is shown with 2-ports, (1) for data and (1) for telephony per ISTS; these are rated for Category 6A compliance and utilize angled inserts (jacks) and faceplates for optimum compliance with the cable manufacturers bend radius.

The design establishes construction phasing requirements to ensure that critical systems will remain operational until they can be cut over to the new infrastructure.

A site data survey identifying all existing WAOs was completed prior to the 65% submittal. The quantity of these WAOs can be seen in the drawings on sheet ET701 in the schedule entitled "TELECOMMUNICATIONS WAO AND CABLE TRAY SCHEDULE". The A/E design team and VA station are currently in the process of evaluating Design Alert 16 in accordance with the SEP-provided Active Port Counts recommendations. These evaluations are ongoing and will be fully captured in the final submittal.

FIBER-OPTIC BACKBONE (OSP & ISP)

Telecom SD Narrative (Fiber):

- The current fiber infrastructure patterns a star topology distributed out of Building 9. Building 9 has served as the Data Center, and with construction of the new Data Center adjacent to Buildings 18 and 111, the existing fiber star will no longer fully support the campus network.

- A new ring design with diverse A and B paths originating from the new Data Center encircles the campus buildings within the project scope. The A and B paths need to share many routes to logically connect the buildings. Rings A and B will be constructed in opposing directions, clockwise and counterclockwise, to provide redundancy. The fiber ring consists of segments both inside and outside plant. Where feasible, building entrances are physically separated by 70 ft. Where fiber routes together inside of building corridors, a minimum of 10 ft. physical separation is maintained. Fiber to non-patient care facilities is encased together in one duct bank. The recommended route as shown through the Northern row of buildings utilizes their lower level connecting corridors.
- All known campus utilities have been identified and evaluated for conflicts where proposed fiber routes are located. Fibers are routed with consideration of future development, staying clear of open spaces on site and as close to roadways as possible.
- Two redundant ISP routes to the new Data Center is the responsibility of the ISP providers in coordination with the VA, but it is observed that existing or planned routes may be able to be coordinated to support those services.

Outside Plant (OSP) Backbone Design Intent:

- Two, redundant and diverse, 24-strand OS2 indoor/outdoor SM fiber-optic cable rated assemblies are used for OSP and long-distance transmission for requirements exceeding the capabilities of MM fiber.
- Any new ducts or duct banks required have been sized for expansion and include spares; where practical, minimum conduit size is 4”.

Inside Plant (ISP) Backbone Design Intent:

- ISP horizontal and intra-building backbone utilizes a combination of OM4 Multi-Mode (MM) fiber-optic cable and OS1 Single-Mode (SM) fiber-optic cable. The intra-building backbone between TRs and MDAs consists of a minimum of (2) 24-strand MM cable assemblies and (2) 12-strand SM cables from both A and B-side of the MDAs. All fiber-optic cable feeds are designed to be redundant and diversely routed.
- In instances where intra-building distances exceed the OM4 MM limit, OS1 SM is used in its place. In that case, (2) 24-strand cable assemblies are required.

EXISTING SYSTEMS

All existing conditions have been taken from the available existing as-builts, VA provided Readiness Assessment, and the A/E’s site visits. Please reference the below “SCOPE OF WORK BY BUILDING AND TASK” for additional information.

SECURITY

For the expanded or relocated TRs, each are provided with new security provisions as required including, but not limited to, a PIV enabled two-factor authorization access control key-pad, electric strike, dual technology PTZ camera, siren, request-to-exit, and motion control sensors.

All new TRs are provided with the required security features per the VA Telecom and Physical Security standards.

FIRE ALARM

Design is in accordance with the latest editions of the NFPA 101 Life Safety Code, VA Fire Protection Design Manual, and the International Building Code (IBC). Where life safety systems are impacted during construction, the design addresses interim life safety measures to be implemented as part of the construction documents. Any new fire alarm devices required is specified to match the existing installed base to provide conformity and modularity.

Smoke partitions and fire alarm zones and devices are coordinated with during the TR upgrades/relocations as required. Existing fire alarm devices located in areas where TRs are to be relocated or established will be demolished.

SYSTEM MODIFICATIONS

Communication structured cabling infrastructure with a UL Listing of Category 6 and below shall be upgraded to Category 6A data outlets, patch panels, and data cables. Please reference the below "SCOPE OF WORK BY BUILDING AND TASK" for additional information.

SCOPE OF WORK BY BUILDING AND TASK

This renovation project consists of upgrading the campus's existing electrical and IT infrastructure to provide the required elements for the new EHRM system. The telecommunications scope of this project includes the following infrastructure improvements:

- Reconfiguration, expansion, and renovation of existing TR spaces throughout the buildings in the scope of work for this project.
- Communication infrastructure (new data outlets, patch panels, data racks, upgrade to Cat 6A cable) in buildings as necessary, physical security upgrades, assess and upgrade fiber infrastructure backbone campus wide within buildings and between buildings.
- Provide OSP/ISP diversified/redundant paths from Data Center to individual TR rooms.

Wherever possible, this design for this project aims to meet or exceed all requirements as indicated in the latest edition VA Design Standards and other VA Operations Manuals; where deviations occur as a result in dealing with existing conditions, A/E has notified the VA to provide direction of required work. As part of the scope, on-site investigations of the existing systems have been conducted to determine existing conditions and possible options to provide the best solution for each project upgrade.

Onsite investigations included field verifying the following:

- All existing telecommunications installations such as existing concealed conduit runs, conduit, cable termination types/sizes, telecommunication, and systems equipment locations, etc., which potentially impact new installations.

- Expansion-Identified Rooms: Field verify the required expansion space; coordinate with architectural and mechanical as needed. Verify all additional electrical, IT, or mechanical requirements as needed.
- New/Relocated Rooms: Field verify existing available electrical, IT, and mechanical equipment for the proposed room; note, which equipment would be relocated/reused, salvaged, or demolished. Typically, new spaces will require a complete new build out prior to any modifications of the existing spaces because critical OIT and other important equipment reside on walls that would be demolished. The new spaces should be fully operational before any demolition work is started in the existing spaces.
- Site Infrastructure: Verify and as-built all relevant manholes/vaults, pull boxes, and raceways as required to accurately model and design the new IT site wide infrastructure.

TELECOMMUNICATIONS ROOM (TR)

Serves as the transition point between horizontal and backbone cabling systems. TRs contain all Local Area Network (LAN), security, video distribution, paging, and any other system that serves the TR zone. The following indicates the requirements laid out by VA standards that we are utilizing for our basis of design. Note: Due to existing conditions, all criteria may not be possible; all issues and solutions were coordinated with VA for approval.

- Size:
  - Non-Healthcare Facility: 80-SQFT for (1) rack, every additional rack adds 20-SQFT.
  - Healthcare Facility: 170-SQFT for (4) racks, every additional rack adds 20-SQFT. If 170-SQFT is not achievable due to existing conditions, Design Alert 6 provides a reprieve from the ISTS standards for existing buildings; healthcare buildings will require a minimum of 100-SQFT TRs.
  - Defining the size of the required TR is determined by the number of required data racks. Reference the data rack paragraph below for further basis-of-design details.
- Location:
  - Provide at least (1) TR per floor.
  - Additional TRs per floor are generally required when the horizontal cabling distance to the work area exceeds 295-FT.
  - On buildings with multiple floors TRs shall be stacked where possible.
  - TRs should try to be located at least 20-FT away from the following areas: Electrical rooms, mechanical rooms, imaging equipment, other electro-magnetic field producing equipment.
  - TRs should try not to be located adjacent to the following areas: Elevator shafts, large chases, or stairwells.
- Telecommunications and special systems equipment to be housed in each TR location includes the following:
  - Raceway entry points into TR:
    - Sleeve for Main Cross Connect (Campus/Building Distribution) and/or sleeve for Backbone Cabling (MCR to TR).
    - Sleeve horizontal distribution to Work Area Outlets (WAO).
    - Sleeve or conduit with bushing firestop and interduct for fiber.

- Cable Tray shall be utilized for horizontal cabling to WAO and backbone or main cross connect cabling.
- Data Racks (quantity as required for coverage). Reference the data rack paragraph below for further basis-of-design details.
- Security Equipment
  - Camera with Pan-Tilt-Zoom, passive infrared dual technology.
  - Motion sensor (quantity as required for coverage).
  - Siren.
  - PIV enabled two-factor authentication keypad.

We have conducted 80-Meter horizontal cable studies (AKA – Diamond Study) for each existing and proposed new or relocated TR per the VA provided Readiness Assessment; these horizontal cable studies are included in the attached appendix.

Data racks shall be a minimum of 84-in tall, 45 Rack Units (RU), white finish, with cable management; Ortronics MM20 will be the Basis-of-Design. These racks will house a combination of active and passive components including, but not limited to: Fiber and ethernet patch panels, ethernet switches, wire managers, blanking panels, UPSs, and Power Distribution Units (PDU). Currently, we have determined the number of racks required in each TR per the required amount of horizontal cabling patch panels; utilizing the VA standard of the rule of 1/3's, each rack will be separated into 3 sections. The top sections will be utilized for patching, the middle section will be utilized for switching, and the bottom section will be utilized for power distribution equipment. Additionally, (6) UTP patch panels will be the maximum amount allowed; with a 48-port patch panel each TR rack can support up to 288 WAOs/data connections.

DATA CENTER & MAIN COMPUTER ROOM (MCR)

The new Data Center is rated mission critical and adheres to the VA's Physical Security and Resiliency Design Manual. The following indicates the general telecommunications requirements for the proposed Data Center:

1. Two diversly routed and redundant telecommunications feeds (A-side and B-side) from each entrance room (service point) and to each individual TR with no intermediate cross-connects.
2. The data center houses the following telecommunications equipment:
   a. Redundant Main Distribution Areas (MDA), A-side and B-side.
   b. Redundant Horizontal Distribution Areas (HDA), A-side and B-side.
   c. High-Density (HD) and Standard-Density (SD) server cabinets as required for the facility's telecommunications needs.
   d. Two levels of wire mesh cable tray shall be provided. The lower level will be provided for horizontal cabling and the upper level will be provided for fiber backbone cabling.
   e. Fire-rated sleeves shall be provided as required for the following as required:
      i. Service Backbone – From entrance room(s) to Data center.
      ii. Main Cross-Connect – From Data Center MDA to each individual TR.
3. Security systems including, but not limited to, the following:
   a. Camera with Pan-Tilt-Zoom, passive infrared dual technology.
   b. Motion sensor (quantity as required for coverage).

c. Siren.
d. PIV enabled two-factor authentication keypad.
e. Request-to-exit.

GENERAL (ALL BUILDINGS)

Based on as-built documents and site findings, the following indicates the upgrade requirements and/or current deficiencies for each building:

- General:
  - Cabling and WAO will be revised for CAT 6A cabling as required.
  - Relocate or extend existing IT closets to meet VA Infrastructure Standards for Telecommunications Spaces, unless otherwise directed by VA. A Minimum of 3 feet of clearance is required in front and back of each rack. All racks, UPS units, and other equipment are to be seismically braced.
  - In general, all rooms that require WAO have been provided with (2) 2-port data outlets. Specialty or larger rooms may include additional ports/outlets.
- TR Locations: Reference the attached Diamond Study for current TR locations.

100% CD2 DESIGN UPDATES

- Interior Fiber Pathways: Changed from standard fiber cables routed in conduit to each telecom room to using armored-clad optical fiber cables.
- Provided core drills and pathways (STI #NEZ and #EZDP series) to route cables through walls and floors.
- Exterior Conduits: stub through building walls, then route armored fiber in j-hooks in lieu of conduits.
- Added general note for 10% WAO bid overage for each building for Contractor.

SPACE PLANNING

FACILITIES PLANNING

The A/E has worked directly with the COR and facilities planning to accommodate as many of the requirements as possible while working to meet the local needs of the Castle Point VAMC campus and the VA design requirements. The A/E has identified spaces that do not meet requirements and has included these on the updated exceptions memo or variance request as appropriate.