Fire Protection Project Overview

Fire Protection scope

The fire protection design narrative is intended to satisfy the requirements of the VA Fire Protection Design Manual, A/E Submission Instructions for Minor and NRM Construction Program, and SOW. The author of this fire protection narrative is Gus Gagliardi, PE of Rated Engineering. Gus Gagliardi is serving as the project Qualified Fire Protection Engineer as required by the Department of Veterans Affairs “Qualifications and Scope of Services - Project Fire Protection Engineer” document.

While this project includes the evaluation of life safety and code compliance applicable to the scope of work, the life safety scope of work is being performed by Spur Engineering, with Rated Engineering’s review. Refer to the architectural narrative for life safety design scope. This project consists of upgrades to existing telecom spaces to meet new Electronic Health Record Modernization (EHRM) requirements. These upgrades include but are not limited to; space programming, grounding, and emergency power associated with the scope of work.

The main computer room (MCR) 3A109, which is in building 77 on floor 3, is not compliant with current VA telecommunications standards. The project scope involves renovation of an existing space near the existing MCR to serve as a new MCR. The MCR is required by VA standards to have clean agent fire suppression system and very early warning detection system.

The building tenant/owner is the Department of Veteran Affairs located at James H. Quillen VA Medical Center (JHQVAMC).

Existing system description

The fire alarm system for the building is a voice evacuation system utilizing speakers and strobes for notification. The SOW area has existing speaker strobe coverage. The initiation devices existing in the SOW are spot type smoke detectors within the storage room 3A113. The fire sprinkler system for the renovated space is a wet pipe sprinkler system. The existing MCR is protected with a pre-action fire sprinkler system. The facility is provided with fire alarm system which reports to a network node for the campus. Existing TR are not required to have initiation devices or notification appliances by the VA fire protection design manual.

All the spaces within the SOW are provided with protection by a wet pipe sprinkler system. The TR rooms are unfinished spaces with exposed ceilings. Each sprinkler that protects the space must be upright in orientation. The sprinkler heads are supplied by one inch schedule 40 piping. Modified sprinklers are required to have a maximum spacing of one per 130 square feet.

Selective Demolition

Fire alarm and sprinkler systems will be demolished as necessary to facilitate any modification

to TR and MCR layout. Existing level of fire protection will be maintained throughout any modified spaces. No major outages are anticipated for fire protection related work.

Proposed System Description

The fire protection system scope consists of maintaining existing fire sprinkler and fire alarm system protection in accordance with the applicable codes and standards. 3.7(B) paragraph 3 from the VA fire protection design manual (VAFPDM) states "*Standard response fusible link sprinklers will lessen the chance of a sprinkler being accidentally broken and will still provide structure protection since a standard response head is more robust and harder to break than a typical glass bulb quick response sprinkler.*" To comply with the design guide requirement all sprinkler heads within the TR rooms will be replaced with standard response fusible link sprinklers. If TR room layout is modified the fire alarm and sprinkler systems will be adjusted to maintain the existing system coverage.

The existing MCR is provided with a pre-action system. The VA fire protection design manual section 6.1(C) prohibits pre-action type systems. The existing fire sprinkler coverage will be modified within spaces 3A112, 3A112D, 3A113, and 3A113A. The maximum sprinkler coverage, response type, and fusible element style will be modified to comply with the VAFPDM and applicable criteria. New fire sprinklers installed in the MCR space are required to comply with VAFPDM section 3.7(B) paragraph 3 which requires standard response fusible link sprinklers.

VAFPDM section 3.7(C) paragraph 1 requires that telecommunications spaces that are classified as life-safety protected must be provided with early warning fire detection. Table 28 in the VA infrastructure standard for telecommunications spaces indicates VESDA as a basis of design for aspirating smoke detection. The VAFPDM section 3.7(B) requires that mission critical or life safety protected with mission critical utilities/system redundancies must be protected with clean agent gaseous suppression. The new MCR is designed to be provided with clean agent gaseous suppression utilizing Novec 1230 as the basis of design agent. The new MCR will also be provided with a wet pipe sprinkler system in accordance with the VA Fire Protection Design Manual and all applicable criteria.

Phasing

No phasing indicated in scope of work.

Commissioning

The system will be commissioned subject to the requirement of Section 0191 00 General Commissioning Requirements

Seismic Requirements

- Seismic design category for the facility is Category D based on the structural

engineering drawings. In accordance with this design designation seismic protection is required.

Applicable Codes and Standards

- NFPA 13 Standard for the Installation of Sprinkler Systems – 2025 Edition
- NFPA 72 National Fire Alarm and Signaling Code – 2025 Edition
- NFPA 101 Life Safety Code – 2024 Edition
- NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems – 2025 Edition
- VA Design Guide Infrastructure Standard for Telecommunications Spaces – Edition 3.1 – July 1, 2021
- VA Fire Protection Design Manual – Ninth Edition – November 1, 2023

Tests Prior to Design

- Any system modifications to fire alarm would require testing to ensure installation did not adversely affect overall system.

Fire Sprinkler design

- Occupancy: See architectural narrative for life safety analysis.
- Classification: Light Hazard and Ordinary Hazard 1 (NFPA 13 Hazard Classification Table 5.0).
- Pipe Material: Per NFPA 13 requirements.

Wet-Pipe Sprinkler Systems

- Fire Service Entrance – Not in SOW.
- Space Occupancy Classifications:
  - See Architectural narrative for occupancy classification, All TR rooms are classified as Light Hazard, 0.1 gpm/sq.ft.
    Ordinary Hazard Group 1, 0.15 gpm/sq.ft.
- Pipe Material and Sizes
  - 2-inches and smaller shall be steel, Schedule 40
  - 2 ½-inches and greater may be steel, Schedule 10

Manual Dry Standpipe Systems

- Not applicable to SOW.

Dry-Pipe Sprinkler Systems

- Not applicable to SOW.

Clean Agent Fire Suppression Systems

As mentioned in the SOW section, gaseous suppression systems are required for the MCR /Data Center renovation. The facility currently utilizes FM-200 for its existing MCR. FM-200 is a hydrocarbon clean agent that is being phased out for sustainability concerns. Novec 1230 is the proposed new clean agent. Novec 1230 is one of the three approved clean agents by the VA fire protection design manual. 3M is discontinuing the production of Novec 1230. There are multiple Novec 1230 chemical equivalents that are available such as BestSolv Zulu FS. Zulu FS provides equivalent fire suppression and agent quantities. Therefore, a ready supply of the agent the renovation is design for will be available. The only other clean agent option acceptable by the VA is Inergen. Inergen is an inerting agent that has a higher design concentration requirement. Preliminary calculations indicate that use of Inergen would require more than three times the quantity of agent/cylinders. The renovated space extents is a limiting factor for the agent storage. The quantity and weight of storage of Inergen is prohibitive for the renovation.

The new MCR is to be provided with an early warning fire detection system, which the basis of design will be an ASD Vesda system. The HVAC units for the MCR are rated for 34,228 CFM combined. This equates to nearly 130 air changes per hour. A high air change environment is any space that has more than eight changes per hour per NFPA 72 table 17.7.7.3.3.2. As such aspirating smoke detector device placement is a maximum of 125 square feet.

Electric-Driven, Fire Pumps

- Not applicable to SOW.

Diesel-Driven, Fire Pumps

- Not applicable to SOW.

Special Electrical Systems

- Sprinkler system will be monitored by building fire alarm system.
- See Division 28 for Fire Detection and Alarm for related requirements.

End Fire Protection