

**Veterans Administration Medical Center
White River Junction, Vermont**

**Inpatient Ward Renovation
Building 31
VAMC Project 405-13-104**

**Project Manual
Volume 1
Divisions 0 through 13**

***Issued for Bidding, Permitting & Construction
September 30, 2022***

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Inpatient Ward Renovation
White River Junction, Vermont

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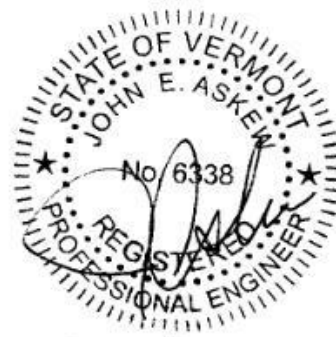
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SECTION 010000 GENERAL REQUIREMENTS

1.1 SAFETY REQUIREMENTS

- A. Refer to section 013526 - GOVERNMENTAL SAFETY REQUIREMENTS.
- B. Refer to Section 013533 - INFECTION CONTROL REQUIREMENTS.

1.2 GENERAL INTENTION

- A. The purpose of this project is to renovate approximately 20,000 square feet of the inpatient unit to bring it up to current standards of care located on the 1st floor in building 31 at the White River Junction VA Medical Center, VT. The existing and new finished space is a medical and surgical inpatient unit. Work shall include architectural, structural, plumbing, mechanical and electrical and all such systems and components as may be necessary to completely renovate this inpatient unit.
- B. Offices of **e4hArchitecture** MorrisSwitzer Environments for Health, as Architect/Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Project Engineer/VA-COR.
- C. Before placement and installation of work subject to tests by testing laboratory retained by the Contractor, the Contractor shall notify the Project Engineer/VA-COR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the Project Engineer/VA-COR.
- D. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.
- E. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" (CP) (29 CFR 1926.20(b)(2)) will maintain a presence at the work site whenever the general or subcontractors are present.
- F. Training:
 - 1. All employees of general contractor or subcontractors shall have the 10-hour OSHA certified Construction Safety course and or other relevant competency training, as determined by the VA CP with input from the Construction Safety Committee of VAMC White River Junction.
 - 2. Submit training records of all such employees for approval before the start of work.

1.3 STATEMENT OF OFFER ITEM(S)

- A. ITEM I, Work includes the necessary supervision, labor, equipment, material, transportation, testing, site surveying and infrastructure required to complete work for Inpatient Ward Renovation, Project No. 405-13-104, White River Junction Veterans Affairs Medical Center, White River Junction, Vermont in accordance with the Contract Documents, including Technical Specifications and Drawings. Work includes, but is not limited to, general construction, constructing an addition, selective demolition, alterations, ceilings, casework, carpentry, partitions, doors, louvers, finishes, miscellaneous specialties, exterior cladding, metals, roofing, mechanical, electrical, plumbing, fire protection, telephone and data cabling, security systems, equipment, site utilities, site work and certain other items.

1.4 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

- A. AFTER AWARD OF CONTRACT, A single CD-ROM of the contract documents in pdf format will be furnished.
- B. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from the CD-ROM furnished by the Contracting Officer or the Project Engineer/VA-COR.

1.5 CONSTRUCTION SECURITY REQUIREMENTS

- A. Security Plan:
 - 1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
 - 2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.
- B. Security Procedures:
 - 1. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
 - 2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 day's notice to obtain approval of the Project Engineer/VA-COR so that security and escort arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
 - 3. No photography of VA premises is allowed without written permission of the Project Engineer/VA-COR.
 - 4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Project Engineer/VA-COR.
- C. Key Control:
 - 1. The General Contractor shall provide duplicate keys and lock combinations to the Project Engineer/VA-COR for the purpose of security inspections of every area of project including tool boxes and parked machines and for the purpose of taking any emergency action.
 - 2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 087100, DOOR HARDWARE and coordinate.
- D. Document Control:
 - 1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
 - 2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
 - 3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Project Engineer/VA-COR upon request.
 - 4. These security documents shall not be removed or transmitted from the project site without the written approval of Project Engineer/VA-COR.
 - 5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
 - 6. Notify Project Engineer/VA-COR and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
 - 7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
 - a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.
 - b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.
- E. Motor Vehicle Restrictions:
 - 1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.

2. Separate permits shall be issued for General Contractor and its employees for parking in designated areas only. Parking in designated patient parking is strictly prohibited as is parking on grass.

1.6 FIRE SAFETY

- A. Applicable Publications: Publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.
 1. American Society for Testing and Materials (ASTM):
E84-2008 Surface Burning Characteristics of Building Materials
 2. National Fire Protection Association (NFPA):
10-2006 Standard for Portable Fire Extinguishers
30-2007 Flammable and Combustible Liquids Code
51B-2003 Standard for Fire Prevention During Welding, Cutting and Other Hot Work
70-2007 National Electrical Code
241-2004 Standard for Safeguarding Construction, Alteration, and Demolition Operations
 3. Occupational Safety and Health Administration (OSHA):
29 CFR 1926 Safety and Health Regulations for Construction
- B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Project Manager for review for compliance with contract requirements in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the Resident Engineer that individuals have undergone contractor's safety briefing.
- C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposed overall length, separate by 3m (10 feet).
- E. Temporary Construction Partitions:
 1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas and adjoining areas. Fire-retardant plastic may be used for temporary construction partitions that remain in place for no more than 72 hours. Construct all other partitions of gypsum board (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors and frames with self-closing devices.
 2. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 07 84 00, FIRESTOPPING.
- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Manager.

- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Project Manager.
- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with Project Manager. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the Project Manager.
- L. Smoke Detectors: Prevent accidental operation. Comply with White River Junction VAMC procedures for preventing false fire alarms, (Specification Section 013513, Appendix A).
- M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Manager. Obtain permits from Project Manager at least 48 hours in advance
- N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Manager.
- O. Smoking: Smoking is prohibited in, and adjacent to, construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is also prohibited.
- P. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- Q. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

1.7 OPERATIONS AND STORAGE AREAS

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Project Engineer/VA-COR. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Project Engineer/VA-COR and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Project Engineer/VA-COR, the buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by the Project Engineer/VA-COR, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Project Engineer/VA-COR. When materials are transported in performance of the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.
- D. Working space and space available for storing materials shall be as determined by the Project Engineer/VA-COR.
- E. Workmen are subject to rules of Medical Center applicable to their conduct.

- F. Execute work so as to interfere as little as possible with normal functioning of the Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by Project Engineer/VA-COR where required by limited working space.
1. Do not store materials and equipment in other than assigned areas.
 2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
 3. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.
- G. Phasing: To insure such executions, Contractor shall furnish the Project Engineer/VA-COR with a schedule of approximate phasing dates on which the Contractor intends to accomplish work in each specific areas of site, building or portion thereof. In addition, Contractor shall notify the Project Engineer/VA-COR two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing dates to insure accomplishment of this work in successive phases mutually agreeable to Medical Center Director, Project Engineer/VA-COR and Contractor.
- H. All Buildings will be occupied during performance of work. Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Medical Centers operations will not be hindered. Coordinate alteration work in areas occupied by Department of Veterans Affairs so that Medical Center operations will continue during the construction period.
- I. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the Project Engineer/VA-COR.
1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of the Medical Center. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval.
 2. Contractor shall submit a request to interrupt any such services to the Medical Center Project Engineer/VA-COR, in writing, a minimum of 15 calendar days in advance of proposed interruption. A minimum of 15 calendar days is required by Medical Center staff to assess interruption impacts and to prepare mitigation measures; therefore, the requirement to make utility interruption requests a minimum of 15 calendar days in advance of the planned interruption will not be waived. Request shall state specific details of the interruption to include identification of the utility system and device to be interrupted, its location, reason, date, exact time of, and approximate duration of such interruption.
 3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time that such interruption will cause least inconvenience to activities of Medical Center. Interruption time approved by Medical Center will occur at other than Contractor's normal working hours unless the VA determines that the interruption is of a minor nature and will not cause inconvenience to hospital activities.

4. If the Medical Center determines that the requested interruption is of a minor nature and will not cause inconvenience to hospital activities, the Medical Center may allow the interruption to proceed in less than 15 calendar days after receipt of the contractor's request for interruption.
5. In case of a contract construction emergency, service will be interrupted on approval of Project Engineer/VA-COR. Such approval will be confirmed in writing as soon as practical.
6. Contractor shall not manipulate any utility device that will interrupt any utility service. Medical Center staff will operate utility devices to initiate and to terminate an approved utility service interruption. Contractor shall comply with lock out/tag out procedures.
- J. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.
 1. All waterlines shall be cut back to the main.
- K. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
 1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles.
- L. Coordinate the work for this contract with other construction operations as directed by Project Engineer/VA-COR. This includes but is not limited to:
 1. the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.
 2. the possible replacement of substandard overhead plumbing, when the second-floor piping is exposed in the ceiling of the first floor during demolition and renovation operations. This work to be performed by VA staff or other VA contractors. Project Contractor shall coordinate and allow access to VA staff and other contractors for replacement of sanitary and water service piping as determined by Project Engineer/VA-COR.

1.8 ALTERATIONS

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the Project Engineer/VA-COR of areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both, to the Contracting Officer. This report shall list by rooms and spaces:
 1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
 2. Shall note any discrepancies between drawings and existing conditions at site.
 3. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and Project Engineer/VA-COR.
- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of Project Engineer/VA-COR to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).
- C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and Project Engineer/VA-COR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:

1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.
- D. Protection: Provide the following protective measures:
 1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
 2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
 3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

1.9 INFECTION PREVENTION MEASURES

- A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- B. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines as specified in these contract documents. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to Project Manager for review for compliance with contract requirements in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
 1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
 1. The Project Manager and VAMC Infection Control personnel will review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.
 2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.
- D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
 1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by Project Engineer/VA-COR. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction.
 2. Do not perform dust producing tasks within occupied areas without the approval of the Project Manager. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
 - a. Provide dust proof one-hour fire-rated temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, and an agreement is reached with the Project Manager and Medical Center.

- b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other pre-filter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.
 - c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
 - d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.
 - e. The contractor shall not haul debris through patient-care areas without prior approval of the Project Manager and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
 - f. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
 - g. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
 - h. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.
- E. Final Cleanup:
- 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
 - 2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes, but is not limited to, walls, ceilings, cabinets, furniture (built-in or free standing), partitions, and flooring.

1.10 DISPOSAL AND RETENTION

- A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:
 - 1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by Project Engineer/VA-COR.
 - 2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
 - 3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused

will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

1.11 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS - NOT USED

1.12 RESTORATION

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the Project Engineer/VA-COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the Project Engineer/VA-COR before it is disturbed. Materials and workmanship used in restoring work shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.13 PHYSICAL DATA – NOT USED

1.14 PROFESSIONAL SURVEYING SERVICES – NOT USED

1.15 LAYOUT OF WORK

- A. Establish and plainly mark center lines for each building and corner of column lines and/or addition to each existing building, and such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each such structure and/or addition, are in accordance with lines and elevations shown on contract drawings.
- B. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark (through use of appropriate batter boards or other means) sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work. Survey shall include, but not be limited to, location of lines and grades of footings, exterior walls, center lines of columns in both directions, major utilities and elevations of floor slabs:
 - 1. Such additional survey control points or system of points thus established shall be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the Project Engineer/VA-COR before any work (such as footings, floor slabs, columns, walls, utilities and other major controlling features) is placed.

1.16 AS-BUILT DRAWINGS

- A. The contractor shall maintain two full size sets of as-built drawings which shall be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the Project Engineer/VA-COR review, as often as requested.

- C. Contractor shall deliver two approved completed sets of as-built drawings in the electronic version (scanned PDF) to the Project Engineer/VA-COR within 15 calendar days after each completed phase and after the acceptance of the project by the Project Engineer/VA-COR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.17 USE OF ROADWAYS

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the Project Engineer/VA-COR, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed and restoration performed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

1.18 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:
 - 1. Permission to use each unit or system must be given by Project Manager. If the equipment is not installed and maintained in accordance with the following provisions, the Project Manager will withdraw permission for use of the equipment.
 - 2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.
 - 3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
 - 4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze up damage.
 - 5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
 - 6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
- C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.
- D. Any damage to the equipment or excessive wear due to prolonged use will be repaired replaced by the contractor at the contractor's expense.

1.19 TEMPORARY USE OF EXISTING ELEVATORS

- A. Use of existing elevator for handling building materials and Contractor's personnel will be permitted subject to following provisions:
 - 1. Contractor makes all arrangements with the Project Engineer/VA-COR for use of elevator. The Project Engineer/VA-COR will ascertain that elevators are in proper condition.
 - 2. Contractor covers and provides maximum protection of following elevator components:
 - a. Entrance jambs, heads soffits and threshold plates.
 - b. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
 - c. Finish flooring.
 - 3. Place elevator in condition equal, less normal wear, to that existing at time it was placed in service of Contractor as approved by Contracting Officer.

1.20 TEMPORARY TOILETS

- A. Provide where directed, (for use of all Contractor's workmen) ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by Project Engineer/VA-COR, provide suitable dry closets where directed. Keep such places clean and free from flies and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

1.21 AVAILABILITY AND USE OF UTILITY SERVICES

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the Project Engineer/VA-COR, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.
- C. Contractor shall install meters at Contractor's expense and furnish the Medical Center a monthly record of the Contractor's usage of electricity as hereinafter specified.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
 - 1. Obtain heat by connecting to Medical Center heating distribution system.
 - a. Steam is available at no cost to Contractor.
- E. Electricity (for Construction and Testing): Furnish all temporary electric services.
 - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.
- F. Water (for Construction and Testing): Furnish temporary water service.
 - 1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection. Water is available at no cost to the Contractor.
 - 2. Maintain connections, pipe, fittings and fixtures and conserve water use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at Project Engineer/VA-COR discretion) of use of water from Medical Center's system.

1.22 TESTS

- A. As per specification section 230593 the contractor shall provide a written testing and commissioning plan complete with component level, equipment level, sub-system level and system level breakdowns. The plan will provide a schedule and a written sequence of what will be tested, how and what the expected outcome will be. This document will be submitted for approval prior to commencing work. The contractor shall document the results of the approved plan and submit for approval with the as built documentation.
- B. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- C. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Project Engineer/VA-COR. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.

- D. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feed water, condensate and other related components.
- E. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
- F. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

1.23 INSTRUCTIONS

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the Project Engineer/VA-COR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
- C. Instructions: Contractor shall provide qualified, factory trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the Project Engineer/VA-COR and shall be considered concluded only when the Project Engineer/VA-COR is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the Project Engineer/VA-COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.24 CONSTRUCTION SIGN - NOT USED

1.25 HISTORIC PRESERVATION - NOT USED

- A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the Project Engineer/VA-COR verbally, and then with a written follow up.

1.26 WARRANTY

- A. General Warranty: Manufacturer's warranty specified in this article shall not deprive the Government of other rights Government may have under other provisions of Contract Documents, and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.27 WARRANTY OF CONSTRUCTION

- A. All work shall be warranted for a period of one year, as specified under Warranty of Construction FAR clause 52.246-21, to be free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.
- B. Contractor shall also, as specified under Warranty in FAR clause 52.246-21, obtain all warranties that would be given in normal commercial practice executed, in writing, for the benefit of the Government.
- C. This contract shall be subject to all parts of FAR clause 52.246-21.

1.28 SUBMITTAL REQUIREMENTS:

- A. Refer to Section 013323 - Shop Drawings, Product Data, and Samples for additional requirements.
- B. Contractor shall prepare a submittal register per Section 013323.
- C. Contractor must submit a proposed Hazardous Materials Abatement Plan for VA approval. VA to review all applications, documents and drawings, make comments and approve before submission of application(s) to Federal/State regulators.
- D. Contractor to submit a schedule identifying planned days of work, identifying which area and activities will commence; additionally, the contractors schedule shall verify that the construction completion date does not exceed the contracted work period.

Schedule of Contractor's Submittals:

Infection Control Risk Assessment (ICRA)	Request pre-construction review
Interim Life Safety Measures (ILSM)	Request pre-construction review
Green Environmental Management (GEMs)	Request pre-construction review
Utility Outages	Request
Parking Space Closings	Request
Site Safety	Job Specific Written Plan, OSHA Certification (30 HR for Supervisor, 10 HR for Laborers)
Subcontractors	Company name, address, phone number
Work Site employees	Name, Company name
Construction Schedule	MS Project or other

1.29 SAFETY PRECAUTIONS

- A. The Contractor shall comply with project Specification Section 01 35 26.
- B. The Contractor shall comply with all applicable Federal, State and local legal requirements regarding workers health and safety. The requirements include but are not limited to, those found in Federal and State Occupational Safety and Health Act (OSHA) statutes and regulations, such as applicable provisions of Title 29, Code of Federal Regulations (CFR) Parts 1910 and 1926. Contractor is solely responsible for determining the legal requirements that apply to activities, and shall ensure safe and healthful working conditions for its employees.
- C. Contractor shall assume the responsibility to guard against causing of fires and/or explosions and to protect Government Property.
- D. The Contractor shall perform the work in a manner consistent with the area security and fire safety regulations especially with regard to exits and exit way access. Utility shutdowns shall not compromise security, communication or fire safety for occupants.
- E. No flammable liquids shall be stored or used in the medical center.

- F. The necessary number and appropriate types of portable fire extinguishers are required per National Fire Protection Agency (NFPA) 10 and NFPA 241. Contractor shall keep certification on site at all times of extinguisher inspections.
- G. The Contractor shall receive from the COR a permit for all cutting, welding, and soldering 24 hours in advance. All permits shall be prominently displayed during all construction.
- H. All necessary precautions shall be taken by the contractor to prevent accidental operation of any existing smoke detectors or sprinkler heads.
- I. The Contractor shall comply with an Infection Control Risk Assessment (ICRA) which will be developed with the COR and the Infection Control Practitioner assigned to the project at the Preconstruction Conference. Multiple ICRA's may be necessary to address specific risks at various stages of the project and must be approved prior to proceeding on each phase.

1.30 HAZARDOUS MATERIAL REPORTING:

- A. The Contractor shall maintain hazardous material inventories and material safety data sheets (MSDS) for all hazardous materials (as defined in CFR 1910.120, 40 CFR's 355, 370, & 372) to be stored and used on this Medical Center. Hazardous materials must be inventoried when received and at the project's completion. The amounts used shall be maintained for the project duration, and for the calendar year (ending 31 December).
- B. Hazardous Materials Inventories, Material Safety Data Sheets and material quantities used shall be submitted to the Contracting Officer for approval.
- C. In the event of a spill, Contractor shall immediately notify the Contracting Officer's Technical Representative (extension 5138) as well as the Contracting Officer. The Contractor shall be solely responsible for the expense of any cleanup of such spill, and the cleanup shall be in accordance with the applicable provisions of 40 CFR Part 761.

1.31 ENVIRONMENTAL PROTECTION:

- A. In order to provide for abatement and control of all environmentally hazardous materials arising from demolition and/or construction activities, the Contractor shall comply with all applicable environmentally hazardous material control and abatement and all applicable provisions of the Corps of Engineers' Manual EM 385-1-1, "General Safety Requirements" as well as the specific requirements stated elsewhere in the Contract Documents.
- B. Contract is responsible for daily cleanup of all areas affected by construction. Construction areas in use or affected shall be returned to condition in which they were turned over or initially found. VA Housekeeping shall not be dispatched for cleaning associated with contractor construction.
- C. Contractor shall take every precaution in preserving flooring, finishes, equipment, and furniture in areas of construction. Contractor shall repair or replace any damage incurred during construction at their expense.
- D. Contractor shall use freight elevators for transmission of materials and personnel. Contractor shall take every precaution in preserving the elevators, including the hoist way and lobby doors, interior finishes, and shall conduct all good practices in observing lifting and motor components tolerances. Any damage incurred to any elevator component due to negligence will be repaired at expense of the contractor, within the work day of incurred damage.

END OF SECTION

SECTION 013216.15
PROJECT SCHEDULES

PART 1- GENERAL

1.1 DESCRIPTION

- A. General: The total project schedule shall be 602 calendar days. It is anticipated that the selected contractor will use the first three months pre-construction for early submittals, field investigation and survey. The finalized phasing plan would then be developed followed by the product submittals and lead times of material and equipment. The actual duration where work is being performed is expected to include 16 months of continuous construction with each phase being completed prior to the next one beginning. To complete the final closeout with as-builts, O&Ms and warranties an additional 30 days has been allotted.
- B. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.

1.2 CONTRACTOR'S REPRESENTATIVE

- A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Project Engineer/VA-COR.
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

1.3 CONTRACTOR'S CONSULTANT

- A. The Contractor shall submit a qualification proposal to the Project Engineer/VA-COR, within 10 days of bid acceptance. The qualification proposal shall include:
 - 1. The name and address of the proposed consultant.
 - 2. Information to show that the proposed consultant has the qualifications to meet the requirements specified in the preceding paragraph.
 - 3. A representative sample of prior construction projects, which the proposed consultant has performed complete project scheduling services. These representative samples shall be of similar size and scope.
- B. The Project Engineer/VA-COR has the right to approve or disapprove the proposed consultant, and will notify the Contractor of the VA decision within seven calendar days from receipt of the qualification proposal. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The Contractor shall have their scheduling consultant approved prior to submitting any schedule for approval.

1.4 COMPUTER PRODUCED SCHEDULES

- A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of up to five different reports (inclusive of all pages) available within the user defined reports of the scheduling software approved by the Project Engineer/VA-COR; a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively support the contractor's monthly

payment request and the signed look ahead report. The Project Engineer/VA-COR shall identify the five different report formats that the contractor shall provide.

- B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also responsible for the accurate and timely submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.
- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Project Engineer/VA-COR representative, to correct errors which affect the payment and schedule for the project.

1.5 THE COMPLETE PROJECT SCHEDULE SUBMITTAL

- A. Within 45 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Project Engineer/VA-COR review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Project Engineer/VA-COR. The contractor shall make a separate written detailed request to the Project Engineer/VA-COR identifying these date constraints and secure the Project Engineer/VA-COR's written approval before incorporating them into the network diagram. The Project Engineer/VA-COR's separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling the complete project. **The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final network diagram development period and shall reflect the entire contract duration as defined in the bid documents.** These changes/delays shall be entered at the first update after the final Project Schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.
- B. Within 30 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Project Engineer/VA-COR or his representative, will do one or both of the following:
 - 1. Notify the Contractor concerning his actions, opinions, and objections.
 - 2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Project Engineer/VA-COR. The revised submission will be reviewed by the Project Engineer/VA-COR and, if found to be as previously agreed upon, will be approved.
- C. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.
- D. The Complete Project Schedule shall contain work activities/events.

1.6 WORK ACTIVITY/EVENT COST DATA

- A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work activities/events shall equal the total contract price. Prorate overhead, profit and general requirements on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Project Engineer/VA-COR to assist him in determining approval or disapproval of the cost loading. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.
- C. In accordance with FAR 52.236 – 1 (PERFORMANCE OF WORK BY THE CONTRACTOR) and VAAR 852.236 – 72 (PERFORMANCE OF WORK BY THE CONTRACTOR), the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this Section, a responsibility code for all activities/events of the project for which the Contractor's forces will perform the work.
- D. The Contractor shall cost load work activities/events for all BID ITEMS including ASBESTOS ABATEMENT. The sum of each BID ITEM work shall equal the value of the bid item in the Contractors' bid.

1.7 PROJECT SCHEDULE REQUIREMENTS

- A. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:
 - 1. Show activities/events as:
 - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
 - b. Project Engineer/VA-COR's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
 - c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
 - d. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.
 - e. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
 - 2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
 - 3. Break up the work into activities/events of a duration no longer than 20 work days each or one reporting period, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Project Engineer/VA-COR may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 20 work days.
 - 4. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
 - 5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.
- B. The Contractor shall submit the following supporting data in addition to the project schedule:
 - 1. The appropriate project calendar including working days and holidays.

2. The planned number of shifts per day.
3. The number of hours per shift.

Failure of the Contractor to include this data shall delay the review of the submittal until the Project Engineer/VA-COR is in receipt of the missing data.

- C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Project Engineer/VA-COR. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the Project Engineer/VA-COR's approval of the Project Schedule.
- D. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce a schedule, reflecting all the activities/events of the complete project schedule being submitted.

1.8 PAYMENT TO THE CONTRACTOR

- A. Monthly, the contractor shall submit an application and certificate for payment using VA Form 10-6001a or the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 – 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 – 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.
- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

1.9 PAYMENT AND PROGRESS REPORTING

- A. Monthly schedule update meetings will be held on dates mutually agreed to by the Project Engineer/VA-COR and the Contractor. Contractor and their CPM consultant (if applicable) shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the Project Engineer/VA-COR three work days in advance of the schedule update meeting. Job progress will be reviewed to verify:
 1. Actual start and/or finish dates for updated/completed activities/events.
 2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
 3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.
 4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
 5. Completion percentage for all completed and partially completed activities/events.
 6. Logic and duration revisions required by this section of the specifications.
 7. Activity/event duration and percent complete shall be updated independently.
- B. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the Project Engineer/VA-COR's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.
- C. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule. The analysis shall only include original workday durations and schedule logic

agreed upon by the contractor and resident engineer for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the resident engineer. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the resident engineer within fourteen (14) calendar days of completing the regular schedule update. **Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.**

- D. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.

1.10 RESPONSIBILITY FOR COMPLETION

- A. If it becomes apparent from the current revised monthly progress schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
 2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
 3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Project Engineer/VA-COR for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.

1.11 CHANGES TO THE SCHEDULE

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes including predecessors and successors for any of the following reasons:
1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
 3. The schedule does not represent the actual prosecution and progress of the project.

4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Project Engineer/VA-COR for approval.
- C. Project Engineer/VA-COR's approval for the revised project schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Project Engineer/VA-COR or the VA representative.
- D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 – 4 (Changes) and VAAR 852.236 – 88 (Changes – Supplemental), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.

1.12 ADJUSTMENT OF CONTRACT COMPLETION

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the Project Engineer/VA-COR may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Project Engineer/VA-COR's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.
- B. Actual delays in activities/events which, according to the computer- produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Project Engineer/VA-COR will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Project Engineer/VA-COR's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Project Engineer/VA-COR in accordance with the provisions specified under FAR 52.243 – 4 (Changes) and VAAR 852.236 – 88 (Changes – Supplemental). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

END OF SECTION

SECTION 013323

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.1 GENERAL

- A. For the purposes of this contract, samples, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- B. Detailed submittal requirements are found in the technical sections of the contract specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective technical specifications at no additional cost to the government.
- C. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
 - 1. Satisfactory written evidence is presented to, and approved by Project Engineer/VA-COR, that manufacturer cannot make scheduled delivery of approved item or;
 - 2. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
 - 3. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- D. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract-required items. Delays attributable to untimely and rejected submittals will not serve as a basis for extending contract time for completion.
- E. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Project Engineer/VA-COR on behalf of the Contracting Officer.
 - 1. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense

1.2 DEFINITIONS

- A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.
- B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.

- C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials, systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.
- D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.
- E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.
- F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.
- H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and MSDS concerning impedances, hazards, and safety precautions.
- I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.
- J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data shall be incorporated in an operations and maintenance manual.
- K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.3 SUBMITTAL REGISTER

- A. The submittal register will list items of equipment and materials for which submittals are required by the specifications. This list may not be all inclusive and additional submittals may be required by the specifications. The Contractor is not relieved from supplying submittals required by the contract documents, but which have been omitted from the submittal register.
- B. The submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period.
- C. The VA will provide the initial submittal register as an attachment to this section. Thereafter, the Contractor shall track all submittals by maintaining a complete list, including

completion of all data columns, including dates on which submittals are received and returned by the VA.

- D. The Contractor shall update the submittal register as submittal actions occur and maintain the submittal register at the project site until final acceptance of all work by Contracting Officer.
- E. The Contractor shall submit formal monthly updates to the submittal register in electronic format. Each monthly update shall document actual submission and approval dates for each submittal.

1.4 SUBMITTAL SCHEDULING

- A. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment.
- B. Submittals must be submitted by Contractor only and shipped prepaid.
- C. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.
- D. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- E. All submittals are required to be approved prior to the start of the specified work activity.

1.5 SUBMITTAL PREPARATION

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.
- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned without review.
- E. Provide a transmittal form for each submittal with the following information:
 - 1. Project title, location and number.
 - 2. Construction contract number.
 - 3. Date of the drawings and revisions.
 - 4. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
 - 5. List Specification Section number and paragraph number and sheet number of the contract drawings by which the submittal is required.
 - 6. When a resubmission, add alphabetic suffix on submittal description. For example, submittal 18 would become 18A, to indicate resubmission.
 - 7. Product identification and location in project.

- F. The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting for VA review. Proposed deviations from the contract requirements are to be clearly identified. All deviations submitted must include a side by side comparison of item being proposed against item specified. Failure to point out deviations will result in the VA requiring removal and replacement of such work at the Contractor's expense.
- G. Stamp, sign, and date each submittal transmittal form indicating action taken.
- H. Stamp used by the Contractor on the submittal transmittal form to certify that the submittal meets contract requirements is to be similar to the following:

	CONTRACTOR	
	(Firm Name)	
	_____ Approved	
	_____ Approved with corrections as noted on submittal data and/or	
	attached sheets(s)	
	SIGNATURE: _____	
	TITLE: _____	
	DATE: _____	

1.6 SUBMITTAL FORMAT AND TRANSMISSION

- A. Provide submittals in electronic format, with the exception of material samples. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer.
- B. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents.
- C. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable

and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required.

- D. E-mail electronic submittal documents smaller than 5MB in size to e-mail addresses as directed by the Contracting Officer.
- E. Provide electronic documents over 5MB through an electronic FTP file sharing system. Confirm that the electronic FTP file sharing system can be accessed from the VA computer network. The Contractor is responsible for setting up, providing, and maintaining the electronic FTP file sharing system for the construction contract period of performance.
- F. Provide hard copies of submittals when requested by the Contracting Officer. Up to 3 additional hard copies of any submittal may be requested at the discretion of the Contracting Officer, at no additional cost to the VA.

1.7 SAMPLES

- A. Submit two sets of physical samples showing range of variation, for each required item.
- B. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified.
- C. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- D. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.
- E. The VA reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.
- F. Physical samples supplied maybe requested back for use in the project after reviewed and approved.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.
- B. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.9 TEST REPORTS

- A. COR may require specific test after work has been installed or completed which could require contractor to repair test area at no additional cost to contract.

1.10 VA REVIEW OF SUBMITTALS

- A. The VA will review all submittals for compliance with the technical requirements of the contract documents. The Architect-Engineer for this project will assist the VA in reviewing all submittals and determining contractual compliance. Review will be only for conformance with the applicable codes, standards and contract requirements.
 - 1. Submittals shall be sent simultaneously to Architect-Engineer and VA-COR.
- B. Period of review for submittals begins when the VA COR receives submittal from the Contractor.
- C. Period of review for each resubmittal is the same as for initial submittal.

- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. VA review period is 15 working days for submittals.
- F. The VA will return submittals to the Contractor with the following notations:
 - 1. "Approved": authorizes the Contractor to proceed with the work covered.
 - 2. "Approved as noted": authorizes the Contractor to proceed with the work covered provided the Contractor incorporates the noted comments and makes the noted corrections.
 - 3. "Disapproved, revise and resubmit": indicates noncompliance with the contract requirements or that submittal is incomplete. Resubmit with appropriate changes and corrections. No work shall proceed for this item until resubmittal is approved.
 - 4. "Not reviewed": indicates submittal does not have evidence of being reviewed and approved by Contractor or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals after taking appropriate action.

1.11 APPROVED SUBMITTALS

- A. The VA approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.
- B. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.
- C. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.
- D. Retain a copy of all approved submittals at project site, including approved samples.

1.12 WITHHOLDING OF PAYMENT

- A. Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.13 ATTACHMENTS

- A. APPENDIX A: VA Submittal Register.

END OF SECTION

SUBMITTAL REGISTER

10/17/2022

TASK ORDER: 405-13-104

VAMC CONTRACT #:

VA MEDICAL CENTER
Inpatient Ward Renovation
at
White River Junction VAMC
215 N. Main Street
White River Junction, VT 05009

1.Submission

2.Submission

3.Submission

1	2	3	4	5	6	7	8	9	10	11	12	13	14
No.	Specification/Para	Type	Description	CONTRACTOR TARGET SUBMISSION	Contractor Submitted	AE Action	Return Date	Contractor Submitted	AE Action	Return Date	Contractor Submitted	AE Action	Return Date
DIVISION 1 - GENERAL CONDITIONS													
1	010000 1.5 A	Document	Security Plan										
2	010000 1.5 E1	Document	Electronic Security Memorandum										
3	010000 1.6B	Document	Fire Safety Plan										
4	010000 1.7G	Document	Phasing Schedule of Work										
5	010000 1.7I.2	Document	Services Interruption										
6	010000 1.8A	Document	Alterations/Survey Reports										
6	010000 1.16B	Drawings	As-Builts										
7	010000 1.28B	Document	Submittal Register										
8	010000 1.28C	Document	Hazardous Materials Abatement Plan										
9	010000 1.28 D	Document	Schedule of Planned Days of Work										
10	013216.15 1.3A	Certificate	Qualifications: Contractor's Schedule Consultant										
11	013216.15 1.4A	Document	Project Schedule, Monthly Reports										
12	013216.15 1.5A	Document	Project Schedule, Submittal										
13	013216.15 1.9B	Document	Monthly Schedule Updates										
14	013216.15 1.10B	Document	Schedule Change Requests										
15	013216.15 1.11A	Document	Schedule Changes										
16	013216.15 1.12C	Document	Adjustment of Contract Completion										
17	013323 1.1F	Document	Submittal Register										
18	013526 1.4	Document	Accident Prevention Plan										
19	013526 1.5	Document	Activity Hazard Analysis										
20	013526 1.8	Document	Training Records										
21	013526 1.12B	Document	ICRA										
22	013526 1.13A	Certificate	TB Screening										
23	013526 1.14	Document	Fire Safety Plan										
24	013533 3.1A	Document	Infection Control Construction Permit										
25	014339 1.4A	Drawings	Submittal Drawings, Mockups										
26	014339 1.4A	Samples	Samples, Misc										
27	014500 1.3	Document	Interim CQC Plan										
28	014500 1.3	Document	CQC Plan										

VA MEDICAL CENTER Inpatient Ward Renovation at White River Junction VAMC 215 N. Main Street White River Junction, VT 05009				CONTRACTOR TARGET SUBMISSION	1.Submission			2.Submission			3.Submission		
29	014500 1.3	Report	Verification Statement										
30	014502 1.11	System	Quality Control System										
31	014529 1.3	Certificate	Qualifications: Materials Lab										
32	014529 3.5	Reports	Test Results; Masonry, Sprayed-on Fireproofing										
33	015719 1.4A	Document	Environmental Protection Plan										
34	016235 1.7	Document	Recycled/Recovered Record Keeping										
35	017329 1.3A	Document	Request for Special Cutting and Patching										
36	017419 1.7	Document	Draft Waste Management Plan										
37	017419 1.9	Document	Final Waste Management Plan										
38	019113 1.6A	Document	Prefunctional Checklist										
39	019113 1.6A	Document	Functional Performance Test Documents										
40	019113 1.6A	Document	Training Plans										
41	019113 1.6A	Document	Preventive Maintenance Plans										
42	019113 1.6A	Document	Calibration Schedule										
43	019113 1.6B	Data	Commissioning related requirements for submittals										
44	019113 1.6D	Document	Approved Submittal PDF Document										
45	019113 1.6F	Document	Manufacturer Start-up Information										
46	019113 1.6I	Warranty	Warranty Division PDF files										
47	019113.16J	Drawings	Coordination and Record Drawings										
48	019113 3.1	Reports	Field Reports										
49	019999 1.2	Document	Prerequisites to Substantial Completion										
50	019999 1.3	Document	Prerequisites to Final Acceptance										
51	019999 1.4	Document	Record Documents General										
52	019999 1.5	Document	Operation and Maintenance Manuals										
53	019999 1.6	Document	Final Approved Submittals										
DIVISION 2 - EXISTING CONDITIONS													
54	024100 1.6A	Schedule	Proposed methods and sequence of operations										
55	024100 1.6B	Document	Locations of capped utilities										
56	028211 2.3	Document	AHAP - Asebestos Hazard Abatement Plan										
57	028211 2.4.1A	Document	Work Schedule										
58	028211 2.4.1B	Document	Staff organization chart										
59	028211 2.4.1D	Document	Specifics of the materials and equipment										
60	028211 2.4.1E	Document	Name of approved Landfill Site.										
61	028211 2.4.1F	Document	Reqd Notification with VAMC and AHJ										
62	028211 2.4.1G	Document	Name of approved Testing Lab										
63	028211 2.4.1H	Certificate	Qualifications: Abatement Co.										
64	028211 2.4.1J	Certificate	License: Abatement Co.										
65	028211 2.4.1I	Document	Qualifications: Abatement Co. Personnel										
66	028211 2.4.1L	Data	Encapsulant types and MSDS sheets										
67	028211 2.4.2A	Report	Competent Person Daily Log										

VA MEDICAL CENTER Inpatient Ward Renovation at White River Junction VAMC 215 N. Main Street White River Junction, VT 05009				CONTRACTOR TARGET SUBMISSION	1.Submission	2.Submission	3.Submission
68	028211 2.4.2B	Report	CPIH/CIH Inspection				
69	028211 2.4.3	Document	Project Report - Final				
70	028211 2.4.3	Document	Waste Shipment Records, Chain of Command Forms				
71	028211 2.5.3	Certificate	Certificate of Completion.				
DIVISION 3 - CONCRETE							
72	030136 1.4A	Data	Mfg. Literature and Data (Resurfacing CIP Concrete)				
73	030136 1.4A	Report	Concrete Mix Test Reports				
74	030136 1.4A	Drawing	Scope and Reinforcement				
75	030513 1.4A	Data	Mfg. Literature and Data (Concrete Sealers)				
76	030513 1.4A	Samples	Verification: Aggregate				
DIVISION 4 - MASONRY							
77	042000 1.4A	Data	Mfg. Literature and Data (Unit Masonry)				
78	042000 1.4A	Certificate	Material complies with requirements				
79	042000 1.4A	Test	Mortar, Grout, and Masonry				
80	042000 1.4A	Drawings	Elevations				
81	042000 1.4A	Samples	Verification: Brick and Accessories				
DIVISION 5 - METALS							
82	054000 1.3A	Data	Mfg. Literature and Data (Cold-Formed Metal Framing)				
83	054000 1.3B	Calculations	Delegated Design Submittals				
84	054000 1.3C	Drawings	Submittal Drawings				
85	054000 1.3E	Certificate	Qualifications: Professional Engineer, Installer, Welder				
86	055000 1.5A	Data	Mfg. Literature and Data (Metal Fabrications)				
87	055000 1.5A	Drawings	Submittal Drawings				
88	055000 1.5A	Samples	Selection: Color				
89	055000 1.5A	Samples	Verification: Finish and Components				
90	055000 1.5A	Certificate	Qualifications: Galvanizer, Welder				
91	055000 1.5A	Calculations	Delegated Design Submittals				
DIVISION 6 - WOOD, PLASTICS, COMPOSITES							
92	061000 1.5A	Data	Mfg. Literature and Data (Rough Carpentry)				
93	061000 1.5A	Certificate	Wood Preservation and Fire-Retardant Treatments.				
94	061600 1.5A	Data	Mfg. Literature and Data (Sheathing)				
95	061600 1.5A	Drawings	Submittal Drawings				
96	061600 1.8B	Warranty	Manufacturer				
97	062000 1.4A	Drawing	Submittal Drawings				
98	062000 1.4A	Data	Mfg. Literature and Data (Finish Carpentry)				
99	062000 1.4A	Samples	Samples as Requested				
100	064000 1.5A	Data	Mfg. Literature and Data (Architectural Woodwork)				
101	064000 1.5A	Drawings	Submittal Drawings				
102	064000 1.5A	Samples	Selection: Plastic Laminate, PVC Edging				
103	064000 1.5A	Samples	Verification: Hardware				
104	064000 1.5A	Certificate	Formaldehyde Free				
105	066116 1.3A	Data	Mfg. Literature and Data (Solid Surfacing Fabrications)				
106	066116 1.3A	Drawings	Submittal Drawings				

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107	066116 1.3A	Samples	Selection: Solid Surface, Sealant				
108	066116 1.3A	Samples	Verification: Solid Surface				
DIVISION 7 - THERMAL & MOISTURE PROTECTION							
109	072100 1.4A	Data	Mfg. Literature and Data (Thermal Insulation)				
110	072116 1.5A	Data	Mfg. Literature and Data (Blanket Insulation)				
111	072116 1.5B	Closeout	Certificate: Work Completed in compliance.				
112	072116 1.5B	Closeout	Field Reports				
113	072116 1.5B & 1.8	Warranty	Manufacturer and Special				
114	072133 1.5A	Data	Mfg. Literature and Data (Open Cell Sprayed Foam Insul)				
115	072133 1.5A	Certificate	Manufacturer				
116	072133 1.5A	Drawings	Submittal Drawings				
117	072133 1.5A	Samples	Verification: Products				
118	072133 1.5B	Closeout	Field Reports				
119	072133 1.5B & 1.9	Warranty	Manufacturer and Special				
120	072600 1.5A	Data	Mfg. Literature and Data (Vapor Retarders)				
121	072700 1.4B	Data	Mfg. Literature and Data (Air/Vapor Barriers)				
122	072700 1.4C	Drawings	Submittal Drawings				
123	072700 1.4E	Certificate	Materials				
124	078100 1.5A	Data	Mfg. Literature and Data (Applied Fireproofing)				
125	078100 1.5A	Reports	Test Results, Bond Strength, Fire				
126	078100 1.5B	Closeout	Certificate: Work Completed in compliance.				
127	078100 1.5B	Closeout	Field Reports				
128	078100 1.5B & 1.9	Warranty	Special				
129	078400 1.5A	Data	Mfg. Literature and Data (Firestopping)				
130	078400 1.5A	Certificate	Manufacturer				
131	078400 1.5A	Reports	Test Results				
132	078400 1.5A	Sample	Mock-up				
133	078400 1.5A	Drawings	Submittal Drawings				
134	078400 1.6D	Reports	Special Inspections				
135	078400 1.6E	Certificate	Qualifications: Installer/Applicator				
136	079200 1.4A	Data	Mfg. Literature and Data (Joint Sealants)				
137	079200 1.4A	Samples	Selection: Color				
138	079200 1.4A	Samples	Verification: Color				
139	079299 1.4A	Certificate	Manufacturer: Product compliance				
140	079200 1.4A	Reports	Test Results				
141	079299 1.4B & 1.8	Warranty	Manufacturer				
DIVISION 8 - OPENINGS							
142	081113 1.5A	Data	Mfg. Product literature (Hollow Metal Doors and Frames)				
143	081113 1.5A	Drawing	Submittal Drawings				
144	081113 1.5A	Certificate	Manufacturer: Product compliance				
145	081113 1.5B	Warranty	Manufacturer				
146	081400 1.3B	Sample	Verification: Corner Construction				
147	081400 1.3B	Sample	Verification: Veneer and Finish				

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148	081400 1.3C	Drawing	Submittal Drawings										
149	081400 1.3D	Data	Mfg. Product literature (Interior Wood Doors)										
150	081400 1.3E	Reports	Test Results										
151	081400 1.4A	Warranty	Manufacturer: Lifetime										
152	083100 1.3A	Data	Mfg. Product literature (Access Doors and Frames)										
153	083100 1.3A	Schedule	Locations, Size and Type										
154	083100 1.3A	Drawings	Submittal Drawings										
155	083473 1.4B	Data	Mfg. Product literature (Sliding Wd Sound Control Doors)										
156	083473 1.4C	Drawings	Submittal Drawings										
157	083473 1.4D	Certificate	Manufacturer: Product compliance										
158	083473 1.4E	Sample	Verification: Veneer and Finish										
159	083473 1.7	Warranty	Manufacturer and Special										
160	085113 1.3A	Data	Mfg. Product literature (AluminumWindows)										
161	085113 1.3B	Drawings	Submittal Drawings										
162	085113 1.3C	Sample	Verification: Finish										
163	085113 1.3D	Schedule	Windows										
164	085113 1.3E	Reports	Test Results										
165	085113 1.4A	Sample	Mock-up										
166	085113 1.5A	Warranty	Special										
167	087100 1.4B	Data	Hardware Schedule (Door Hardware)										
168	087100 1.4C	Data	Mfg. Product literature (Door Hardware)										
169	087113 1.4D	Certificate	Manufacturer: Product compliance										
170	088000 1.5A	Data	Mfg. Product literature (Glazing)										
171	088000 1.5A	Drawings	Submittal Drawings										
172	088000 1.5A	Samples	Glass and Glazing Tape										
173	088000 1.5A	Certificate	Manufacturer: Product compliance										
174	088000 1.5B & 1.9	Warranty	Manufacturer										
DIVISION 9 - FINISHES													
175	090506 3.3C & G.6	Reports	Test Results: Concrete in Situ Testing										
176	092216 1.5A	Data	Mfg. Product literature (Metal Framing)										
177	092900 1.5A	Data	Mfg. Product literature (Gypsum board)										
178	092900 1.5A	Drawings	Submittal Drawings										
179	093000 1.5A	Data	Mfg. Product literature (Tiling)										
180	093000 1.5A	Drawings	Submittal Drawings										
181	093000 1.5A	Samples	Selection: Color										
182	093000 1.5A	Samples	Verification: Color, Trim										
183	093000 1.5A	Certificate	Manufacturer: Product Compliance										
184	093001.5B	Closeout	Extra Materials: Tile and Trim										
185	093000 1.9A	Warranty	Manufacturer and Special										
186	093000 1.9B	Warranty	Special										
187	095100 1.5A	Data	Mfg. Literature and Data (Acoustical Ceilings)										
188	095100 1.5A	Samples	Verification: Panels, Grid										
189	095100 1.5B & 1.9	Warranty	Manufacturer, Base and Adhesive										

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190	095100 1.5C	Closeout	Extra Materials: Panels and Suspension Components										
191	096513 1.5A	Data	Mfg. Product literature (Resilient Base)										
192	096513 1.5A	Samples	Selection: Color										
193	096513 1.5A	Samples	Verification: Base										
194	096513 1.5B	Closeout	Extra Materials										
195	096513 1.9	Warranty	Manufacturer										
196	096516 1.4A	Data	Mfg. Product literature (Resilient Sheet Flooring)										
197	096516 1.4A	Certificate	Manufacturer: Product compliance										
198	096516 1.4A	Drawings	Submittal Drawings										
199	096516 1.4A	Samples	Selection: Color										
200	096516 1.4A	Samples	Verification: Flooring, Edging, Transition Strips										
201	096516 1.8	Warranty	Manufacturer										
202	096516 1.10	Closeout	Extra Materials										
203	096519 1.5A	Data	Mfg. Literature and Data (Resilient Tile Flooring)										
204	096519 1.5A	Drawings	Submittal Drawings										
205	096519 1.5A	Samples	Selection: Color										
206	096519 1.5A	Samples	Verification: Tile, Edging										
207	096519 1.5A	Certificate	Manufacturer: Product compliance										
208	096519 1.5A	Certificate	Qualifications: Installer/Applicator										
209	096519 1.5B	Closeout	O&M: Cleaning										
210	096519 1.7	Sample	Mock-up										
211	096519 1.5B & 1.10	Warranty	Manufacturer										
212	096519 1.5C	Closeout	Extra Materials: Tile and Adhesive										
213	096723 1.4A	Data	Mfg. Product literature (Resinous Flooring)										
214	096723 1.4A	Certificate	Manufacturer: Product compliance										
215	096723 1.4A	Samples	Selection: Color										
216	096723 1.4A	Samples	Verification: Aggregate, Pattern										
217	096723 1.4B	Warranty	Manufacturer										
218	096813 1.4A	Data	Mfg. Literature and Data (Tile Carpeting)										
219	096813 1.4A & 1.10	Warranty	Manufacturer										
220	096813 1.4A	Certificate	Manufacturer: Product compliance										
221	096813 1.4A	Report	Indoor Air Quality										
222	096813 1.4A	Drawings	Submittal Drawings										
223	096813 1.4A	Samples	Selection: Color										
224	096813 1.4A	Samples	Verification: Carpet, Edging										
225	096813 1.4B	Certificate	Manufacturer: Recycling										
226	096813 1.6A	Samples	Mock-up										
227	096813 1.10A	Warranty	Installer										
228	096813 1.11A	Closeout	Extra Materials										
229	096813 1.11A	Closeout	O&M: Maintenance Data										
230	097213 1.4B	Data	Mfg. Literature and Data (High Impact Wall Coverings)										
231	097213 1.4C	Drawings	Submittal Drawings										
232	097213 1.4D	Certificate	Manufacturer: Product compliance										

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233	097213 1.4E	Samples	Selection: Color										
234	097213 1.9A	Closeout	Extra Materials										
235	098100 1.4A	Data	Mfg. Literature and Data (Acoustical Insulation)										
236	098100 1.4A	Certificate	Manufacturer: Recycled slag content										
237	098400 1.4A	Data	Mfg. Literature and Data (Acoustic Room Components)										
238	098400 1.4A	Drawings	Submittal Drawings										
239	098400 1.4A	Samples	Selection: Color										
240	098400 1.4A	Samples	Verification: Panel										
241	098400 1.4A	Certificate	Manufacturer: Product compliance										
242	098400 1.4A	Certificate	Qualifications: Manufacturer, Testing Agency										
243	098400 1.4A	Certificate	Testing Agency: Product compliance										
244	098400 1.4A	Data	Maintenance										
245	098400 1.7	Closeout	Extra Materials										
246	098400 1.9	Warranty	Special										
247	099100 1.3A	Data	Mfg. Product literature + VOC content (Paint)										
248	099100 1.3A	Samples	Verification: Colors										
249	099100 1.3B	Closeout	Color Chips for reorder purposes										
250	099100 1.6	Samples	Mock-up										
DIVISION 10 - SPECIALTIES													
251	101123 1.4A	Data	Mfg. Product Literature and Data (Tackboards)										
252	101123 1.4A	Drawings	Submittal Drawings										
253	101123 1.4A	Samples	Verification: Tackboard										
254	101400 1.3A	Data	Mfg. Product Literature and Data (Interior Signage)										
255	101400 1.3B & C	Drawings	Submittal Drawings										
256	101400 1.3D	Certificate	Manufacturer: Environmental Requirement compliance										
257	101400 1.3E	Samples	Verification: Sign Type D1A/F1/BP										
258	102133 1.5A & B	Data	Mfg. Product Literature & Data (Cubical Curtains & Track)										
259	102133 1.5C	Warranty	Manufacturer										
260	102133 1.5D	Certificate	Manufacturer: Building Code & Environmental compliance										
261	102133 1.5A	Drawings	Submittal Drawings										
262	102133 1.5A	Samples	Selection: Track										
263	102600 1.3A & G	Data	Mfg. Product Literature & Data (Wall & Door Protection)										
264	102600 1.3B	Drawings	Submittal Drawings										
265	102600 1.3C	Samples	Verification: Products										
266	102600 1.3D & E	Certificate	Product and Material										
267	102600 1.4	Warranty	Manufacturer: Special										
268	102813 1.4A	Data	Mfg. Product Literature & Data (Toilet Accessories)										
269	102813 1.4A	Samples	Selection: Color										
270	102813 1.4A	Samples	Verification: Complete units as requested.										
271	104413 1.4A	Data	Mfg. Product Literature & Data (Fire Extinguisher Cabinets)										

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272	104413 1.4A	Drawing	Submittal Drawings				
273	104413 1.4A	Samples	Selection: Color				
274	104413 1.4A	Samples	Verification: Cabinet if requested				
DIVISION 11 - EQUIPMENT							
275	113100 1.2A	Data	Mfg. Product Literature & Data (Residential Appliances)				
276	113100 1.4	Certificate	Manufacturer: Product Compliance				
277	113100 1.2A	Warranty	Manufacturer				
278	117313 1.3A	Data	Mfg. Product Literature & Data (Patient Lifts)				
279	117313 1.3A	Certificate	Manufacturer: Product Compliance				
280	117313 1.3A	Warranty	Manufacturer				
281	117313 1.3A	Drawing	Submittal Drawings				
DIVISION 12 - FURNISHINGS							
282	122400 1.4B, E & F	Data	Mfg. Product Literature & Data (Window Shade Systems)				
283	122400 1.4C	Samples	Selection: Color				
284	122400 1.4D	Drawing	Submittal Drawings				
285	122400 1.4G	Warranty	Manufacturer				
286	122400 1.9	Closeout	Extra Materials				
DIVISION 13 - SPECIAL CONSTRUCTION							
287	130541 1.4A	Drawing	Seismic bracing for equipment				
288	130541 1.4B	Drawing	Seismic bracing for piping				
289	130541 1.4C	Drawing	Seismic bracing for ductwork				
290	130541 1.4D	Calculations	Design Calculations				
291	130541 1.4E	Certificate	ICBC evaluation reports,				
DIVISION 21 - FIRE SUPPRESSION							
292	21-08-00 1.6	Data	Commissioning of Fire Suppression Systems				
293	21-13-13 1.4-A1a	Data	Contractor License				
294	21-13-13 1.4-A1b	Certificate	NICET Certification				
295	21-13-13 1.4-A2	Certificate	FP Shop Drawings by Licensed FPE or NICET				
296	21-13-13 1.4-A3	Data	Mfg. Data Sheets- Materials and equipment				
297	21-13-13 1.4-A4	Data	Hydraulic calcs and seismic calcs per NFPA 13				
298	21-13-13 1.4-A5	Drawing	Control valve location chart				
299	21-13-13 1.4-A6	Data	As-builts, O&M manuals				
DIVISION 22- PLUMBING							
300	22-05-11 1.4	Data	Common Work Results for Plumbing				
301	22-05-11 1.4.I	Drawings	Coordination Drawings				
302	22-05-11 1.4.K	Data	Completed Systems Readiness Checklist				
303	22 05 11 1.7 C&D	Dwgs, Certs	As -Builts and Certifications documents				
304	22-05-23 1.4.C	Data	Mfg Literature (Valves, etc.)				
305	22-05-23 1.4.E	Data	O&M Manuals				

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306	22 05 23 1.4 F	Certificates	Certifications documents										
307	22-07-11 1.4.C	Data	Mfg Literature (Pipe Insulation)										
308	22 07 11 1.4 F	Data	Completed Systems Readiness Checklist										
309	22-08-00 1.6	Data	Commissioning of Plumbing Systems										
310	22-11-00 1.4.C	Data	Mfg. Literature and data (Facility Water Distribution)										
311	22-11-00 1.4.D	Data	O&M Manuals										
312	22 11 00 1.4 E	Data	Completed Systems Readiness Checklist										
313	22 11 00 1.5.A	Data	Welders Certificates										
314	22 11 00 1.7	Dwgs, Certs	As -Bults and Certifications documents										
315	22-13-00 1.4.C	Data	Mfg. Literature and data (Sanitary/Vent)										
316	22-13-00 1.4.D	Drawings	Shop Drawings										
317	22 13 00 1.6	Certificates	Certifications documents										
318	22-14-00 1.4.C	Data	Mfg. Literature and data (Storm Drainage)										
319	22-14-00 1.4.D	Drawings	Shop Drawings										
320	22 14 00 1.4 E	Data	Completed Systems Readiness Checklist										
321	22 14 00 1.6	Dwgs, Certs	As -Bults and Certifications documents										
322	22-40-00 1.4.C	Data	Mfg. Literature and data (Plumbing Fixtures)										
323	22-40-00 1.4.D	Data	O&M Manuals										
324	22 40 00 1.4 E	Data	Completed Systems Readiness Checklist										
325	22 40 00 1.6	Dwgs, Certs	As -Bults and Certifications documents										
326	22 62 00 1.4	Data	Completed Systems Readiness Checklist										
327	22-62-00 1.4.C	Data	Mfg. Literature and data (Vacuum systems)										
328	22-62-00 1.4.D	Data	Station inlets letter										
329	22-62-00 1.4.E-F	Data	System certification and affidavit										
330	22 62 00 1.5	Data	Installer, Supplier, Tester Qualifications										
331	22 62 00 1.5.H	Certificates	Certifications documents										
332	22 62 00 1.7	Dwgs, Certs	As -Bults and Certifications documents										
333	22-63-00 1.4.C	Data	Mfg. Literature and data (Gas systems)										
334	22-63-00 1.4.D	Data	Station outlets letter										
335	22-63-00 1.4.E	Data	System certification										
336	22 63 00 1.4 F	Data	Completed Systems Readiness Checklist										
337	22 63 00 1.5	Data	Installer, Supplier, Tester Qualifications										
338	22 63 00 1.6	Dwgs, Certs	As -Bults and Certifications documents										
DIVISION 23 - HVAC													
339	23-01-30 1.4.B	Data	Qualifications Statement										
340	23-01-30 1.4.C	Data	Project Cleanliness Evaluation and Cleaning Plan										

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341	23-01-30 1.4.D	Data	Manufacturer's data sheets										
342	23-01-30 1.4.E	Data	Duct cleaning plan										
343	23-01-30 1.4.F	Data	Material Safety Data Sheets (MSDS)										
344	23-01-30 1.4.H	Data	Project Closeout Report										
345	23-01-30 3.6.F	Data	Evidence that all portions of the system have been cleaned										
346	23-05-11 1.4	Data	Common Work Results for HVAC										
347	23-05-11 1.4.G	Drawings	Coordination Drawings										
348	23 05 11 1.7 D&E	Dwgs. Certs	As -Built's and Certifications documents										
349	23-05-12 1.3	Data	Shop drawings, manuals, and certifications (motors)										
350	23 05 12 1.3 E	Data	Completed Systems Readiness Checklist										
351	23-05-41 1.4.B	Data	Mfg. Literature for vibration isolators: mountings, hangers, snubbers, thrust restraints, bases, seismic restraints										
352	23-05-41 1.4.C	Documents	Bases/Isolator Load calcs										
353	23-05-93 1.4.B	Documents	Names and Quals. of TAB Agency, specialists, & projects										
354	23-05-93 1.4.D	Documents	Design review report, systems inspection report, duct air leakage report										
355	23-05-93 1.4.E	Documents	Completed TAB report										
356	23-07-11 1.4.B	Data	Mfg. Literature and data (HVAC Insulation)										
357	23-08-00 1.6	Data	Commissioning of HVAC Systems										
358	23-09-00 1.7.D	Data & Drawings	Schematic flow diagrams, wiring diagrams, schedules for dampers, actuators, valves, S.O.O., riser diagram, point list										
359	23-09-00 1.7.E	Data	Product data.										
360	23-09-00 1.7.F	Data	PICS statements										
361	23-09-00 1.7.G	Data	Software description										
362	23-09-00 1.7.I-L	Data	Commissioning documentation, graphics.										
363	23-21-13 1.4.B	Data	Mfg. Lit and data for pipe, flanges, hangers, bolts, Gaskets, Valves, etc. (Hydronic Piping)										
364	23-21-13 1.4.D	Data	Welders Qualifications										
365	23-21-13 1.4.E	Drawings	Mechanical Coordination Piping Drawings/Shop Drawings										
366	23-21-13 1.4.F	Drawings	As-Built Piping Drawings										
367	23-25-00 1.3.C	Data	Tests and Lab Reports										
368	23-25-00 1.4	Data	HVAC Water Treatment										
369	23-31-00 1.4.B	Data	Mfg. Literature-system products (HVAC Ducts/Casing)										
370	23-31-00 1.4.C	Drawings	Mechanical Coordination Drawings										
371	23-34-00 1.4.B-F, H	Data	Mfg. Literature and data (HVAC Fans)										
372	23-34-00 1.4.G	Data	O&M Manuals										
373	23-36-00 1.4.B-D	Data	Mfg. Literature and data (Air Terminal Units)										
374	23-36-00 1.4.E	Data	O&M Manuals										
375	23-37-00 1.4	Data	Mfg. Literature-system products (Air Outlets and Inlets)										
376	23-82-16 1.4.B,D	Data	Mfg. Literature and data (Air Colls)										

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377	23-82-16 1.4.C	Data	O&M Manuals				
378	23-82-16 1.4.F	Data	Completed Systems Readiness Checklist				
DIVISION 26 - ELECTRICAL							
379	26-05-11 1.12	Documents	Requirements for Electrical Installations				
380	26-05-11 1.7 D&E	Dwgs, Certs	As-Builts and Certifications documents				
381	26-05-19 1.5	Documents	LV Electrical Shop Drawings				
382	26-05-26 1.4	Documents	Grounding and Bonding for Electrical Systems				
383	26-05-33 1.4	Documents	Wiring: Data conduits, junction boxes, raceway types, rungs, connectors, straps, etc.				
384	26-08-00 1.6	Documents	Commissioning of Electrical Systems				
385	26-09-23 1.4	Documents	Lighting controls, material construction details, installation details				
386	26-22-00 1.4	Documents	LV Transformers Shop Drawings, manuals				
387	26-24-16 1.4	Documents	Panelboards drawings, Mfg. lit, manuals and data				
388	26-27-26 1.4	Documents	Wiring devices, dimensions, details, manuals, etc.				
389	26-29-11 1.4	Documents	Motor Controllers shop drawings, manuals				
390	26-29-21 1.4	Documents	Enclosed Switches and Circuit Breakers shop drawings and manuals				
391	26-43-13 1.4	Documents	Surge Protective Devices shop drawings and manuals				
392	26-51-00 1.4	Documents	Interior Lighting shop drawings and manuals				
DIVISION 27 - COMMUNICATIONS							
393	27-05-11 1.7	Documents	Requirements for Communications Installations				
394	27-05-11 1.7 D&E	Dwgs, Certs	As-Builts and Certifications documents				
395	27-05-11 1.8	Documents	B - G, I - K				
396	27-05-11 1.9	Documents	Closeout Submittals				
397	27-05-11 1.10	Documents	Maintenance Materials				
398	27-05-11 1.11	Documents	QA submittals				
399	27-05-26 1.3	Documents	Grounding and bonding for Communication Systems: Plan & close out submittals				
400	27-05-33 1.3, 1.3.A	Documents	Raceways and Boxes for Communications Systems, Items 1-4				
401	27-08-00 1.4	Documents	Commissioning of Communications Systems: Prefunctional checklists, training agendas & trainer resumes				
402	27-10-00 1.3	Documents	Control, Communication, and Signal wiring Mfg. Data.				
403	27-11-00 1.3	Documents	Conduit, size, requirements and close out submittals				
404	27-15-00 1.3	Documents	Environmental requirements Subsystem layouts and communications structured cabling. Room layouts, certifications				
405	27-15-00 3.2	Documents	Testing and Acceptance				
406	27-51-16 1.5	Documents	Qualifications-Certifications				
407	27-51-16 1.8	Documents	Public Address and Mass Notification Systems				
408	27-51-16 1.9	Drawings	As-Builts				
409	27-51-16 1.10	Documents	Warranties				
410	27-51-16 1.13	Documents	Closeout Submittals				

VA MEDICAL CENTER Inpatient Ward Renovation at White River Junction VAMC 215 N. Main Street White River Junction, VT 05009				CONTRACTOR TARGET SUBMISSION	1.Submission			2.Submission			3.Submission		
411	27-52-23 1.6	Documents	Qualifications										
412	27-52-23 1.9	Documents	Nurse Call and Code Blue Systems										
DIVISION 28 - ELECTRONIC SAFETY & SECURITY													
413	28-05-00 1.7	Documents	Common Work Results for Electronic Safety and Security										
414	28-05-00 1.23C&D	Dwgs, Certs	As -Built's and Certifications documents										
415	28-05-00 1.4	Documents	Qualifications										
416	28-05-00 1.21	Documents	Warranties										
417	28-05-13 1.5	Documents	Conductors and Cables for Electronic Safety and Security										
418	28-05-26 1.3	Documents	Grounding and Bonding for Electronic Safety and Security.										
419	28-05-28 1.5	Documents	Shop Drawings, Test reports, Certifications, Conduits and Backboxes for Electronic Safety and Security										
420	28-08-00 1.6	Documents	Commissioning of Electronic Safety and Security Systems										
421	28-13-00 1.3	Documents	Qualifications										
422	28-13-00 1.4	Documents	Physical Access Control System										
423	28-31-00 1.4	Documents	Fire Detection and Alarm										
424	28-31-00 1.6	Documents	Warranties and Guarantees										
425	28-31-00 3.5	Documents	Instruction & Sequence of Operation										

SECTION 013526

GOVERNMENTAL SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS:

- A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.
- B. American Society of Safety Engineers (ASSE):
- C.
 - A10.1-2011Pre-Project & Pre-Task Safety and Health Planning
 - A10.34-2012Protection of the Public on or Adjacent to Construction Sites
 - A10.38-2013Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment American National Standard Construction and Demolition Operations
- D. American Society for Testing and Materials (ASTM):
 - E84-2013Surface Burning Characteristics of Building Materials
- E. The Facilities Guidelines Institute (FGI):
 - FGI Guidelines-2010Guidelines for Design and Construction of Healthcare Facilities
- National Fire Protection Association (NFPA):
 - 10-2013.....Standard for Portable Fire Extinguishers
 - 30-2012.....Flammable and Combustible Liquids Code
 - 51B-2014Standard for Fire Prevention During Welding, Cutting and Other Hot Work
 - 70-2014.....National Electrical Code
 - 70B-2013Recommended Practice for Electrical Equipment Maintenance
 - 70E-2012Standard for Electrical Safety in the Workplace
 - 99-2012.....Health Care Facilities Code
 - 241-2013.....Standard for Safeguarding Construction, Alteration, and Demolition Operations
- G. The Joint Commission (TJC):
 - TJC ManualComprehensive Accreditation and Certification Manual
- H. U.S. Nuclear Regulatory Commission:
 - 10 CFR 20Standards for Protection Against Radiation
- I. U.S. Occupational Safety and Health Administration (OSHA):
 - 29 CFR 1904Reporting and Recording Injuries & Illnesses
 - 29 CFR 1910Safety and Health Regulations for General Industry
 - 29 CFR 1926Safety and Health Regulations for Construction Industry
 - CPL 2-0.124.....Multi-Employer Citation Policy
- J. VHA Directive 2005-007

1.2 DEFINITIONS

- A. OSHA "Competent Person" (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).
- B. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- C. High Visibility Accident. Any mishap which may generate publicity or high visibility.
- D. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered personnel.
- E. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
 - 1. Death, regardless of the time between the injury and death, or the length of the illness;
 - 2. Days away from work (any time lost after day of injury/illness onset);
 - 3. Restricted work;
 - 4. Transfer to another job;
 - 5. Medical treatment beyond first aid;
 - 6. Loss of consciousness;
 - 7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

1.3 REGULATORY REQUIREMENTS

- A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Project Engineer/VA-COR.

1.4 ACCIDENT PREVENTION PLAN (APP)

- A. The APP (aka Construction Safety & Health Plan) shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.
- B. The APP shall be prepared as follows:
 - 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language

can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.

2. Address both the Prime Contractors and the subcontractors work operations.
3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.
4. Address all the elements/sub-elements and in order as follows:
 - a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:
 - 1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);
 - 2) Plan approver (company/corporate officers authorized to obligate the company);
 - 3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).
 - b. **BACKGROUND INFORMATION.** List the following:
 - 1) Contractor;
 - 2) Contract number;
 - 3) Project name;
 - 4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).
 - c. **STATEMENT OF SAFETY AND HEALTH POLICY.** Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
 - d. **RESPONSIBILITIES AND LINES OF AUTHORITIES.** Provide the following:
 - 1) A statement of the employer's ultimate responsibility for the implementation of his SOH program;
 - 2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.
 - 3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;
 - 4) Requirements that no work shall be performed unless a designated competent person is present on the job site;
 - 5) Requirements for pre-task Activity Hazard Analysis (AHAs);
 - 6) Lines of authority;
 - 7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;

- e. **SUBCONTRACTORS AND SUPPLIERS.** If applicable, provide procedures for coordinating SOH activities with other employers on the job site:
 - 1) Identification of subcontractors and suppliers (if known);
 - 2) Safety responsibilities of subcontractors and suppliers.
- f. **TRAINING.**
 - 1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.
 - 2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc...) and any requirements for periodic retraining/recertification are required.
 - 3) Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.
 - 4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)
- g. **SAFETY AND HEALTH INSPECTIONS.**
 - 1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., "Site Safety and Health CP"), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.
 - 2) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)
- h. **ACCIDENT INVESTIGATION & REPORTING.** The Contractor shall conduct mishap investigations of all OSHA Recordable Incidents. The APP shall include accident/incident investigation procedure & identify person(s) responsible to provide the following to the COR:
 - 1) Exposure data (man-hours worked);
 - 2) Accident investigations, reports, and logs.
- i. **PLANS (PROGRAMS, PROCEDURES) REQUIRED.** Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:
 - 1) Emergency response;
 - 2) Fire Prevention;
 - 3) Medical Support;
 - 4) Posting of emergency telephone numbers;
 - 5) Prevention of alcohol and drug abuse;
 - 6) Site sanitation (housekeeping, drinking water, toilets);

- 7) Hazard communication program;
 - 8) Welding/Cutting "Hot" work;
 - 9) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);
 - 10) General Electrical Safety
 - 11) Hazardous energy control (Machine LOTO);
 - 12) Site-Specific Fall Protection & Prevention;
 - 13) Excavation/trenching;
 - 14) Asbestos abatement;
 - 15) Lead abatement;
 - 16) Respiratory protection;
 - 17) Health hazard control program;
 - 18) Radiation Safety Program;
 - 19) Demolition plan (to include engineering survey);
- C. Submit the APP to the Project Engineer/VA-COR for review of compliance with contract requirements in accordance with Section 013323 -SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
- D. Once accepted by the Project Engineer/VA-COR, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Project Engineer/VA-COR, until the matter has been rectified.
- E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Project Manager, project superintendent, and Project Engineer/VA-COR. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Project Engineer/VA-COR within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34) and the environment.

1.5 ACTIVITY HAZARD ANALYSES (AHAS)

- A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)
- B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.
- C. Work shall not begin until the AHA for the work activity has been accepted by the Project Engineer/VA-COR and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.
2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
 - a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.
 - b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
3. Submit AHAs to the COR for review of compliance with contract requirements in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 15 calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the Project Engineer/VA-COR.

1.6 PRECONSTRUCTION CONFERENCE

- A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.
- B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Project Engineer/VA-COR as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
- C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 14 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

1.7 "SITE SAFETY AND HEALTH OFFICER" (SSHO) AND "COMPETENT PERSON" (CP)

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-

accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: Superintendence by the Contractor. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).
- F. The SSHO must be an individual separate from the superintendent who reports directly to a senior project (or corporate) official independent from the Superintendent.

1.8 TRAINING

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.
- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the Project Engineer/VA-COR for review of compliance with contract requirements in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance.

- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Project Engineer/VA-COR that individuals have undergone contractor's safety briefing.
- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 INSPECTIONS

- A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors' "Trade Safety and Health CPs" present in their work areas. Coordinate with, and report findings and corrective actions weekly to COR.
- B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.
 - 1. Results of the inspection will be documented with tracking of the identified hazards to abatement.
 - 2. The Project Engineer/VA-COR will be notified immediately prior to start of the inspection and invited to accompany the inspection.
 - 3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.
 - 4. A report of the inspection findings with status of abatement will be provided to the Project Engineer/VA-COR within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS

- A. Notify the Project Engineer/VA-COR as soon as practical, but no more than four hours after any accident meeting the definition of OSHA Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$5,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Project Engineer/VA-COR determines whether a government investigation will be conducted.
- B. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment defined in paragraph DEFINITIONS, and property damage accidents resulting in at least \$20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162, and provide the report to the Project Engineer/VA-COR or Government Designated Authority within 5 calendar days of the accident. The Project Engineer/VA-COR will provide copies of any required or special forms.
- C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the Project Engineer/VA-COR monthly.

- D. A summation of all OSHA recordable accidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Project Engineer/VA-COR monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Project Engineer/VA-COR as requested.

1.11 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.
- B. Mandatory PPE includes:
 - 1. Hard Hats – unless written authorization is given by the Project Engineer/VA-COR in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA regulations.
 - 2. Safety glasses - unless written authorization is given by the Project Engineer/VA-COR appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.
 - 3. Appropriate Safety Shoes – based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the Project Engineer/VA-COR.
 - 4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 INFECTION CONTROL

- A. Infection Control is critical in all medical center facilities. Interior construction activities causing disturbance of existing dust, or creating new dust, must be conducted within ventilation-controlled areas that minimize the flow of airborne particles into patient areas. Exterior construction activities causing disturbance of soil or creates dust in some other manner must be controlled.
- B. An AHA associated with infection control will be performed by VA personnel in accordance with FGI Guidelines (i.e. Infection Control Risk Assessment (ICRA)). The ICRA procedure found on the American Society for Healthcare Engineering (ASHE) website will be utilized. Risk classifications of Class II or lower will require approval by the COR before beginning any construction work. Risk classifications of Class III or higher will require a permit before beginning any construction work. Infection Control permits will be issued by the Project Engineer/VA-COR. The Infection Control Permits will be posted outside the appropriate construction area. More than one permit may be issued for a construction project if the work is located in separate areas requiring separate classes. The primary project scope area for this project is: Class IV, however, work outside the primary project scope area may vary. The required infection control precautions with each class are as follows:
 - 1. Class III requirements:
 - a. During Construction Work:
 - 1) Obtain permit from the Project Engineer/VA-COR
 - 2) Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.
 - 3) Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for

- vacuuming prior to exit) before construction begins. Install construction barriers and ceiling protection carefully, outside of normal work hours.
- 4) Maintain negative air pressure, 0.01 inches of water gauge, within work site utilizing HEPA equipped air filtration units and continuously monitored with a digital display, recording and alarm instrument, which must be calibrated on installation, maintained with periodic calibration and monitored by the contractor.
 - 5) Contain construction waste before transport in tightly covered containers.
 - 6) Cover transport receptacles or carts. Tape covering unless solid lid.
- b. Upon Completion:
- 1) Do not remove barriers from work area until completed project is inspected by the Project Engineer/VA-COR and thoroughly cleaned by the VA Environmental Services Department.
 - 2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.
 - 3) Vacuum work area with HEPA filtered vacuums.
 - 4) Wet mop area with cleaner/disinfectant.
 - 5) Upon completion, restore HVAC system where work was performed.
 - 6) Return permit to the Project Engineer/VA-COR
- C. Barriers shall be erected as required based upon classification (Class III & IV requires barriers) and shall be constructed as follows:
1. Class III and IV - closed door with masking tape applied over the frame and door is acceptable for projects that can be contained in a single room.
 2. Construction, demolition or reconstruction not capable of containment within a single room must have the following barriers erected and made presentable on hospital occupied side:
 - a. Class III & IV (where dust control is the only hazard, and an agreement is reached with the Resident Engineer and Medical Center) - Airtight plastic barrier that extends from the floor to ceiling. Seams must be sealed with duct tape to prevent dust and debris from escaping
 - b. Class III & IV - Drywall barrier erected with joints covered or sealed to prevent dust and debris from escaping.
 - c. Class III & IV - Seal all penetrations in existing barrier airtight
 - d. Class III & IV - Barriers at penetration of ceiling envelopes, chases and ceiling spaces to stop movement air and debris
 - e. Class IV only - Anteroom or double entrance openings that allow workers to remove protective clothing or vacuum off existing clothing
 - f. Class III & IV - At elevators shafts or stairways within the field of construction, overlapping flap minimum of two feet wide of polyethylene enclosures for personnel access.
- D. Products and Materials:
1. Sheet Plastic: Fire retardant polystyrene, 6-mil thickness meeting local fire codes

2. Barrier Doors: Self Closing One-hour fire-rated solid core wood in steel frame, painted
 3. Dust proof one-hour fire-rated drywall
 4. High Efficiency Particulate Air-Equipped filtration machine rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Maintenance of equipment and replacement of the HEPA filters and other filters will be in accordance with manufacturer's instructions.
 5. Exhaust Hoses: Heavy duty, flexible steel reinforced; Ventilation Blower Hose
 6. Adhesive Walk-off Mats: Provide minimum size mats of 24 inches x 36 inches
 7. Disinfectant: Hospital-approved disinfectant or equivalent product
 8. Portable Ceiling Access Module
- E. Before any construction on site begins, all contractor personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- F. A dust control program will be establish and maintained as part of the contractor's infection preventive measures in accordance with the FGI Guidelines for Design and Construction of Healthcare Facilities. Prior to start of work, prepare a plan detailing project-specific dust protection measures with associated product data, including periodic status reports, and submit to Project Engineer/VA-COR and Facility CSC for review for compliance with contract requirements in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- G. Medical center Infection Control personnel will monitor for airborne disease (e.g. aspergillosis) during construction. A baseline of conditions will be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality with safe thresholds established.
- H. In general, the following preventive measures shall be adopted during construction to keep down dust and prevent mold.
1. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. HEPA filtration is required where the exhaust dust may reenter the medical center.
 2. Exhaust hoses shall be exhausted so that dust is not reintroduced to the medical center.
 3. Adhesive Walk-off/Carpet Walk-off Mats shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
 4. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as it is created. Transport these outside the construction area in containers with tightly fitting lids.
 5. The contractor shall not haul debris through patient-care areas without prior approval of the Resident Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools,

material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.

6. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
7. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

I. Final Cleanup:

1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
3. All new air ducts shall be cleaned prior to final inspection.

J. Exterior Construction

1. Contractor shall verify that dust will not be introduced into the medical center through intake vents, or building openings. HEPA filtration on intake vents is required where dust may be introduced.
2. Dust created from disturbance of soil such as from vehicle movement will be wetted with use of a water truck as necessary
3. All cutting, drilling, grinding, sanding, or disturbance of materials shall be accomplished with tools equipped with either local exhaust ventilation (i.e. vacuum systems) or wet suppression controls.

1.13 TUBERCULOSIS SCREENING

- A. Contractor shall provide written certification that all contract employees assigned to the work site have had a pre-placement tuberculin screening within 90 days prior to assignment to the worksite and been found have negative TB screening reactions. Contractors shall be required to show documentation of negative TB screening reactions for any additional workers who are added after the 90-day requirement before they will be allowed to work on the work site. NOTE: This can be the Center for Disease Control (CDC) and Prevention and two-step skin testing or a Food and Drug Administration (FDA)-approved blood test.
1. Contract employees manifesting positive screening reactions to the tuberculin shall be examined according to current CDC guidelines prior to working on VHA property.
 2. Subsequently, if the employee is found without evidence of active (infectious) pulmonary TB, a statement documenting examination by a physician shall be on file with the employer (construction contractor), noting that the employee with a positive tuberculin screening test is without evidence of active (infectious) pulmonary TB.
 3. If the employee is found with evidence of active (infectious) pulmonary TB, the employee shall require treatment with a subsequent statement to the fact on file with the employer before being allowed to return to work on VHA property.

1.14 FIRE SAFETY

- A. Fire Safety Plan: Establish and maintain a site-specific fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Project

Engineer/VA-COR for review for compliance with contract requirements in accordance with Section 013323, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.

- B. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- C. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- D. Temporary Construction Partitions:
 - 1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices.
 - 2. Install one-hour fire-rated temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.
 - 3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 078400, FIRESTOPPING.
- E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with the Project Engineer/VA-COR.
- G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to the Project Engineer/VA-COR.
- H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- J. Standpipes: Install and extend standpipes up with each floor in accordance with 29 CFR 1926 and NFPA 241. Do not charge wet standpipes subject to freezing until weather protected.
- K. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.
- L. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with the Project Engineer/VA-COR. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the Resident Engineer.

- M. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with the Project Engineer/VA-COR.
- N. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Engineer/VA-COR. Obtain permits from Project Engineer/VA-COR at least 4 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- O. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Engineer/VA-COR.
- P. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- Q. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- R. If required, submit documentation to the Project Engineer/VA-COR or other Government Designated Authority that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

1.15 ELECTRICAL

- A. All electrical work shall comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J – General Environmental Controls, 29 CFR Part 1910 Subpart S – Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.
- B. All qualified persons performing electrical work under this contract shall be licensed journeyman or master electricians. All apprentice electricians performing under this contract shall be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.
- C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply with this requirement is subject to immediate termination in accordance with FAR clause 52.236-5(c). Only in rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards, or is infeasible due to equipment design or operational limitations is energized work permitted. The Project Engineer/VA-COR and Facility Safety Manager with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA specific to energized work activities will be developed, reviewed, and accepted prior to the start of that work.
 - 1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.
 - 2. Verification of the absence of voltage after de-energization and lockout/tagout is considered “energized electrical work” (live work) under NFPA 70E, and shall only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rate personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.
 - 3. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the Project Engineer/VA-COR and Facility Safety Manager.

- D. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alternative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work shall not begin until the AHA for the work activity has been accepted by the Project Engineer/VA-COR and Facility Safety Manager and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
- E. Ground-fault circuit interrupters. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites shall have approved ground-fault circuit interrupters for personnel protection. "Assured Equipment Grounding Conductor Program" only is not allowed.

1.16 FALL PROTECTION (NOT USED)

1.17 SCAFFOLDS AND OTHER WORK PLATFORMS (NOT USED)

1.18 EXCAVATION AND TRENCHES (NOT USED)

1.19 CRANES (NOT USED)

1.20 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

- A. All installation, maintenance, and servicing of equipment or machinery shall comply with 29 CFR 1910.147 except for specifically referenced operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment shall comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

1.21 CONFINED SPACE ENTRY

- A. All confined space entry shall comply with 29 CFR 1910.146 except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].
- B. A site-specific Confined Space Entry Plan (including permitting process) shall be developed and submitted to the Project Engineer/VA-COR.

1.22 WELDING AND CUTTING

- A. As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with the Project Engineer/VA-COR. Obtain permits from the Project Engineer/VA-COR at least 4 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

1.23 LADDERS

- A. All Ladder use shall comply with 29 CFR 1926 Subpart X.
- B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.
- C. Manufacturer safety labels shall be in place on ladders
- D. Step Ladders shall not be used in the closed position
- E. Top steps or cap of step ladders shall not be used as a step
- F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.

1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.
 2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.
- G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

1.24 FLOOR & WALL OPENING

- A. All floor and wall openings shall comply with 29 CFR 1926 Subpart M.
- B. Floor and roof holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. See 21.F for covering and labeling requirements. Skylights located in floors or roofs are considered floor or roof hole/openings.
- C. All floor, roof openings or hole into which a person can accidentally walk or fall through shall be guarded either by a railing system with toeboards along all exposed sides or a load-bearing cover. When the cover is not in place, the opening or hole shall be protected by a removable guardrail system or shall be attended when the guarding system has been removed or other fall protection system.
1. Covers shall be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.
 2. Covers shall be secured when installed, clearly marked with the word "HOLE", "COVER" or "Danger, Roof Opening-Do Not Remove" or color-coded or equivalent methods (e.g., red or orange "X"). Workers must be made aware of the meaning for color coding and equivalent methods.
 3. Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, shall be immediately cut out. No hole or opening shall be left unattended unless covered.
 4. Non-load-bearing skylights shall be guarded by a load-bearing skylight screen, cover, or railing system along all exposed sides.
 5. Workers are prohibited from standing/walking on skylights.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013533

INFECTION CONTROL PROCEDURES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Construction Type A - Inspection and Non-Invasive Activities. Includes, but is not limited to: removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet; painting (but not sanding); wall covering; electrical trim work; minor plumbing; and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.
- B. Construction Type B - Small scale, short duration activities that create minimal dust. Includes, but is not limited to: installation of telephone or computer cabling; access to pipe chase spaces; cutting of walls or ceilings where dust migration can be controlled.
- C. Construction Type C - Any work, which generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies. Includes, but is not limited to: sanding of walls for painting or wall covering; removal of floor coverings, ceiling tiles and casework; new wall construction; minor ductwork or electrical work above ceilings; major cabling activities; and any activity which cannot be completed within a single work shift.
- D. Construction Type D - Major demolition and construction projects. Includes, but is not limited to: activities that require consecutive work shifts; require heavy demolition or removal of a complete ceiling system; and new construction.
- E. Group 1 Lowest Risk Patient Risk Group - Office areas
- F. Group 2 Medium Risk Patient Risk Group - Cardiology, Echocardiography, Laboratories, Nuclear Medicine, Physical Therapy, Radiology/MRI, Respiratory Therapy
- G. Group 3 Medium-High Risk Patient Risk Group - Emergency Room, Day Surgery, Pharmacy, Endoscopy
- H. Group 4 Highest Risk Patient Risk Group - Dialysis Unit; Oncology Unit; Operating Rooms; Sterile Processing, Cardiac Catheterization & Angiography Areas, Intensive Care Unit(s); Medical/Surgical Nursing Units, Post-Anesthesia Care Units.
- I. HEPA - High Efficiency Particulate Air
- J. HEPA Filtered – Equipment that uses a HEPA filter that complies with MIL-STD-282 method 102.9.1 and captures a minimum of 99.97% of particulate matter that is 0.3 micron in diameter.
- K. Level of Infection Control - Class I, II, III or IV, as determined from the Infection Control risk assessment matrix.

1.2 DESCRIPTION

- A. The purpose of the infection control procedures are to minimize the risk of infection during construction by maintaining the integrity of the environment, and controlling the spread of dust.
- B. The following Infection Control Matrix defines the matrix of precautions to be implemented for construction, demolition and renovation. Matching the planned construction type with the patient risk group on the matrix defines the minimum level of infection control required (Class I, II, III or IV).

<u>Risk Level</u>	<u>Construction Activity</u>			
	<u>Type A</u>	<u>Type B</u>	<u>Type C</u>	<u>Type D</u>
Group 1 Lowest Risk	Class I	Class II	Class II	Class III/IV
Group 2 Medium Risk	Class I	Class II	Class III	Class IV
Group 3 High Risk	Class II	Class II	Class III/IV	Class IV
Group 4 Highest Risk	Class II	Class III/IV	Class III/IV	Class IV

Class I:

1. Execute work by methods to minimize raising dust and fumes from interior and exterior construction operations.
2. Water mist work surfaces to control dust
3. Immediately replace a ceiling tile displaced for visual inspection
4. Use travel routes that minimize exposure of patients to construction workers, materials, tools, and equipment.
5. Schedule utility interruptions during periods of low hospital activity.

Class II and III: In addition to precautions for Class I:

1. Provide temporary ICRA barrier around construction area to prevent airborne dust from dispersing into atmosphere using fire resistive polyethylene secured by poles, clips and tape with zipper door access OR use approved self-contained ICRA cart with telescoping ICRA barrier at every opening in ceiling.
2. HEPA vacuum upper surfaces of ceiling tiles prior to removal, after removal of first tile.
3. Seal unused doors with tape OR cover doors with fire resistive polyethylene and seal all 4 edges.
4. Block off and seal air vents in work area, OR isolate HVAC system in areas where work is being performed to prevent contamination of ducted systems.
5. Place adhesive walk-off mats at entrance and exit of work areas.
6. Tightly cover waste containers before removing from the work area.
7. HEPA vacuum work surfaces and waste containers before removing from the work area.
8. HEPA vacuum worker clothing, tools, materials, and equipment before leaving the work area.

Class IV: In addition to precautions for Class I, II and III:

1. No work is permitted in areas occupied by patients.
 2. All personnel entering work site are required to wear head covers, shoe covers and coveralls. Head covers, shoe covers and coveralls must be changed within the anteroom (Construction Vestibule) each time the worker exits the work area.
 3. Do not remove ICRA barriers from the work area until the completed project is thoroughly cleaned by the Contractor, the VA's Environmental (Housekeeping) Services Department and inspected by the VA Project Manager.
- C. Conduct work by implementing the appropriate level of infection control as required or as noted herein.

1.3 SUBMITTALS

- A. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only.
- B. SD-06 Test and Inspection Reports:
 - 1. Air sampling results
 - 2. Infection Control Compliance Checklists
 - 3. Logs of negative pressure measurements for work site;
- C. SD-07 Certificates
 - 1. Employee training.
 - 2. VAMC Infection Control Construction Permits; G

1.4 QUALITY ASSURANCE (NOT USED)

1.4.1 QUALIFICATIONS

- A. All personnel are required to wear N95 respirators, disposable booties and coveralls when working inside the containment. These are to be removed when exiting the work area.
- B. All personnel are to be trained on infection control procedures and these work procedures.

1.5 EQUIPMENT

- A. Fire retardant polyethylene
- B. HEPA filtered vacuum
- C. HEPA filtered negative air machine
- D. Duct tape
- E. Framing and other materials necessary to isolate the work area
- F. Power equipment that generates dust will have dust collection equipment attached.

1.6 PROJECT/SITE CONDITIONS

- A. When an AII Room is occupied with an infected patient, the AII and Ante Room doors will generally be closed, and must be closed in order to achieve the required negative 0.01 inch wg AII room pressurization. Tight-fitting construction around each of these spaces shall be required in order to minimize the differential between supply and exhaust airflow rates, (space air leakage) necessary to produce the required space pressurization. To mitigate air flow into the negative pressure AII and Ante rooms, utilities of all types entering each of these spaces shall be sealed to the gypsum wall board, floor, or deck openings. Walls shall extend up to deck above and be sealed. Provide doors with gaskets, gasket access doors in walls, (if any) caulk around interior and exterior windows, caulk around door frames, and at all similar items. The intent is to provide a reasonably air tight condition at the interior surfaces of each of these spaces, (floor, wall, and underside of deck above), otherwise "looser construction" would result in higher air leakage and would require higher air flow rates, which would unpredictably increase both the size of the required mechanical systems and increased energy consumption.
- B. The following procedures shall be the responsibility of the electrical contractor:
 - 1. The electrical contractor shall use semi-rigid stone wool batt insulation at conduit openings into Airborne Infection Isolation (AII) and Ante Rooms which are trade size of 2 inches and smaller, per Section 072116 – BLANKET INSULATION.
 - 2. The electrical contractor shall use Intumescent flexible block at conduit openings into Airborne Infection Isolation (AII) and Ante Rooms which are larger than trade size of 2 inches, per Section 078400 – FIRESTOPPING.

3. The electrical contractor shall use siliconized interior acrylic latex sealant, per Section 079200 – JOINT SEALANTS.

1.6.1 EXISTING CONDITIONS

- A. Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Project Engineer/VA-COR.

1.7 SEQUENCING AND SCHEDULING

- A. All work will be coordinated with the hospital infection control office, facility director, safety department, security office and work will not commence until the Infection Control Construction Permit has been approved by VAMC for that specific work area, including designation of the pre-determined debris removal routes.
- B. Any issue that could have impact on VAMC operations must be reported to the VAMC project representative before commencement. This would include containment breaching, loss of negative pressure, releases of dust/debris into uncontrolled interior building areas or other issues that could affect infection control procedures.
- C. Work phasing and breakout of specific work areas shall be in coordination with the Project Engineer/VA-COR's needs and the General Contractor's schedule and not adversely affect the operations of the VAMC in any way.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Obtain an Infection Control Construction Permit prior to performing any work of construction types A through D as defined above. No work will be allowed to proceed until an Infection Control Construction Permit has been completed and signed and all protective measures required by the permit are in place.
- B. All work shall be accomplished using the controls indicated in the specifications and on the Infection Control Construction Permit for the class of protection required for the work.
- C. Removal of a single ceiling tile in a suspended acoustic ceiling for observation purposes only does not require an infection control construction permit.
- D. Existing air handling ductwork, supply and return grills, and/or HVAC fresh air intakes shall be isolated using air tight seals.
- E. Elevator use must be coordinated with facilities and must not impact VAMC operations. Time and dates of waste load must be identified each day.

3.2 ERECTION

- A. Install impervious barriers from floor to ceiling and wall to wall to seal work areas from non-work areas. When work is in an area designated for Class IV protection, double impervious barriers shall be used.
- B. Impervious barriers shall be constructed of non-combustible or fire retardant materials. Barriers shall be minimum one-hour rated construction. Fire retardant polyethylene may be used for impervious (dust) barriers that remain in place for not more than 72 hours. Construct all other barriers of gypsum board (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Wood framing is not allowed. At door openings, use Class C ¾ hour fire/smoke rated doors and frames with closers.

- C. Critical barriers are to be installed on all doors and windows and other entrances to the work area.
- D. Seal all holes, chases, pipe cavities and other perforations before commencing work. Sealants shall be non-flammable material.
- E. When required as an infection control measure, create a negative air pressure work area by installing HEPA filtered negative air machines within the work area to remove dust particles from the air and exhaust to the outside. Negative air pressure shall be maintained at all times, including non-work periods, for the duration of the work.
- F. Maintain negative pressure of at least -0.02 inches water in all work areas and document compliance.
- G. Construct an entry/exit chamber (construction vestibule) for decontaminating people and equipment leaving the work area. A HEPA vacuum is required to remove dust from equipment and people leaving the site. Disposable PPE shall be removed prior to exiting the entry/exit chamber.
- H. Delivery and remove of materials and equipment at the worksite must be completed in a manner that maintains the specified negative air pressure within the work area at all times. For projects that require maintaining negative air pressure within the work area, provide an entry/exit chamber (construction vestibule) for delivering or removing materials and equipment at the worksite.
- I. Adhesive Step-off pads at least 24"x36" are to be located at the exit of the work area before entering the occupied areas of the VAMC.
- J. Vacuum the top surfaces of ceiling tiles using a HEPA vacuum prior to removal of ceiling tiles.
- K. Traffic shall be minimized to/from the work area.
- L. Elevators or stairwells within the work area must be isolated with impervious barriers.
- M. Activities such as cutting, demolishing, and other large dust generating activities shall have work surfaces water-misted prior to impact.
- N. Where powered equipment that generates dust will be utilized, such equipment shall have dust collection equipment attached.
- O. Provide active means to prevent airborne dust from dispersing into the atmosphere.

3.3 FIELD QUALITY CONTROL (NOT USED)

3.3.1 INSPECTION

- A. Conduct daily infection control inspections using the VAMC Infection Control Compliance Checklist on page 2 of the Infection Control Construction Permit. Daily inspections shall also be conducted on days when no construction activity is performed. Submit compliance checklist not more than 1 work day after completing an inspection.
- B. Continuously monitor negative pressure levels. Document negative pressure levels at the start of work each day and at 2 hour maximum intervals during each work day. Maintain a written log of negative pressure levels measured to include date and time of the measurement. Submit written log of negative pressure levels weekly and not more than 1 work day after completing the last log entry using the VAMC Infection Control Compliance Checklist on page 2 of the Infection Control Construction Permit.
- C. All barriers and HEPA filtered negative pressure are to remain in place until clearance has been obtained from VAMC representatives. This could include the IC Department, Safety Department, and Environmental Services Department.

3.3.2 TESTS

- A. VAMC representatives may conduct post abatement and during abatement sampling for dust, mold spores and surface contamination. Sampling may be conducted for dusts outside the work area to assess impact.

3.4 CLEANING AND DISPOSAL

- A. The construction area and adjacent areas are to be kept in a clean and sanitary manner, using damp methods and HEPA filtered vacuuming.
- B. Dry sweeping shall not be allowed.
- C. Any dust tracked outside of the barriers must be removed immediately and as it accumulates.
- D. Surfaces are to be cleaned daily or more frequently if needed with VAMC approved cleaning products.
- E. There shall be no standing water in the work area. All accidental spills must be cleaned up immediately and wet porous material removed within one hour.
- F. Any water damaged areas scheduled for impact/demolition shall be removed first, under HEPA filtered exhaust and containment, with the waste promptly bagged, to reduce aerosol of microbial agent/fungi/spore from potentially escaping out of the work space.
- G. All barriers are to be removed carefully to minimize the spread of contaminants.
- H. Where feasible, the optimal method for removal of debris is via an exterior type chute to closed top containers.
- I. Where not feasible, waste is to be removed in clean air tight covered containers and transported from the work area by a pre-determined route during off-peak hours. Such designated debris removal routes shall be cleaned by damp-mop and/or HEPA filtered vacuuming prior to being returned to patient/staff use.
- J. For work performed exterior to the building envelope, no debris/waste movement shall be allowed through the building interior space.

END OF SECTION

SECTION 014219
REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to – GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)

The specifications and standards cited in this solicitation can be examined at the following location:

DEPARTMENT OF VETERANS AFFAIRS
Office of Construction & Facilities Management
Facilities Quality Service (00CFM1A)
811 Vermont Avenue, NW - Room 462
Washington, DC 20420
Telephone Numbers: (202) 461-8217 or (202) 461-8292
Between 9:00 AM - 3:00 PM

1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)

The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

- AA Aluminum Association Inc.
<http://www.aluminum.org>
- AABC Associated Air Balance Council
<http://www.aabchq.com>
- AAMA American Architectural Manufacturer's Association
<http://www.aamanet.org>
- AAN American Nursery and Landscape Association
<http://www.anla.org>

AASHTO	American Association of State Highway and Transportation Officials http://www.aashto.org
AATCC	American Association of Textile Chemists and Colorists http://www.aatcc.org
ACGIH	American Conference of Governmental Industrial Hygienists http://www.acgih.org
ACI	American Concrete Institute http://www.aci-int.net
ACPA	American Concrete Pipe Association http://www.concrete-pipe.org
ACPPA	American Concrete Pressure Pipe Association http://www.acppa.org
ADC	Air Diffusion Council http://flexibleduct.org
AGA	American Gas Association http://www.aga.org
AGC	Associated General Contractors of America http://www.agc.org
AGMA	American Gear Manufacturers Association, Inc. http://www.agma.org
AHAM	Association of Home Appliance Manufacturers http://www.aham.org
AISC	American Institute of Steel Construction http://www.aisc.org
AISI	American Iron and Steel Institute http://www.steel.org
AITC	American Institute of Timber Construction http://www.aitc-glulam.org
AMCA	Air Movement and Control Association, Inc. http://www.amca.org
ANLA	American Nursery & Landscape Association http://www.anla.org
ANSI	American National Standards Institute, Inc. http://www.ansi.org
APA	The Engineered Wood Association http://www.apawood.org
ARI	Air-Conditioning and Refrigeration Institute http://www.ari.org
ASAE	American Society of Agricultural Engineers http://www.asae.org
ASCE	American Society of Civil Engineers http://www.asce.org

ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers http://www.ashrae.org
ASME	American Society of Mechanical Engineers http://www.asme.org
ASSE	American Society of Sanitary Engineering http://www.asse-plumbing.org
ASTM	American Society for Testing and Materials http://www.astm.org
AWI	Architectural Woodwork Institute http://www.awinet.org
AWS	American Welding Society http://www.aws.org
AWWA	American Water Works Association http://www.awwa.org
BHMA	Builders Hardware Manufacturers Association http://www.buildershardware.com
BIA	Brick Institute of America http://www.bia.org
CAGI	Compressed Air and Gas Institute http://www.cagi.org
CGA	Compressed Gas Association, Inc. http://www.cganet.com
CI	The Chlorine Institute, Inc. http://www.chlorineinstitute.org
CISCA	Ceilings and Interior Systems Construction Association http://www.cisca.org
CISPI	Cast Iron Soil Pipe Institute http://www.cispi.org
CLFMI	Chain Link Fence Manufacturers Institute http://www.chainlinkinfo.org
CPMB	Concrete Plant Manufacturers Bureau http://www.cpmc.org
CRA	California Redwood Association http://www.calredwood.org
CRSI	Concrete Reinforcing Steel Institute http://www.crsi.org
CTI	Cooling Technology Institute http://www.cti.org
DHI	Door and Hardware Institute http://www.dhi.org
EGSA	Electrical Generating Systems Association http://www.egsa.org

EEI	Edison Electric Institute http://www.eei.org
EPA	Environmental Protection Agency http://www.epa.gov
ETL	ETL Testing Laboratories, Inc. http://www.et1.com
FAA	Federal Aviation Administration http://www.faa.gov
FCC	Federal Communications Commission http://www.fcc.gov
FPS	The Forest Products Society http://www.forestprod.org
GANA	Glass Association of North America http://www.cssinfo.com/info/gana.html/
FM	Factory Mutual Insurance http://www.fmglobal.com
GA	Gypsum Association http://www.gypsum.org
GSA	General Services Administration http://www.gsa.gov
HI	Hydraulic Institute http://www.pumps.org
HPVA	Hardwood Plywood & Veneer Association http://www.hpva.org
ICBO	International Conference of Building Officials http://www.icbo.org
ICEA	Insulated Cable Engineers Association Inc. http://www.icea.net
ICAC	Institute of Clean Air Companies http://www.icac.com
IEEE	Institute of Electrical and Electronics Engineers http://www.ieee.org/
IMSA	International Municipal Signal Association http://www.imsasafety.org
IPCEA	Insulated Power Cable Engineers Association
NBMA	Metal Buildings Manufacturers Association http://www.mbma.com
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry Inc. http://www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers http://www.naamm.org
NAPHCC	Plumbing-Heating-Cooling Contractors Association http://www.phccweb.org.org

NBS	National Bureau of Standards See - NIST
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors http://www.nationboard.org
NEC	National Electric Code See - NFPA National Fire Protection Association
NEMA	National Electrical Manufacturers Association http://www.nema.org
NFPA	National Fire Protection Association http://www.nfpa.org
NHLA	National Hardwood Lumber Association http://www.natlhardwood.org
NIH	National Institute of Health http://www.nih.gov
NIST	National Institute of Standards and Technology http://www.nist.gov
NLMA	Northeastern Lumber Manufacturers Association, Inc. http://www.nelma.org
NPA	National Particleboard Association 18928 Premiere Court Gaithersburg, MD 20879 (301) 670-0604
NSF	National Sanitation Foundation http://www.nsf.org
NWWDA	Window and Door Manufacturers Association http://www.nwwda.org
OSHA	Occupational Safety and Health Administration Department of Labor http://www.osha.gov
PCA	Portland Cement Association http://www.portcement.org
PCI	Precast Prestressed Concrete Institute http://www.pci.org
PPI	The Plastic Pipe Institute http://www.plasticpipe.org
PEI	Porcelain Enamel Institute, Inc. http://www.porcelainenamel.com
PTI	Post-Tensioning Institute http://www.post-tensioning.org
RFCI	The Resilient Floor Covering Institute http://www.rfci.com
RIS	Redwood Inspection Service See - CRA
RMA	Rubber Manufacturers Association, Inc. http://www.rma.org

REFERENCE STANDARDS

SCMA	Southern Cypress Manufacturers Association http://www.cypressinfo.org
SDI	Steel Door Institute http://www.steeldoor.org
IGMA	Insulating Glass Manufacturers Alliance http://www.igmaonline.org
SJI	Steel Joist Institute http://www.steeljoist.org
SMACNA	Sheet Metal and Air-Conditioning Contractors National Association, Inc. http://www.smacna.org
SSPC	The Society for Protective Coatings http://www.sspc.org
STI	Steel Tank Institute http://www.steeltank.com
SWI	Window Institute http://www.steelwindows.com
TCA	Tile Council of America, Inc. http://www.tileusa.com
TEMA	Tubular Exchange Manufacturers Association http://www.tema.org
TPI	Truss Plate Institute, Inc. 583 D'Onofrio Drive; Suite 200 Madison, WI 53719 (608) 833-5900
UBC	The Uniform Building Code See ICBO
UL	Underwriters' Laboratories Incorporated http://www.ul.com
ULC	Underwriters' Laboratories of Canada http://www.ulc.ca
WCLIB	West Coast Lumber Inspection Bureau 6980 SW Varns Road, P.O. Box 23145 Portland, OR 97223 (503) 639-0651
WRCLA	Western Red Cedar Lumber Association P.O. Box 120786 New Brighton, MN 55112 (612) 633-4334
WWPA	Western Wood Products Association http://www.wwpa.org

END OF SECTION

REFERENCE STANDARDS

SECTION 014339

MOCK-UPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Mock-ups are required for, but not limited to the following:
 - 1. Hospital millwork mock-up.
 - 2. Interior finish Mockup.
- B. All mock-ups specified herein, under other Sections of the Specifications, and shown on the Drawings will be reviewed and approved by the Owner and Architect. Unaccepted mock-ups shall be replaced or reconstructed in part or in total and the extent of the replacement or reconstruction shall be at the discretion of the Owner and Architect. The Contractor shall carry forth mock-up replacement or reconstruction until such acceptance is obtained. Mock-up costs, including as many replacements or reconstruction as necessary to gain Owner and Architect's acceptance, shall be included in the Contract Cost and Schedule.

1.2 RELATED REQUIREMENTS

- A. Section 014000 - QUALITY REQUIREMENTS.
- B. Section 079200 - JOINT SEALANTS.
- C. Division 9 – FINISHES:
 - 1. Section 092216 - NON-STRUCTURAL METAL FRAMING.
 - 2. Section 092900 - GYPSUM BOARD.
 - 3. Section 093000 - TILING.
 - 4. Section 095100 - ACOUSTICAL CEILINGS.
 - 5. Section 096513 - RESILIENT BASE AND ACCESSORIES.
 - 6. Section 096516 - RESILIENT SHEET FLOORING.
 - 7. Section 096813 - TILE CARPETING.
 - 8. Section 098100 - ACOUSTICAL INSULATION.

1.3 PRE-INSTALLATION MEETING

- A. Interior Fit-Out Coordination Conference: At least two weeks prior to commencing the on-site work of this Section, conduct a pre-installation conference at the Project site. Coordinate time of meeting to occur prior to installation of work under the related sections named below.
 - 1. Required attendees: Owner, Architect, Contractor Project Superintendent and representatives of all related trades as referenced herein above in Article 1.2, and as directed by the Architect or Contractor. Representatives for installers of related work specified under the following Sections may also be required to attend:
 - a. Section 061000 - Rough Carpentry.
 - b. Division 22 - Plumbing
 - c. Division 23 - Heating, Ventilating, and Air Conditioning.
 - d. Division 26 - Electrical.
 - 2. Agenda:
 - a. Scheduling of installation operations.
 - b. Review of staging and material storage locations.
 - c. Coordination of work by other trades.
 - d. Installation procedures for equipment.

MOCK-UPS

- e. Protection of completed work.
- f. Discuss process for manufacturer's inspection and acceptance of completed roofing and flashings.
- g. Manufacturer's deck inspection to be performed.

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Submit shop drawing of mockup indicating sizes, finishes and method of construction and installation of each component.
 - 2. Sample Submittals:
 - a. Cabinet hinge with manufacturer's product literature, (approved cabinet hardware samples will be returned to Contractor and may become part of the Work).
 - b. Drawer slide with manufacturer's product literature, (approved cabinet hardware samples will be returned to Contractor and may become part of the Work).
 - c. 12 inch long samples of solid hardwoods illustrating maximum range of color variations and applied transparent shop finish.
 - d. 12 by 12 inch samples of plastic laminate, (of each color required for project).
 - e. 12 inch length samples of plastic edging material, (of each color required for project).
 - f. Acoustical ceiling unit: Full size sample, illustrating material and finish.
 - g. 12 inch long samples of suspension system components including main runners, cross runner and edge trim.
 - h. Resilient base: In color selected, 12 inches long.
 - i. Sheet flooring: 12 by 12 inch illustrating color, and pattern for each color and type of flooring selected.
 - j. Resilient tile flooring: Full sized flooring tile, illustrating color, and pattern for each color and type of tile selected
 - k. Edging and transition strips: 12 inches long demonstrating profile, thickness, size and color.

1.5 GENERAL

- A. Where requested by Architect, or as specified in individual specification sections, assemble and erect specified items, with specified blocking, attachment and anchorage devices, firestopping, insulation, sealants and backing materials, and finishes.
- B. Mock-ups, when approved by the Architect, will be used as datum for comparison with the remainder of the Work for the purposes of acceptance or rejection. Maintain mockup throughout construction period until Substantial Completion or as otherwise directed by Architect.
 - 1. Approval of mock-ups and field samples do not constitute approval of deviations from the Contract Documents.
 - 2. Finishes, colors and textures of components shall be as specified for each component and shall be selected by the Architect.
- C. Demolish and remove from site, prior to requesting inspection for certification of Substantial Completion, all Mock-ups which are not permitted to remain as part of the finished work.

1.6 COORDINATION

- A. Coordinate work of trades and schedule elements to expedite the fabricating, furnishing, and installation of multiple component mock-ups specified herein, in other Sections of the Specifications, and as shown in the Contract Documents.

PART 2 - PRODUCTS

2.1 MILLWORK MODULE MOCK-UP

- A. Prior to start of millwork fabrication, sub-contractor shall build a mockup to verify selections made under Sample Submittals and to demonstrate hardware operation, aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, complete with plumbing fixtures and trim, as shown on the Drawings for a typical Room.
- B. Mockup configuration shall be as indicated on the Drawings. If not indicated on the Drawings, mockup shall consist of one entire length of upper cabinets, one entire length of lower drawers/cabinets, countertop, and all applicable hardware.
 - 1. The mockup shall fully demonstrate the proposed range of aesthetic effects, workmanship, and the operation of all hardware, including but not limited to cabinet hinges, drawer slides, and pulls.
- C. Mock-up shall also include the following, as applicable:
 - 1. Wall finishes and applications such as tackable surfaces and wall protection.
 - 2. Lighting fixtures.
 - 3. Mechanical, plumbing and electrical services.
- D. Build mockups in the location as indicated on the Drawings or, if not indicated, as directed by the Architect.
- E. Notify Architect seven days in advance of dates and times when mockups will be fabricated and installed.
- F. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- G. Obtain Owner and Architect's approval of mockups before starting interior architectural woodwork fabrication.
- H. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- I. Demolish and remove mockups when directed.

2.2 INTERIOR FINISH MOCKUP

- A. Interior Finish Mockup: Construct mockup in a location selected by the Architect and approved by the Owner. Mock-up shall consist of several short lengths of wall which shall include an inside corner and an outside corner, complete with all finishes and equipment furnished under this Contract, including but not limited to the following:
 - 1. Construct all room partitions, as detailed on Contract Drawings, complete with all room finishes as specified and indicated and as selected by the Architect and approved by the Owner.
 - a. Construct gypsum wall board assembly; indicating floor gap and caulking, application of scheduled floor base, application of in accordance with the requirements of the following sections:
 - 1) Section 079200 - JOINT SEALANTS:
 - a) Refer to Section 079200 for joint sealant types, and application requirements.
 - b) Refer to Section 092900 for application of concealed acoustical sealant used in conjunction with gypsum board work at abutting surfaces, (perimeter of partitions).

- c) Refer to Section 099100 for sealant used in preparation of applied finish coatings.
 - d) Acceptable manufactures, or approved equal:
 - i. Tremco, Beachwood OH.
 - ii. United States Gypsum Company, Chicago IL.
 - iii. Pecora Corporation, Harleysville PA.
 - e) Refer to Section 079200 for additional information.
- 2) Section 092900 - GYPSUM BOARD:
- a) General: Install gypsum board walls within the designated mock-up area in accordance with the requirements of Section 092900 - GYPSUM BOARD.
 - b) Screw-fasten only, gypsum board to framing and furring, with ends and edges occurring over firm bearing. If door opening(s) is to be included in this mock-up, the jambs gypsum board shall be screw-fastened, 8 inches on center, to both box studs,
 - c) Provide taped, compounded and sanded gypsum board finishes.
 - i. Unless otherwise instructed, gypsum board assembly for the purposes of the mockup shall receive a Level 4 finish per ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
 - d) Apply acoustical joint sealant and backing at perimeter of gypsum board partitions, in compliance with ASTM C 919.
 - i. Acceptable manufactures, or approved equal:
 - 1. Tremco, Beachwood, OH.
 - 2. United States Gypsum Company, Chicago, IL.
 - 3. Pecora Corporation, Harleysville, PA.
 - e) Install all trim and accessory components related to gypsum board work, and as additionally instructed by the Architect.
 - f) Refer to Section 092900 - GYPSUM BOARD for additional information.
- 3) Section 095100 - ACOUSTICAL CEILINGS:
- a) General: Install acoustical ceilings, including suspension system and associated edge moldings, within the designated mock-up area in accordance with the requirements of Section 095100 – ACOUSTICAL CEILINGS. Mock-up components shall demonstrate the standard for the Work as required by the Drawings and Specifications.
 - b) Install all components, including hanger attachments, main tees and acoustical tiles and edge moldings, where devices are located, in accordance with the manufacturer's instructions, the approved shop drawings, the specifications, and conforming to ASTM C-636.
 - c) Apply field applied coating, as specified, at all field cut edges.
 - i. Touch-up field cut surfaces per manufacturer's instructions, using latex paint with a VOC content of 2.5g/l, equal to Armstrong Super Coat, model number 5760.
 - d) Refer to Section 095100 – ACOUSTICAL CEILINGS for additional information.
- 4) Section 096513 - RESILIENT BASE AND ACCESSORIES:

- a) General: Install resilient base, within the designated mock-up area in accordance with the requirements of Section 096513 - RESILIENT BASE AND ACCESSORIES. Mock-up components shall demonstrate the standard for the Work as required by the Drawings and Specifications.
 - b) Installation of resilient base:
 - i. Spread only enough adhesive to permit installation of materials before initial set.
 - ii. Install base on solid backing, bond to vertical substrate with continuous contact at horizontal and vertical surfaces. Apply wall base to walls, casework and other permanent fixtures in areas where base is required.
 - iii. Scribe to fit to door frames and other interruptions.
 - iv. Form all external and internal corners in accordance with manufacturer's written instructions. Cope inside corners and fit neatly.
 - v. Fill voids with plastic filler along the top edge of the resilient wall base on masonry surfaces or other similar irregular substrates.
 - c) Refer to Section 096513 - RESILIENT BASE AND ACCESSORIES for additional information.
- 5) Section 096516 - RESILIENT SHEET FLOORING:
- a) General: Install seam welded, sheet vinyl flooring, with integral base, within the designated mock-up area in accordance with the requirements of Section 096516 - RESILIENT SHEET FLOORING. Mock-up components shall demonstrate the standard for the Work as required by the Drawings and Specifications.
 - b) Installation of resilient sheet flooring:
 - i. Install sheet vinyl using conventional full-spread method and heat welded seams. Application shall be performed by factory trained mechanics franchised by the manufacturer in accordance with the manufacturer's instructions, and using tools and techniques recommended by the flooring manufacturer.
 - ii. Cut sheet material into required lengths and sizes. Layout and cut to achieve minimum number of seams and for pattern match between abutting edges, Reverse every other sheet (if recommended by manufacturer)
 - 1. Seams in corridors shall run perpendicular to corridor.
 - iii. Lay cut sheets flat and allow to come to room temperature prior to installation.
 - iv. Lay sheet vinyl flooring so as to ensure full uniform contact with substrate and to produce finished surfaces which are smooth, even and in true planes, free of buckles, waves, and other imperfections.
 - v. Install the sheets and roll the floor surface to work wrinkles and air pockets out past the outer edges.
 - 1. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer

- vi. Fit the sheet vinyl neatly and tightly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.
- vii. Weld seams with welding rods, as recommended by flooring manufacturer. When routing for seams, do not rout or groove through the flooring. Check temperature and speed of application to prevent charring, replace all damaged flooring. Weld seams in two pass method to prevent concave seaming. Use trim plates or sleds when making trimming first pass seam, use sharpened tools with second pass, trimming in a smooth continuous motion, resulting in a smooth seam.
- c) Installation of integral base:
 - i. Flash sheet vinyl flooring up the walls forming an integral coved base at wall surfaces. The height of the base at walls shall be 4 inches unless otherwise indicated on the drawings.
 - ii. Install continuous coved fillet strip behind sheet vinyl at the intersection of vertical surfaces and floor surfaces for walls and casework; cut, fit, and miter-weld at internal and external corners.
 - iii. Install continuous vinyl cap strip at top edge of sheet vinyl base at walls; securely fastened in place, with top edge of trim level, and with all trim joints mitered. Cap strip will not be required at underside of toe space.
 - iv. Install integral base at sides and at toe space of cabinets. The height of the integral base at casework shall match that of the toe space.
 - v. All interior and exterior corners of the integral base shall be formed without hardware.
- d) Refer to Section 096516 - RESILIENT SHEET FLOORING for additional information.
- 6) Section 096519 - RESILIENT TILE FLOORING:
 - a) General: Install vinyl tile flooring within the designated mock-up area in accordance with the requirements of Section 096519 - RESILIENT TILE FLOORING. Mock-up components shall demonstrate the standard for the Work as required by the Drawings and Specifications.
 - b) Installation of resilient tile flooring:
 - i. Apply resilient materials to have uniform contact with receiving surfaces throughout, with tight joints, and with all finish surfaces smooth, in true plane, free from buckles, waves, and other imperfections.
 - ii. Extend resilient flooring to wall lines beneath all movable equipment and movable casework. Fit resilient flooring onto breaks and recesses, against non-resilient bases, around pipes and other protrusions, under saddles, and to and around other fixed surfaces, making neat cuts in the flooring and minimizing joints.
 - iii. Lay flooring in a square grid pattern, with joints and seams parallel to building lines. Lay tile flooring in pattern as indicated on the drawings or if not indicated as such, lay with alternating pattern-grain to form a basket weave pattern. Lay tile with joints straight

and continuous in both directions and with border tile not less than 1/2 the width of the tile.

- c) Refer to Section 096519 - RESILIENT TILE FLOORING for additional information.

7) Section 099100 – PAINTING:

- a) General: Paint all walls within the designated mock-up area in accordance with the requirements of Section 099100 - PAINTING.
- b) Provide mock-up areas using accepted paint colors, a minimum of 160 square feet, unless otherwise instructed, illustrating color, texture and finish, and demonstrating the standard for the Work as required by the specification.
- c) Locate mock-ups where directed and include all surfaces and materials scheduled to receive a field applied finish.
- d) Accepted mock-ups may remain as part of the Work.
- e) Painting of new gypsum board surfaces: Fill minor defects with latex based spackle. Spot-seal all compound surfaces and repair areas in gypsum board, with specified first coat material before application of the first coat.
- f) Application:
 - i. Apply all materials in strict accordance with the approved manufacturer's printed instruction, and in accordance with the best trade practices. Each coat shall be reviewed and approved by the Architect before succeeding coats are applied.
 - ii. Do not apply successive coating until the preceding coat is thoroughly dry, and in no case in less than 24 hours after the preceding coat.
 - iii. Number of coats is indicated under Painting Schedules. Number of coats is indicated as a minimum number to be applied over scheduled substrates. An additional coat or coats may be required for proper color coverage of substrate as determined by the Architect, at no additional cost to the Owner. Examples of these conditions include, but are not limited to:
 - 1. Dark colored substrates may require an additional primer or intermediate coat to stabilize color, if final applied top-coat color is light.
 - 2. Pre-finished or pre-primed products may require an additional field applied coat to stabilize the shop/factory applied base color prior to application of top-coat finishes.
 - 3. Dark color top coat finishes may require additional finish coat over white or light colored substrates to obtain correct color density.
 - iv. Apply each coat to a uniform finish; Apply primer and first coat of slightly lighter in color tint than the scheduled color of the final coat.
 - v. Sand lightly between coats to achieve required finish and remove sanding dust prior to applying succeeding coat.
- g) Refer to Section 099100 – PAINTING and Section 099123 – INTERIOR PAINTING SCHEDULE for additional information.

MOCK-UPS

PART 3 - EXECUTION

3.1 PREPARATION

- A. Construct mock-ups at locations indicated or, if not indicated, at locations directed by the Architect.
- B. Construct mockup in time to make product and/or assembly modifications without delaying production work.

3.2 INSTALLATION AND REMOVAL

- A. Construct mockup to duplicate actual job conditions.
 - 1. Locate at an area on site as directed by the Architect.
- B. Retain mock-ups during construction as a standard for judging completed work until time designated by the Architect and the Owner,
 - 1. Accepted mock-ups (which are specifically identified by the Architect to become part of the Work) may be incorporated into the work provided they are not damaged during subsequent construction.

END OF SECTION

SECTION 01 45 00 QUALITY CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies requirements for Contractor Quality Control (CQC) for Design-Bid-Build (DBB) or Design-Build (DB) construction projects. This section can be used for both project types.

1.2 APPLICABLE PUBLICATIONS

- A. The publication listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
- B. ASTM International (ASTM)
 - 1. D3740 - (2012a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
 - 2. E329 - (2014a) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.3 SUBMITTALS

Government approval is required for all submittals. CQC inspection reports shall be submitted under this Specification section and follow the [Applicable CQC Control Phase (Preparatory, Initial, or Follow-Up)]: [Applicable Specification section] naming convention.

- 1. Preconstruction Submittals
 - a. Interim CQC Plan
 - b. CQC Plan
- 2. Test Reports
 - a. Verification Statement

PART 2 PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system. that complies with the FAR Clause 52.246.12 titled "Inspection of Construction". QC consists of plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The QC system covers all design and construction operations, both onsite and offsite, and be keyed to the proposed design and construction sequence. The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Office or Authorized designee for non-compliance with the quality requirements

specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the project superintendent. The project superintendent maintains a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.2 CQC PLAN:

- A. Submit the CQC Plan no later than 30 days after receipt of Notice to Proceed (NTP) proposed to implement the requirements of the FAR Clause 52.246.12 titled "Inspection of Construction". The Government will consider an Interim CQC Plan for the first 30 days of operation, which must be accepted within 5 business days of NTP. Design and/or construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an Interim plan applicable to the particular feature of work to be started. Work outside of the accepted Interim CQC Plan will not be permitted to begin until acceptance of a CQC Plan or another Interim CQC Plan containing the additional work scope is accepted.
- B. Content of the CQC Plan: Include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, designers of record consultants, architects/engineers (A/E), fabricators, suppliers, and purchasing agents:
 - 1. A description of the QC organization, including a chart showing lines of authority and acknowledgement that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager that reports to the project superintendent.
 - 2. The name, qualifications (in resume format) duties, responsibilities, and authorities of each person assigned a CQC function.
 - 3. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the Contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC System Manager. Furnish copies of these letters to the Contracting Officer or Authorized designee.
 - 4. Procedures for scheduling, reviewing, certifying, and managing submittals including those of subcontractors, designers of record, consultants, A/E's offsite fabricators, suppliers and purchasing agents. These procedures must be in accordance with Section 01 33 23 Shop Drawings, Product Data, and Samples.
 - 5. Control, verification, and acceptance of testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test

frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer or Authorized designee are required to be used)

6. Procedures for tracking Preparatory, Initial, and Follow-Up control phases and control, verification, and acceptance tests including documentation.
 7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.
 8. Reporting procedures, including proposed reporting formats.
 9. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks has separate control requirements, and is identified by different trades or disciplines, or it is work by the same trade in a different environment. Although each section of specifications can generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the Coordination meeting.
- C. Acceptance of Plan: Acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC Plan, notify the Contracting Officer or Authorized designee in writing of any proposed change. Proposed changes are subject to acceptance by the Government prior to implementation by the Contractor.

3.3 COORDINATION MEETING:

- A. After the Preconstruction Conference Post-award Conference before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer or Authorized designee to discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 5 business days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CC operations, design activities (if applicable), control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government, signed by both the Contractor and Contracting Officer or Authorized designee and will become a part of the contract file. There can be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION:

- A. Personnel Requirements: The requirements for the CQC organization are a Safety and Health Manager, CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Safety and Health Manager shall satisfy the requirements of Specification 01 35 26 Safety Requirements and reports directly to a senior project (or corporate) official independent from the CQC System Manager. The Safety and Health Manager will also serve as a member of the CQC Staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff maintains a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer or Authorized designee. Provide adequate office space, filing systems, and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawings submittals, schedules and all other project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Government.
- B. CQC System Manager: Identify as CQC System Manager an individual within the onsite work organization that is responsible for overall management of CQC and has the authority to act in all CQC matters for the Contractor. The CQC system Manager is required to be a construction person with a minimum of 5 years construction experience on construction similar to the scope of this Contract. This CQC System manager is on the site at all times during construction and is employed by the General Contractor. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.
- C. Additional Requirements: In addition to the above experience and education requirements, the CQC System Manager and Alternate CQC System Manager are required to have completed the Construction Quality Management (CQM) for Construction course. If the CQC System Manager does not have a current specification, obtain the CQM for Contractors course identification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer or Authorized designee for information on the next scheduled class.
- D. Organizational Changes: Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer or Authorized designee for acceptance.

3.5 SUBMITTALS AND DELIVERABLES:

- A. Submittals have to comply with the requirements in Section 01 33 23 Shop Drawings, Product Data, and Samples. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 01 91 00 General Commissioning Requirements is included in the contract, the submittals required by the section have to be coordinated with the Section 01 33 23 Shop Drawings, Product Data, and Samples to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL:

- A. CQC is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control are required to be conducted by the CQC System Manager for each definable feature of the construction work as follows:
 - 1. Preparatory Phase: This phase is performed prior to beginning work on each definable feature of work after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:
 - a. A review of each paragraph of applicable specifications, references codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.
 - b. Review of the Contract drawings.
 - c. Check to assure that all materials and equipment have been tested, submitted, and approved.
 - d. Review of provisions that have been made to provide required control inspection and testing.
 - e. Review Special Inspections required by Section 01 45 35 Special Inspections, that Statement of Special Inspections and the Schedule of Specials Inspections.
 - f. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.
 - g. Examination of required materials, equipment, and sample work to assure that they are on hand conform to approved shop drawings or submitted data, and are properly stored.
 - h. Review of the appropriate Activity Hazard Analysis (AHA) to assure safety requirements are met.

- i. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards – contract defined or industry standard if not contract defined - for that feature of work.
 - j. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
 - k. Discussion of the initial control phase.
 - l. The Government needs to be notified at least 48 hours or 2 business days in advance of beginning the Preparatory control phase. Include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the Preparatory phase actions by separate minutes prepared by the CQC System Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.
2. Initial Phase: This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:
- a. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the Preparatory meeting.
 - b. Verify adequacy of controls to ensure full contract compliance. Verify the required control inspection and testing is in compliance with the contract.
 - c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
 - d. Resolve all differences.
 - e. Check safety to include compliance with an upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
 - f. The Government needs to be notified at least 48 hours or 2 business days in advance of beginning the initial phase for definable features of work. Prepare separate minutes of this phase by the CQC System Manager and attach to the daily CQC report. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with Follow-Up phases.
 - g. The initial phase for each definable feature of work is repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-Up Phase: Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements until the completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final Follow-Up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming

work. Coordinate scheduled work with Special Inspections required by Section 01 45 35 Special Inspections, the Statement of Special Inspections, and the Schedule of Special Inspections

4. Additional Preparatory and Initial Phases on the same definable features of work if: the quality ongoing work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

- A. Testing Procedure: Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance test when specified. Procure the services of a Department of Veteran Affairs approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:
 1. Verify that testing procedures comply with contract requirements.
 2. Verify that facilities and testing equipment are available and comply with testing standards.
 3. Check test instrument calibration data against certified standards.
 4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
 5. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the unique sequential control number identifying the test. If approved by the Contracting Officer or Authorized designee, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer or Authorized designee. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.
- B. Testing Laboratories: All testing laboratories must be validated through the procedures contained in Specification section 01 45 29 Testing Laboratory Services.
 1. Capability Check: The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt and steel is required to meet criteria detailed in ASTM D3740 and ASTM E329.

2. Capability Recheck: If the selected laboratory fails the capability check, the Contractor will be assessed a charge equal to value of recheck to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.
- C. Onsite Laboratory: The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.8 COMPLETION INSPECTION

- A. Punch-Out Inspection: Conduct an inspection of the work by the CQC system Manager near the end of the work, or any increment of the work established by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications. Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final Inspection.
- B. Pre-Final Inspection: The Government will perform the Pre-Final Inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Government, so that a Final Acceptance Inspection with the customer can be scheduled. Correct any items noted on the Pre-Final Inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph need to be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate construction completion dates.
- C. Final Acceptance Inspection: The Contractor's QC Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Authorized designee is required to be in attendance at the Final Acceptance Inspection. Additional Government personnel can also be in attendance. The Final Acceptance Inspection will be formally scheduled by the Contracting Officer's or Authorized designee based upon results of the Pre-Final Inspection. Notify the Contracting Officer through the Resident Engineer office at least 14 days prior to the Final Acceptance Inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date schedule for the Final Acceptance Inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with FAR Clause 52.246-12 titled "Inspection of Construction".

3.9 DOCUMENTATION

- A. Quality Control Activities: Maintain current records providing factual evidence that required QC activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:
1. The name and area of responsibility of the Contractor/Subcontractor
 2. Operating plant/equipment with hours worked, idle, or down for repair.
 3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
 4. Test and control activities performed with results and references to specification/drawing requirements. Identify the Control Phase (Preparatory, Initial, and/or Follow-Up). List deficiencies noted, along with corrective action.
 5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specification/drawing requirements.
 6. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.
 7. Offsite surveillance activities, including actions taken.
 8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
 9. Instructions given/received and conflicts in plans and specifications.
 10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Reviewer (ITR) team, the ITR review comments, responses, and the record of resolution of the comments.
- B. Verification Statement: Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish the original and one copy of these records in report form to the Government daily with 1 week after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit on report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports prepared by all subordinate QC personnel within the CQC System Manager Report.

3.10 SAMPLE FORMS

- A. Templates of various quality control reports can be found on the Whole Building Design Guide website at:

https://www.wbdg.org/FFC/NAVGRAPH/01%2045%2000.00%2020_quality_control_reports.pdf

3.11 NOTIFICATION OF NONCOMPLIANCE:

- B. The Contracting Officer or Authorized designee will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor should take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer can issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

--- End of Section ---

SECTION 014502
QUALITY CONTROL SYSTEM (QCS)

PART 1 - GENERAL

1.1 QCS SYSTEM

- A. The Contractor shall provide a QCS approved by the Government to assist in monitoring administration of this contract throughout the contract period. Information shall include data on:
1. Administration.
 2. Finances.
 3. Quality Control.
 4. Submittal Management
 5. Construction Schedule
 6. Data Submission
 7. Monthly Coordination Meeting
 8. Notification of noncompliance

1.1.1 CORRESPONDENCE AND ELECTRONIC COMMUNICATIONS

- A. For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 OTHER FACTORS

- A. Particular attention is directed to Contract Clause "Schedules for Construction Contracts", Contract Clause "Payments", Section 013323 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, which have a direct relationship to the reporting to be accomplished. All costs associated therewith shall be included in the contract pricing for the work.

1.2 CONTRACT DATABASE

- A. Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.3 DATABASE MAINTENANCE

- A. The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS data at the Contractor's site office. Data updates to the Government shall be submitted to the Government electronically, e.g., daily reports, schedule updates, payment requests. If permitted by the Project Engineer/VA-COR, a CD-ROM may be used (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The QCS data typically shall include current data on the following items:

1.3.1 ADMINISTRATION

1.3.1.1 CONTRACTOR INFORMATION

- A. The submitted data shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Upon NTP from the Government, the Contractor shall deliver Contractor administrative data in electronic format.

1.3.1.2 SUBCONTRACTOR INFORMATION

- A. The data shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Upon NTP from the Government, the Contractor shall deliver subcontractor administrative data in electronic format.

1.3.1.3 CORRESPONDENCE

- A. All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.3.1.4 EQUIPMENT

- A. The Contractor's QCS data shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.3.1.5 MANAGEMENT REPORTING

- A. The QCS shall include a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input. Among these reports are:
 - 1. Progress Payment Request worksheet, QA/QC comments, Submittal Register
 - 2. Status, Three-Phase Inspection checklists.

1.3.2 FINANCES

1.3.2.1 PAY ACTIVITY DATA

- A. The QCS data shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.3.2.2 PAYMENT REQUESTS

- A. The Contractor shall complete a payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report. The Contractor shall submit the payment requests with supporting data. If permitted by the Project Engineer/VA-COR, a CD-ROM may be used. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.3.3 QUALITY CONTROL (QC)

- A. The Contractor shall track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and other contractor

QC requirements. The Contractor shall maintain this data on a daily basis. The Contractor shall provide the Government a Contractor Quality Control (CQC). Within seven calendar days of Government acceptance, the Contractor shall submit a CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.3.3.1 DAILY CONTRACTOR QUALITY CONTROL (CQC) REPORTS.

- A. The Contractor shall use the VA approved Daily Report Form to record basic QC data. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the Daily VA CQC Report. Reports shall be submitted electronically to the Government within 24 hours after the date covered by the report. Mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.3.3.2 DEFICIENCY TRACKING.

- A. The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be provided to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.3.3.3 THREE-PHASE CONTROL MEETINGS

- A. The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings.

1.3.3.4 ACCIDENT/SAFETY TRACKING

- A. The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be provided to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall advise the Government of any accidents occurring on the jobsite. This brief report is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

1.3.3.5 FEATURES OF WORK

- A. The Contractor shall include a complete list of the features of work QCS. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.3.3.6 QC REQUIREMENTS

- A. The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government.

1.3.4 SUBMITTAL MANAGEMENT

- A. The Contractor shall provide the initial submittal register in electronic format per Section 013323 and shall maintain the register with a complete list of all submittals, including completion of all data columns. The transmittal number on the submittal register shall match the submission number on the VA Material Approval Submittal Form. Dates on which submittals are received and returned by the Government will be provided to the Contractor. The Contractor shall track and transmit all submittals using the VA Material

Approval Submittal Form and on the submittal register. The Contractor shall provide an updated submittal register to the Government on a weekly basis.

1.3.5 CONSTRUCTION SCHEDULE

- A. The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts". The updated schedule data shall be included with each pay request submitted by the Contractor.

1.4 DATA SUBMISSION VIA CD-ROM

- A. The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is electronically. For locations where this is not feasible, the Project Engineer/VA-COR may permit use of CD-ROM for data transfer. If used, CD-ROMs will be submitted in accordance with the following:

1.4.1 FILE MEDIUM

- A. The Contractor shall submit required data on CD-ROMs. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.4.2 CD-ROM LABELS

- A. The Contractor shall affix a permanent exterior label to each CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, the VA Project Number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.4.3 FILE NAMES

- A. The Government will provide the file names to be used by the Contractor with the QCS software.

1.5 MONTHLY COORDINATION MEETING

- A. The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.6 NOTIFICATION OF NONCOMPLIANCE

- A. The Project Engineer/VA-COR will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014529

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained by the Contractor.

1.2 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
- T27-11 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
 - T96-02 (R2006) Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - T99-10 Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
 - T104-99 (R2007) Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
 - T180-10 Standard Method of Test for Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
 - T191-02(R2006) Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method
- C. American Concrete Institute (ACI):
- 318-11 Building Code Requirements for Reinforced Concrete.
 - 301-10 Standard Specifications for Structural Concrete.
- D. American Society for Testing and Materials (ASTM):
- A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - A370-12 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
 - A416/A416M-10 Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
 - A490-12 Standard Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
 - C31/C31M-10 Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - C33/C33M-11a Standard Specification for Concrete Aggregates
 - C39/C39M-12 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - C109/C109M-11b Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

C136-06	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
C138/C138M-10b.....	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
C140-12	Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
C143/C143M-10a.....	Standard Test Method for Slump of Hydraulic Cement Concrete
C172/C172M-10.....	Standard Practice for Sampling Freshly Mixed Concrete
C173/C173M-10b.....	Standard Test Method for Air Content of freshly Mixed Concrete by the Volumetric Method
C330/C330M-09.....	Standard Specification for Lightweight Aggregates for Structural Concrete
C567/C567M-11	Standard Test Method for Density Structural Lightweight Concrete
C780-11	Standard Test Method for Pre-construction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C1019-11	Standard Test Method for Sampling and Testing Grout
C1064/C1064M-11.....	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
C1077-11c.....	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
C1314-11a	Standard Test Method for Compressive Strength of Masonry Prisms
D422-63(2007)	Standard Test Method for Particle-Size Analysis of Soils
D698-07e1	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
D1140-00(2006).....	Standard Test Methods for Amount of Material in Soils Finer than No. 200 Sieve
D1143/D1143M-07e1....	Standard Test Methods for Deep Foundations Under Static Axial Compressive Load
D1188-07e1	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
D1556-07	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557-09	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft lbf/ft ³ (2,700 KNm/m ³))
D2166-06	Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
D2167-08)	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
D2216-10	Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D2974-07a	Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
D3666-11	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
D3740-11	Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction
D6938-10	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
E94-04.....	(2010) Standard Guide for Radiographic Examination
E164-08.....	Standard Practice for Contact Ultrasonic Testing of Weldments
E329-11c.....	Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
E543-09.....	Standard Specification for Agencies Performing Non-Destructive Testing
E605-93(R2011).....	Standard Test Methods for Thickness and Density of Sprayed FireResistive Material (SFRM) Applied to Structural Members
E709-08.....	Standard Guide for Magnetic Particle Examination
E1155-96(R2008).....	Determining FF Floor Flatness and FL Floor Levelness Numbers

E. American Welding Society (AWS):

D1.D1.1M-10.....	Structural Welding Code-Steel
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1.3 REQUIREMENTS

- A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e.; E329, C1077, D3666, D3740, A880, E543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."
- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Project Engineer/VA-COR. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of Project Engineer/VA-COR to such failure.
 1. Third Party Testing is required and shall be arranged and paid for by the Contractor to the extent that any of the work identified is performed on this project,
 2. The number of tests for each material shall be as indicated elsewhere in the project specifications or, if not indicated, as necessary to reliably demonstrate compliance with the requirements. However, the VAMC may, on occasion, engage testing services on their own and at their own discretion, in which case section 010000 indicates the Contractor's coordination requirements.
 3. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and

reinspecting, for construction that replaced Work that failed to comply with the Contract Documents at no cost to the Owner.

- C. Written Reports: Testing laboratory shall submit test reports to Project Engineer/VA-COR, Contractor, unless other arrangements are agreed to in writing by the Project Engineer/VA-COR. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to Project Engineer/VA-COR immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MASONRY

- A. Mortar Tests:
 - 1. Laboratory compressive strength test:
 - a. Comply with ASTM C780.
 - b. Obtain samples during or immediately after discharge from batch mixer.
 - c. Furnish molds with 50 mm (2 inch), 3 compartment gang cube.
 - d. Test one sample at 7 days and 2 samples at 28 days.
- B. Grout Tests:
 - 1. Laboratory compressive strength test:
 - a. Comply with ASTM C1019.
 - b. Test one sample at 7 days and 2 samples at 28 days.
- C. Masonry Unit Tests:
 - 1. Laboratory Compressive Strength Test:
 - a. Comply with ASTM C140.
 - b. Test 3 samples.

3.2 SPRAYED-ON FIREPROOFING

- A. Provide field inspection and testing services to certify sprayed-on fireproofing has been applied in accordance with contract documents.
- B. Obtain a copy of approved submittals from Project Engineer/VA-COR.
- C. Use approved installation in test areas as criteria for inspection of work.
- D. Test sprayed-on fireproofing for thickness and density in accordance with ASTM E605.
 - 1. Thickness gauge specified in ASTM E605 may be modified for pole extension so that overhead sprayed material can be reached from floor.
- E. Location of test areas for field tests as follows:
 - 1. Thickness: Select one bay per floor, or one bay for each 930 m² (10,000 square feet) of floor area per phase, whichever provides for greater number of tests with a minimum of two (2) test areas per phase. Take thickness determinations from each of following locations: Metal deck, beam, and column.

2. Density: Take density determinations from each floor, or one test from each 930 m² (10,000 square feet) of floor area per phase, whichever provides for greater number of tests with a minimum of (2) test areas per phase, from each of the following areas: Underside of metal deck, beam flanges, and beam web.

3.3 BLANKET INSULATION

- A. Provide field inspection to certify blanket insulation has been installed in accordance with contract documents.

3.4 EXPANSION ANCHORS

- A. Inspect installation. Verify that existing reinforcement is not cut. Verify installation per manufacturer specifications. Verify embedment and torque of anchors.

3.5 TYPE OF TEST

- A. Masonry:

Sampling and Testing Mortar, Comp. Strength (ASTM C780)

Sampling and Testing Grout, Comp. Strength (ASTM C1019)

Masonry Unit, Compressive Strength (ASTM C140)

- B. Sprayed-On Fireproofing:

Thickness and Density Tests (ASTM E605)

3.6 TECHNICAL PERSONNEL

- A. Technicians to perform tests and inspection listed above shall demonstrate their Qualifications.

1. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - a. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - b. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
2. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
3. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

END OF SECTION

SECTION 015719
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies regulatory environmental compliance and the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of applicable project permits, visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
 - 1. Adversely affect human health or welfare.
 - 2. Unfavorably alter ecological balances of importance to human life.
 - 3. Affect other species of importance to humankind, or degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions:
 - 1. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
 - 2. Sediment: Soil and other debris that has been eroded and transported by runoff water.
 - 3. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
 - 4. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water of the United States" and would require a permit to discharge water from the governing agency.
 - 5. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
 - 6. Sanitary Wastes:
 - a. Sewage: Domestic sanitary sewage and human and animal waste.
 - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2 QUALITY CONTROL

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.
- C. All regulatory compliance activities shall be reviewed and accepted by the GEMS Coordinator, via the Project Engineer/VA-COR.

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA): 33 CFR 328.

1.4 SUBMITTALS

- A. Environmental Protection Plan:
 - 1. The Contractor shall submit an Environmental Protection Plan at or before the Preconstruction Conference.
 - 2. The Environmental Protection Plan shall include the following:
 - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for obtaining applicable environmental permits and ensuring adherence to the Environmental Protection Plan.
 - b. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control, and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
 - c. Procedures and methods to provide compliance with the applicable laws and regulations.
 - d. Documentation for applicable permits and licenses.
 - e. Drawings showing locations of any proposed temporary excavations, embankments and stockpiles of excess or spoil materials.
 - 3. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued regulatory compliance and control of pollutants and other environmental protection measures.
 - 4. Work may not begin until the Environmental Protection Plan is approved.

1.5 PROTECTION OF ENVIRONMENTAL RESOURCES

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the Project Engineer/VA-COR. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
 - 1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
 - 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
 - a. Box and protect from damage existing trees and shrubs to remain on the construction site.

TEMPORARY ENVIRONMENTAL CONTROLS

- b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
 - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
 - d. Reuse or conserve the collected topsoil sediment as directed by the Project Engineer/VA-COR. Topsoil use and requirements are specified in Section 312000, EARTH MOVING.
 3. Manage and control site activities, including spoil stockpile areas, to limit and/or prevent erosion of soil/sediment/pollutants from migrating and/or entering the storm water system and other areas.
 4. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in covered containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of solid waste in compliance with Federal, State, and local requirements.
 5. Handle discarded materials other than those included in the solid waste category as directed by the Project Engineer/VA-COR.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the construction activities that are included in this contract.
 1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter sewer or storm water drainage systems. Management of potential wastewater generated onsite shall be discussed with the GEMS Coordinator via the Project Engineer/VA-COR prior to generation.
- D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife.
- E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of NH Department of Environmental Services (DES) regulations and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency for those construction operations and activities specified.
 1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials at all times, including weekends, holidays, and hours when work is not in progress.
 2. Particulates Control: Maintain all excavations, stockpiles, permanent and temporary access roads, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance.
 3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
 4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.
- F. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Project Engineer/VA-

TEMPORARY ENVIRONMENTAL CONTROLS

COR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Comply with local noise regulations as in the town of Hardford, VT, Code of Ordinances: Noise Regulations.
2. Perform construction activities involving repetitive, high-level impact noise only between 7:00 a.m. and 9:00 p.m., Monday-Friday, in accordance with Hardford's noise regulations. Repetitive impact noise on the property shall not exceed the following dB limitations.

<u>Time Duration of Impact Noise</u>	<u>Sound Level in dB</u>
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

3. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
 - a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA).
 - b. Use shields or other physical barriers to restrict noise transmission.
 - c. Provide soundproof housings or enclosures for noise-producing machinery.
 - d. Use efficient silencers on equipment air intakes.
 - e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
 - f. Line hoppers and storage bins with sound deadening material.
 - g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
 4. Measure sound level for noise exposure due to each noise-producing construction activity a minimum of once per every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure 15 m (50 feet) from the noise source. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the Project Engineer/VA-COR noting any problems and the alternatives for mitigating actions.
- G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the Project Engineer/VA-COR. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

END OF SECTION

TEMPORARY ENVIRONMENTAL CONTROLS

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SECTION 015816
TEMPORARY INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies temporary interior signs.

PART 2 - PRODUCTS

2.1 TEMPORARY SIGNS

- A. Fabricate from 50 Kg (110 pound) mat finish white paper.
- B. Cut to 100 mm (4-inch) wide by 300 mm (12 inch) long size tag.
- C. Punch 3 mm (1/8-inch) diameter hole centered on 100 mm (4-inch) dimension of tag. Edge of Hole spaced approximately 13 mm (1/2-inch) from one end on tag.
- D. Reinforce hole on both sides with gummed cloth washer or other suitable material capable of preventing tie pulling through paper edge.
- E. Ties: Steel wire 0.3 mm (0.0120-inch) thick, attach to tag with twist tie, leaving 150 mm (6-inch) long free ends.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install temporary signs attached to room door frame or room door knob, lever, or pull for doors on corridor openings.
- B. Mark on signs with felt tip marker having approximately 3 mm (1/8-inch) wide stroke for clearly legible numbers or letters.
- C. Identify room with numbers as designated on floor plans.

3.2 LOCATION

- A. Install on doors that have room, corridor, and space numbers shown.
- B. Doors that do not require signs are as follows:
 - 1. Corridor barrier doors (cross-corridor) in corridor with same number.
 - 2. Folding doors or partitions.
 - 3. Toilet or bathroom doors within and between rooms.
 - 4. Communicating doors in partitions between rooms with corridor entrance doors.
 - 5. Closet doors within rooms.
- C. Replace missing, damaged, or illegible signs.

END OF SECTION

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SECTION 016235
RECYCLED / RECOVERED MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section covers the requirements of the EPA's Comprehensive Procurement Guide (CPG) Program. The CPG program is part of EPA's continuing effort to promote the use of materials recovered from solid waste. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. The CPG program is authorized by Congress under Section 6002 of the Resource Conservation and Recovery Act (RCRA) and Executive Order 13148. EPA is required to designate products that are or can be made with recovered materials, and to recommend practices for buying these products. Once a product is designated, procuring agencies are required to purchase it with the highest recovered material content level practicable.

1.2 REFERENCES

- A. Section 6002 of the Resource Conservation and Recovery Act (RCRA)
B. Executive Order 13148, Greening the Government Through Leadership in Environmental Management
C. 40 CFR 247, Comprehensive Procurement Guideline for Products Containing Recovered Materials.

1.3 OBJECTIVES

- A. It is the White River Junction VA's procurement policy to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable, consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. A key component of the CPG program is EPA's list of designated products and the accompanying recycled-content recommendations. EPA has already designated or is proposing to designate the products listed below. They are grouped into eight categories:

Construction Products

Landscaping Products

Nonpaper Office Products

Paper and Paper Products

Park and Recreation Products

Transportation Products

Vehicular Products

Miscellaneous Products

- B. The above CPG list is located at the following URL: <http://www.epa.gov/cpg/products.htm>
C. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the contracted work.

1.4 EPA ITEMS INCORPORATED INTO THE WORK

- A. It is the responsibility of the Architectural Engineering (AE) firm performing the design to be aware of current EPA requirements and to determine the suitability of an EPA designated item in the work.

- B. Level of competition, delivery time, performance requirements, and price should all be considered in making the determination.
- C. These items, when incorporated into the work under this contract, shall contain at least the specified percentage of recycled or recovered materials unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.5 EPA PROPOSED ITEMS IN THE WORK

- A. Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.6 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

- A. There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

1.7 RECORDKEEPING AND DOCUMENTATION

- A. It is the responsibility of the Contractor to provide the White River Junction VA submittals outlining the individual products and quantities that have been used on the project which meet the CPG guidance outlined in the preceding sections. These submittals shall be prepared on a quarterly basis throughout the term of the contract and submitted to the COR for inclusion in the contract records and documentation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 017329
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Examination of existing conditions and acceptance of conditions.
- B. Administrative and procedural requirements for cutting and patching, including attendant excavation and backfill as required to complete the Work. General Contractor is responsible for all cutting and patching work, including but not limited to:
 - 1. Perform all cutting, altering, patching, and fitting of the Work (new and existing) as necessary for the Work and the existing improvements. Fully integrate with existing and new construction, all cutting, alterations and patching, to present the visual appearance of an entire, completed, and unified project.
 - a. Make all products and their components of the work fit together properly.
 - 2. Provide openings in elements of the Work, and the patching of same, for penetrations required by all trades, including but not limited to mechanical, plumbing, fire protection and electrical work.
 - a. Individual trades are responsible for designated types of coring and drilling penetrations for piping, conduit, ducts and other penetrations as defined elsewhere in this Section.
 - 3. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
 - 4. Remove and replace work not conforming to requirements of the Contract Documents or as otherwise determined to be defective.
 - 5. Patch and match all surfaces and products disturbed or damaged by the Work.
 - 6. Remove samples of installed work as specified for testing.

1.2 RELATED REQUIREMENTS

- A. Section 024100 - DEMOLITION: Demolition of selected portions of the building for new construction.
- B. Individual product specification Sections:
 - 1. Cutting and patching of not-exposed-to-view materials incidental to work of the Section.
 - 2. Core drilling (up to 8 inches in diameter) of interior building components, incidental to work of individual Sections.
 - 3. Cutting and Patching work of particular exposed-to-view finish work, performed by trades as specified herein.

1.3 SUBMITTALS

- A. Submit written proposals to perform cutting and patching under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Describe cutting and patching procedures in advance of the time cutting and patching.
 - 1. Submit a written request when cutting work affects the following:
 - a. Structural integrity of any element in the project.
 - b. Integrity of weather-exposed or moisture-resistant elements.
 - c. Integrity of any fire suppression, fire alarm, or life safety system.

- d. Interruption or disturbance of utilities service. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - e. Efficiency, maintenance, or safety of operational elements and systems.
 - f. Aesthetic and visual qualities of exposed-to-view elements.
 - g. Efficiency, operational life, maintenance, or safety of operational elements.
 - h. Work of Owner or work performed under separate Contract.
 - i. Owners on-going operations or schedule.
2. Include in the request:
- a. Identification of project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Alternatives to cutting and patching.
 - e. Scope of proposed cutting, patching, alteration or excavation.
 - f. List of tradespeople who will execute the work.
 - g. Description of products to be used.
 - h. Extent of refinishing and cleaning to be performed.
 - i. Effect on work by Owner or work performed under separate Contract, and written permission of affected party.
 - j. Date and time cutting and patching is scheduled to be executed.
 - k. Cost proposal, when applicable.
 - l. Written permission of separate contractor(s) whose work will be affected.
3. Review by the Project Engineer/VA-COR and the Architect does not waive the Architect's right to later require complete removal and replacement of Work found to be unsatisfactory.

1.4 QUALITY ASSURANCE

- A. Only tradespersons skilled and experienced in cutting and patching shall perform such Work.
- B. In performing Work which requires cutting, fixing, or patching, Contractor and subcontractors shall utilize best efforts to protect and preserve the visual appearance and aesthetics of the Project to the reasonable satisfaction of both the Project Engineer/VA-COR and the Architect.

1.5 PERFORMANCE REQUIREMENTS

- A. General performance requirements: Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Structural elements: Do not cut and patch structural elements in a manner that would reduce the load-carrying capacity or load deflection ratio. Always obtain written approval of the cutting and patching proposal before cutting and patching structural elements.
 - 1. Do not drill through structural beams, slabs or columns. Core drilling through concrete block walls and stair platforms must be approved by the Project Engineer/VA-COR and the Architect.

2. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
- C. Exposed elements:
 1. Employ original installer of new construction to perform cutting and patching for weather exposed and moisture resistant elements, and sight exposed surfaces.
 2. Employ an appropriate tradesperson to perform cutting and patching of existing weather-exposed and moisture-resistant construction, and exposed-to-view surfaces.
- D. Penetrating elements: Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated materials in accordance to applicable codes and regulations, and compatible to surrounding construction.
- E. Visual requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Project Engineer/VA-COR and the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
 1. General: Restore work with new products in accordance with the requirements of the Contract Documents.
 2. Engage a firm recognized and experienced in the trade or specialty operation required to cut and patch the exposed-to-view work listed below.
 - a. Cutting of existing masonry at new brick infill.
 - b. Matched-veneer woodwork.
 - c. Windows/storefront wall system.
 - d. Gypsum board.
 - e. Acoustical ceilings.
 - f. Tile carpeting.
 - g. HVAC enclosures, cabinets, or covers.
 3. Engage a firm recognized and experienced in firestopping for patching of existing firestopping, smoke seals and firesafing in compliance with applicable codes and as additionally required by authorities having jurisdiction. Comply with requirements of Section 078400 - FIRESTOPPING.
- F. Operational and safety limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life or safety.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Fire resistance rated barriers and smoke barriers.
 - c. Fire protection systems.
 - d. Noise and vibration control elements and systems.
 - e. Control systems.
 - f. Communication systems.
 - g. Electrical wiring systems.

1.6 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void existing applicable warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Materials: Use patching materials identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible. Use materials whose installed performance will equal or surpass that of the existing materials. Comply with specifications and standards for each specific product involved.
 - 1. All materials used shall be approved by the Project Engineer/VA-COR and the Architect for consistency with the existing surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Pre-bid examination: General Contractor and its subcontractors shall inform themselves of existing conditions before submitting bids, and are fully responsible for carrying out all work required to completely and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions which are inconsistent with those assumed, except for fully concealed conditions.
- B. Examination: Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, inspect conditions affecting performance of work. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.2 PREPARATION

- A. Protection:
 - 1. Provide temporary supports to ensure structural integrity of the Work.
 - 2. Protect existing construction during cutting and patching to prevent damage.
 - 3. Provide protection from adverse weather conditions.
 - 4. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 GENERAL CUTTING AND PATCHING

- A. Performance: Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive repairs, patching, and finishing.
- B. Execute cutting, fitting, and patching, including excavation and fill, to complete the work.
 - 1. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not permitted without prior approval, from the Project Engineer/VA-COR and the Architect.
 - 2. Fit products together, to integrate with other work.
 - 3. Uncover work to install ill-timed work.
 - 4. Remove and replace defective or non-conforming work.
 - 5. Remove samples of installed work for testing, when requested.
 - 6. Provide openings in the work for penetration of mechanical and electrical work.

- C. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 4. Comply with requirements of applicable Division 31 - EARTHWORK Sections where cutting and patching requires excavating and backfilling.
 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

3.4 FINISHING OF PATCHED AREAS:

- A. General: Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break; for assemblies, refinish entire unit.
1. Patching: Patch with durable seams that are as invisible as possible, showing no evidence of patching and refinishing. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction. Comply with specified tolerances.
 - a. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated materials in accordance to applicable codes and regulations, and compatible to surrounding construction.
 - b. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Provide vapor and air seal when penetrating existing vapor and air seals.
 - c. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat. Extend re-painting to entire surface plane up to where plane changes direction.
 3. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.5 CORING AND DRILLING

- A. Coring and Drilling of holes incidental to work of individual sections shall be performed by the trade requiring the penetration, except as follows:

1. Coring and Drilling of holes greater than 8 inches in diameter in concrete decks and slabs.
2. The General Contractor is responsible for performing core drilling in wall and roof surfaces leading to, or from, the outside of the Building.
3. The General Contractor is responsible for coordination of all coring and drilling and resultant patches necessary for the completion of this Contract and for the quality and appearance of all patch Work in exposed-to-view finished materials.

3.6 CLEANING

- A. Cleaning patched areas: Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove paint, mortar, oils, putty and similar items.

END OF SECTION

SECTION 017419
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section covers the requirements for management of non-hazardous building construction and demolition waste materials. Under the Sustainable Building requirements of Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal leadership in Environmental, Energy, and Economic Performance, Federal agencies are directed to recycle or salvage at least 50 percent construction, demolition, and clearing waste, excluding soil, where markets or on-site recycling opportunities exist.

1.2 RELATED WORK

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 013513 - SPECIAL PROJECT PROCEDURES
- E. Section 024100 - DEMOLITION
- F. Section 028211 - ASBESTOS ABATEMENT

1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
 - 1. Excess or unusable construction materials.
 - 2. Packaging used for construction products.
 - 3. Poor planning and/or layout.
 - 4. Construction error.
 - 5. Over ordering.
 - 6. Weather damage.
 - 7. Contamination.
 - 8. Mishandling.
 - 9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.

- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.
- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

1.4 TERMINOLOGY

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

1. On-site Recycling – Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
 2. Off-site Recycling – Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.5 GOVERNMENT POLICY

- A. Contractor shall maximize use of source reduction and recycling procedures outlined in ASTM D5834.
- B. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators and facilitate their recycling.
- C. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling and any revenues or savings obtained from salvage or recycling shall accrue to the Contractor.
- D. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by federal, state and local regulations.

1.6 INTENT AND WASTE MANAGEMENT GOALS

- A. The White River Junction VAMC's Construction and Demolition (C&D) Waste diversion goal is 50% by 2015. This goal mirrors the goal stated in EO 13514. Waste management goals include increased recycling and conservation of materials. C&D Wastes have been identified as a particular target for reuse and recycling, for several reasons:
 1. C&D debris typically represents a large volume of material;
 2. Many of the waste streams generated during building demolition and construction projects are highly recyclable at reasonable prices;
- B. The White River Junction VAMC has determined that reducing, to the maximum extent practicable, the amount of waste disposed of in this project is a high priority. The Contractor and subcontractors shall take steps to generate the least amount of waste possible by minimizing waste due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be segregated for reuse, salvage, or recycling, or recycled as mixed debris. In no case shall material be disposed of in a landfill or incinerator where an approved and less

costly recycling or reuse alternative exists. Waste disposal in landfills and incinerators shall be minimized and shall be considered the alternative of last resort.

- D. With regard to these goals the Contractor shall develop, for the Owner's review and approval, a Waste Management Plan for this Project as described in Section 1.7.

1.7 DRAFT WASTE MANAGEMENT PLAN

- A. Within 14 calendar days after receipt of Notice of Award of Bid, and prior to any waste removal, the Contractor shall submit a Draft Waste Management Plan to the Architect & Engineering Firm and/or Resident Engineer. The Draft Waste Management Plan shall contain, as a minimum:
1. A written analysis of the project wastes expected to be generated, by type and approximate quantity.
 2. Disposal options: - The name of all landfill(s) and/or incinerator(s) proposed for trash disposal, the respective tipping fee(s) for each of these disposal options including transportation costs, and the projected cost of disposing of all Project waste in the landfill(s).
 3. Alternatives to Landfill Disposal/Incineration: - A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed end use or market for each material, the respective tipping fees for each end use or market (including transportation costs), and the estimated net cost savings or cost increase resulting from recycling each material (versus landfilling or other disposal), taking into account revenue from the sale of recycled or salvaged materials and tipping fees saved due to diversion of materials.
 4. The Draft Waste Management Plan shall include, at a minimum, the materials included in Section 1.5 that are required to be reused or recycled.
 5. Communication strategy for insuring all contractors and subcontractors are familiar with C&D Waste Management Plan.
 6. A "Sample C&D Waste Management Plan" can be found as attachment 1.
- B. Following the submittal of the Draft Waste Management Plan, The Resident Engineer and Architect & Engineering Firm will review the plan and consider the proposed recycling and waste disposal alternatives. The Owner and/or Architect may suggest alternatives to the proposed disposal options in order to increase recycling, reduce costs, or both.

1.8 MATERIALS FOR WHICH RECYCLING IS REQUIRED

- A. The White River Junction VAMC requires that, as a minimum, the following materials must be considered for recycling, salvage, or reuse during this project:
1. Asphalt
 2. Concrete, concrete block, concrete masonry units (CMU), slump stone (decorative concrete block), and rocks
 3. Asphalt Concrete
 4. Brick
 5. Paper, including bond, newsprint, cardboard, mixed paper, packing materials, and packaging
 6. Cement Fiber Products, including shingles, panels, siding
 7. Paint
 8. Rigid Foam
 9. Glass
 10. Plastics
 11. Carpet and Pad
 12. Beverage Containers

13. Insulation
14. Gypsum Wallboard
15. Porcelain Plumbing Fixtures
16. Fluorescent Light Tubes, per 40 CFR 173.164(e) regulations
17. Green materials (i.e. tree trimmings and land clearing debris).
18. Metals including, but not limited to, stud trim, ductwork, piping, reinforcing steel (rebar), roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze. (ferrous and non-ferrous).
19. Soils
20. Wood, including clean dimensional wood, pallet wood, plywood, oriented strand board (OSB), particle board
21. Furnishings

1.9 FINAL WASTE MANAGEMENT PLAN

- A. Once VAMC White River Junction has considered the draft Waste Management Plan and made appropriate suggested modifications, the Contractor shall submit, within 14 Calendar days of receiving such suggested modifications, a Final Waste Management Plan, incorporating VAMC White River Junction's input.

1.10 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. **Manager:** - The Contractor shall designate a specific party (or parties) responsible for instructing workers in recycling and overseeing and documenting results of the C&D Waste Management Plan for the Project.
- B. **Distribution:** - The Contractor shall distribute copies of the C&D Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.
- C. **Instruction:** - The Contractor or his designated waste manager shall provide on-site instruction regarding appropriate separation, handling, and recycling, salvage, reuse, and/or return methods to be used by all involved parties at the appropriate stages of the Project.
- D. **Separation facilities:** - As appropriate during each stage of the Project, the Contractor shall lay out and label a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

1.11 REPORTING REQUIRED AT TIME OF INVOICING

- A. Application for Progress Payments: - The Contractor shall submit with each Application for Progress Payment a "C&D Waste Management Report Form" outlining the waste generated by the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Summary shall be submitted on a form acceptable to the Owner (see Attachment 2 for an example) and shall contain the following information:
 1. The amount (in tons) of material land-filled from the Project, the identity of the landfill, and any manifests weight tickets, receipt, and invoices.
 2. For each material recycled, salvaged, or reused from the Project, the amount (in pounds or cubic yards), the reporting period covered, the receiving party, and attach manifests, weight tickets, receipts, and invoices.

Attachment 1

Construction & Demolition (C&D) Waste Management Plan

Company: _____

Project: _____

Designated Recycling Coordinator:

Waste Management Goals:

This project will recycle or salvage for reuse ____% [e.g. 75%] by weight of the waste generated on-site.

Communication Plan:

- ❖ Waste prevention and recycling activities will be discussed at the beginning of each safety meeting.
- ❖ As each new subcontractor comes on-site, the recycling coordinator will present him/her with a copy of the C&D Waste Management Plan and provide a tour of the recycling areas.
- ❖ The subcontractor will be expected to make sure all their crews comply with the C&D Waste Management Plan.
- ❖ All recycling containers will be clearly labeled.
- ❖ Lists of acceptable/unacceptable materials will be posted throughout the site.
- ❖ *Additional bullets as needed.*

Expected Project Waste, Disposal, and Handling:

The following charts identify waste materials expected on this project, their disposal method, and handling procedures.

Deconstruction/Demolition Phase

Material	Quantity	Disposal Method	Handling Procedure

Construction Phase

Material	Quantity	Disposal Method	Handling Procedure

Attachment 2
CONSTRUCTION & DEMOLITION WASTE MANAGEMENT
REPORT FORM

REPORTING PERIOD COVERED: _____

C&D WASTE MANAGEMENT PROGRESS REPORT							
MATERIAL CATEGORY	DISPOSED IN MUNICIPAL SOLID WASTE LANDFILL	DIVERTED FROM LANDFILL BY RECYCLING, SALVAGE OR REUSE					
		Recycled	D.O.	Salvaged	D.O.	Reused	D. O.
1. Asphalt (cu yds)							
2. Concrete (cu yds)							
3. Porcelain Plumbing Fixtures (lbs)							
4. Ferrous Metals (lbs)							
5. Non-Ferrous Metals (lbs)							
6. Wood (lbs)							
7. Glass (lbs)							
8. Bricks (lbs)							
9. Bond Paper (lbs)							
10. Cardboard (lbs)							
11. Plastic (lbs)							
12. Gypsum (lbs)							
13. Paint (gal)							
14. Insulation (lbs)							
15. Carpet and Pad (lbs)							
16. Beverage Containers (lbs)							
17. Rigid Foam (lbs)							
18. Furnishings (lbs)							
19. Soils (cy yds)							
20. Fluorescent Light Tubes, per 40 CFR 173.164(c) regulations							
21. Other (insert description)							
Total Weight		(TOTAL OF ALL ABOVE VALUES)					
	Percentage of C&D Waste Diverted	(TOTAL WASTE DIVIDED BY TOTAL DIVERTED)					

D.O. (Disposal Options): List the landfills, scrap yards, or recyclers used for each item disposed, i.e.:

1. ABC Municipal Landfill
2. Metal Scrap Inc,
3. Other vendors

END OF SECTION

Section 01 9113
COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. OPR and BoD documentation are included by reference for information only.
- C. Commissioning pertains primarily to the work described in Divisions 21, 22, 23, 26, 27 and 28 and shall be included for all systems to be commissioned as specified herein.
- D. Commissioning Plan – A Preliminary Commissioning Plan will be provided as supplemental information and will guide the commissioning process.

1.2 SUMMARY

- A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.
- B. Related Divisions:
 - 1. All sections relating to the Systems to be Commissioned are related to the commissioning requirements and process.
 - 2. This includes, but is not limited to all Sections of Divisions 1, 20, 21, 22, 23, 24, 25, 26 and 27.

1.3 DEFINITIONS

- A. Retain definition(s) remaining after this Section has been edited.
- B. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor.
- C. BoD: Basis of Design: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines.
- D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- E. Prefunctional Check-out Documents and Prefunctional Checklists – checklists developed by the CxA, completed by the contractor and verified by the CxA.
- F. Contractor: the prime contractor identified in the Contract for Construction between Owner and Contractor. This may be a General Contractor, a Construction Manager or some other entity.
- G. Corrective Action– documentation of an issue identified by the CxA in a Field Report that requires correction and response by the Contractor.
- H. CxA: Commissioning Authority.
- I. Engineering Professionals: Includes the Engineers identified in the Contract for Construction between Owner and Contractor, responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.
- J. Functional Performance Testing – the rigorous, documented testing of systems. Tests are developed by the CxA and performed by the Contractor under the supervision of the CxA.
- K. CxAlloy® Commissioning Construction Issues – log of all CxA identified issues and their status.
- L. OPR: Owners Project Requirements: A written document, prepared by Owner that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

- M. Subcontractor: contractors responsible to the Contractor or Owner for installation of Systems to be Commissioned.
- N. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
- O. Systems to be Commissioned: includes all systems, subsystems and equipment and associated components to be commissioned.
- P. TAB: Testing, Adjusting, and Balancing.

1.4 COMMISSIONING TEAM

- A. The Commissioning Team is organized and lead by the CxA with the support and coordination of the Contractor. Members include:
 - 1. Representatives of the CxA.
 - 2. Representatives of the Owner including facility users and operation and maintenance personnel.
 - 3. Architect and engineering design professionals.
 - 4. The Contractor Project Manager, Superintendent and other appropriate parties responsible for coordination of other Division activities.
 - 5. Subcontractor representatives including the project manager and foreman responsible for installation of systems to be commissioned including, but not limited to:
 - a. Mechanical
 - b. Controls
 - c. Plumbing
 - d. Electrical
 - e. Fire Alarm
 - f. Sprinkler
 - g. Nurse Call
 - h. Security/Access
 - i. TAB
- B. Subcontractor appointed training liaisons.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Identify one member of the contractor's team who will act as the primary point of contact for the CxA.
- B. Provide utility services required for the commissioning process. This includes ensuring the equipment necessary to access the CxAlloy® commissioning website is available on the construction site. This access needs to be provided during construction activities to ensure on site completion of commissioning documentation.
- C. Access and utilize the CxAlloy® online commissioning software for documentation of commissioning activities.
- D. Coordinate subcontractor commissioning activities; ensuring all affected trades are provided with the documentation necessary for the completion of their commissioning scope.
- E. Provide the CxA with a detailed and accurate construction schedule updated monthly. Coordinate scheduling of commissioning activities with the CxA and include them in the construction schedule.
 - 1. Provide schedule for equipment submittals, installation manual submittals, operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule monthly throughout the construction period.
 - 2. Coordinate the regular submission of detailed Subcontractor Schedules to the CxA.
- F. Provide CxA with copies of all approved change-orders or other modifications impacting construction when approved.

- G. Process and respond to Commissioning Construction Issues, Field Reports and RFIs from the CxA. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
- H. The Contractor has primary responsibility for ensuring commissioning activities are successfully completed by the subcontractors in a timely manner. In order to fulfill that responsibility the contractor shall assist the CxA in coordination and execution of all Construction Phase Commissioning Activities including, but not limited to:
 - 1. Planning and participation in construction-phase coordination meetings.
 - 2. Planning and participation in commissioning verifications.
 - 3. Coordination of submittal responses and resubmissions to ensure that resubmissions adequately address design team and CxA comments.
 - 4. Ensure accurate completion of Prefunctional Checklists for all Systems to be Commissioned **prior** to verification site visits by the CxA.
 - 5. Certify readiness of Systems to be Commissioned and ensure accurate completion of Functional Performance Test documents **prior** to performance of Functional Performance Testing.
 - 6. Facilitate Functional Performance Testing of Systems to be Commissioned and participate in testing at the request of the CxA or responsible Subcontractor.
 - 7. Facilitate operation and maintenance training planning, verification of training, and development of associated documentation for operations and maintenance transition.
 - a. Ensure that the CxA-provided training documentation is completed for all training on systems to be commissioned.
 - 8. Manage the documentation of commissioning work by the sub-contractors.
 - 9. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 - 10. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - 11. Track and follow-up on outstanding corrective action items as follows:
 - a. All responses shall be made in the CxAlloy® Commissioning Construction Issues provided by Cx Associates via the online platform CxAlloy®.
 - b. Issues shall be addressed and responses provided within two weeks after they are identified.
 - c. Where an issue will take longer than two weeks to address, provide a completion date within two weeks of issue identification.
 - d. Resolve all issues within one month of substantial completion.
- I. Subcontractors shall assign representatives with expertise and authority to act on behalf of the entity responsible for installation of Systems to be Commissioned who shall participate in and perform commissioning team activities including, but not limited to, the following:
 - 1. Provide schedules for equipment and system submittals including: submittal information for all Systems to be Commissioned, installation manuals, and operation and maintenance submittals; equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a monthly basis throughout the construction period.
 - 2. Participate in construction-phase coordination meetings.
 - 3. Process and respond to Commissioning Construction Issues, Field Reports and RFIs from the CxA via the CxAlloy® commissioning website.
 - 4. Provide information to the CxA for developing construction-phase commissioning plan including, but not limited to: schedule as cited above, equipment submittals, installation manual submittals and operation and maintenance information submittals.
 - 5. Complete Prefunctional Checklists for all Systems to be Commissioned in a progressive manner. This entails completing checksheets as the work proceeds – bi-weekly submittal of completed checksheets shall be provided to the CxA via CxAlloy® throughout MEP fit-up and equipment installation work.
 - 6. Participate with the CxA during field verification of contractor completed checklists.

7. Schedule manufacturer start-up to include completion of commissioning documentation relative to equipment. Schedule manufacturer representative to be on site during the commissioning verification of start-up documentation and functional testing of equipment set up by Manufacturer representatives including but not limited to equipment specific controls, equipment specific VFDs, emergency generators, etc.
 8. Maintain updated Project Record Documents for periodic review of the CxA and submit final record documents at project completion.
 9. Certify readiness of Systems to be Commissioned for performance of Functional Performance Testing.
 10. Complete Functional Performance Tests documents via the CxAlloy® commissioning website.
 11. Perform Functional Performance Testing of Systems to be Commissioned under the direction of the CxA.
 - a. Provide technicians who are familiar with the construction and operation of installed systems, are trained in the use of required testing instruments and procedures to participate in testing of installed systems, subsystems, and equipment.
 12. Designate an Operations and Maintenance Liaison who will have direct responsibility for training planning and execution, the development of the Operations & Maintenance Manual.
 - a. Provide operation and maintenance planning, documentation and verification.
 - b. Provide training sessions for Owner's operation and maintenance personnel.
- J. Use of Online or Digital Platform:
1. Use of CxAlloy®
 - a. The contractor shall use CxAlloy®, an online commissioning platform, as directed by the CxA and as outlined in the Cx Plan. Any equipment necessary for accessing this online tool shall be provided by the contractor on the construction site. CxAlloy® will be used for Pre-functional checkout, functional performance testing, and responding to items in the Commissioning Construction Issues.
 - b. A Starting Guide for how to use CxAlloy® can be found here:
https://s3.amazonaws.com/helpscout.net/docs/assets/58a201fddd8c8e56bfa7a917/attachments/58c04a012c7d3a576d35c9df/Getting_Started_Team_Member.pdf
- K. The ATC Contractor will be responsible for establishing any points and trending required for commissioning purposes, including but not limited to, functional performance testing. The ATC Contractor will:
1. Review the BAS and submeters to establish which systems will be monitored and trended.
 2. Identify acceptable ranges for data points and meter values.
 3. Identify any necessary action for excursions from the acceptable ranges.
 4. Verify that the BAS data storage capacity is capable of the determined points to be tracked and frequency and duration of monitoring.
 5. Ensure that the monitored points and trending align with the commissioning schedule's systems.
 6. Collaborate with the CxA to ensure that monitoring and trending are covering identified operational issues.
 7. Develop a reporting method in collaboration with the CxA and Facility Operation and Management (FO&M) personnel.

1.6 COMMISSIONING SUBMITTALS BY CONTRACTOR

- A. Commissioning-specific submittals:
1. The contractor shall submit completed Prefunctional Checklists and Functional Performance Test Documents via the CxAlloy® commissioning website.
 2. The contractor shall submit completed training plans upon approval of submitted equipment.
 3. The contractor shall submit preventive maintenance plan upon approval of submitted equipment.

4. The contractor shall submit control device calibration schedule upon approval of the controls submittal.
- B. Commissioning related requirements for submittals on Systems to be Commissioned: The following information shall be submitted with the product and system product literature and shop drawing submittals for review and approval by the Owner, Architect, Engineering Professionals and the CxA.
 1. Manufacturer cut sheets and product literature and shop drawings in accordance with the requirements of other Divisions.
 2. Motor enclosure types and efficiencies designated as NEMA Nominal Efficiency and expressed as a percentage.
 3. Detailed product data for each piece of equipment including part load capacities (20, 40, 60, 80, 100%), electrical components and requirements, etc. (as appropriate).
 4. Manufacturer's certified test reports on each piece of equipment.
 5. Performance curves for each piece of equipment being submitted (20, 40, 60, 80, 100% as appropriate).
 6. Controls submittals shall include:
 - a. Logic flow diagrams for control systems sequences of operation.
 - b. Diagrams indicating location of all sensors, actuators, safeties and other control devices for all Systems to be Commissioned.
 - c. Detailed Sequences of Operation for all Systems to be Commissioned.
 - d. Control diagram graphic panels for use with DDC PC monitor, in color.
 - e. Abbreviations and Symbols List.
 - f. All initial setpoints, reset schedules, time delays, etc. using numerical values.
 - g. Calibration certificates for all required test instruments demonstrating compliance with Part 2 of this section and any additional requirements of Divisions 22, 23 and 26.
 7. Submit Final Approved Shop Drawings for each piece of equipment to be Commissioned including all "as noted" comments in the final submittal.
 8. TAB plan including equipment to be used as well as methods and strategies to accomplish TAB where system diversity is present.
- C. The CxA will provide a single review of the submittals. Failure to incorporate agreed upon CxA review comments in subsequent submittals will result in a charge back to the contractor for additional submittal review time.
- D. Approved submittals for all Systems to be Commissioned must be compiled and individually bookmarked in the navigation pane of a single PDF document, which shall be electronically transferred to the CxA via email or an online file transfer service.
- E. Progress submittals of completed prefunctional checksheets
 1. Contractor shall be responsible for notifying CxA via email of when contractors will be completing or have completed a majority of the CxAlloy® prefunctional checklists for each equipment type.
 2. These email notifications shall be provided bi-weekly once fit-up and equipment installation for the affected subcontracts commences and the checksheets have been provided by the CxA.
 3. The contractor shall submit a schedule for checksheet completion, submittal and verification to assist the team in ensuring that the commissioning process is incorporated as construction progresses.
- F. Manufacturer Start-up Information
 1. Manufacturer's detailed installation and start-up requirements including equipment checklists (manufacturer's installation, startup, etc.) for each piece of equipment shall be submitted to the CxA within two weeks of when equipment arrives on site.
 2. Submit manufacturer start-up information prior to starting equipment.
- G. Detailed Project Training Plans (see Section 3.5 for a complete list of requirements.).
- H. Operation and Maintenance Manual shall include the following:

COMMISSIONING REQUIREMENTS

1. Submit O&M Manual as a single PDF document for each division. Clearly identify the Client and Project Name and the specific contents of each PDF document.
 - a. Provide a Table of Contents in each PDF document clearly indicating where information is located.
 - b. Bookmark each section and subsection in the PDF document's navigation pane.
 - c. Begin with a "Preventative Maintenance Plan" that includes maintenance instructions with timeframe/frequency for each task for all applicable equipment included in the O&M Manual.
 - d. Each subsequent section shall address individual pieces of equipment and be clearly labeled as such. Subsections shall be comprised of specific information for each piece of equipment as listed below.
 - e. Operations and Maintenance Manuals shall be fully customized to the project and shall include only product information which is specific and relevant to the project.
2. All submittal information indicated in part A.3, A.4., and B of this section (above) shall be included in the operations and maintenance manual, compiled as subsection per piece of equipment and bookmarked, in addition to the information required below.
 - a. Manufacturer's break-in instructions.
 - b. Manufacturer's suggested service requirements.
 - c. Spare parts list edited for specific equipment used on the project.
 - d. Copy of all equipment specifications.
 - e. Troubleshooting guide.
 - f. Controls calibration checklist.
- I. Provide all warranties for each division as a single PDF file, bookmarked by equipment name in the navigation panel. Equipment Warranties, contractor, manufacturer and owner obligations to maintain the warranty shall be specifically stated.
- J. Coordination and Record Drawings.

1.7 QUALITY ASSURANCE

- A. Calibration of Test Equipment: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated by NIST traceable standards within six months prior to use.

1.8 SYSTEMS TO BE COMMISSIONED

- A. The following systems will be commissioned in this project.
 1. HVAC
 - a. AHU/ERU Interconnections
 - b. HVAC Piping & Ductwork
 - c. Exhaust Fans
 - d. VAV and Air Valve Terminal Units
 - e. HW Coils
 - f. Radiant Ceiling Panels
 - g. Split AC System
 - h. HVAC Controls
 - i. VFDs
 2. Plumbing
 - a. Domestic hot water system
 3. Electrical
 - a. Lighting and lighting control systems
 - b. Emergency Power System.
 4. Specialty Systems – Prefunctional checkout by CxA. Functional testing by others and verified by CxA.
 - a. Fire Alarm

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- b. Sprinkler System
- c. Nurse Call System
- d. Floor Access

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All testing equipment required to perform startup, checklist verification and functional performance testing shall be provided by the contractor responsible for the equipment being tested.
- B. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in this Section.
- C. All testing equipment calibration shall be:
 - 1. NIST traceable standards.
 - 2. Maintained in good repair and operating condition throughout the duration of use on this project.
 - 3. Recalibrated/repared if dropped or damaged in any way since last calibration.
- D. Test instrumentation shall meet the following standards:
 - 1. Immersion temperature measuring instruments, liquids:
 - a. Range, 0 F to 220 F
 - 1) Minimum accuracy, +/- .5 degree F
 - 2) Resolution, .1 degree F
 - 2. Air temperature measuring instruments:
 - a. Range, 0 F to 220 F
 - 1) Minimum accuracy, +/- .5 degree F
 - 2) Resolution, .1 degree F
 - 3. Air humidity measuring instruments:
 - 4. Range, 0 % RH to 80 % RH
 - a. Minimum accuracy, +/- 2 % RH
 - b. Resolution, .1 % RH
 - 5. Range, 80 % RH to 97 % RH
 - a. Minimum accuracy, +/- 3 % RH
 - b. Resolution, .1 % RH
 - 6. Carbon Dioxide (CO₂) measuring instruments:
 - a. Range, 0 ppm to 2,000 ppm
 - 1) Minimum accuracy, +/- 50 ppm
 - 2) Resolution, 1.0 ppm
 - 7. Carbon Monoxide (CO) measuring instruments:
 - a. Range, 0 ppm to 500 ppm
 - 1) Minimum accuracy, +/- 2 ppm
 - 2) Resolution, .1 ppm
 - 8. Hydronic pressure measuring instruments:
 - a. Range, 0 PSI to 150 PSI
 - 1) Minimum accuracy, +/- .5 PSI
 - 2) Resolution, .1 PSI
 - 9. Air differential pressure measuring instruments:
 - a. Range, 0 "w.c. to 10" w.c.
 - 1) Minimum accuracy, +/- .001 " w.c.
 - 2) Resolution, .001 " w.c.
 - 10. Air velocity measuring instruments:
 - a. Range, 25 fpm to 2400 fpm
 - 1) Minimum accuracy, +/- 15 fpm
 - 2) Resolution, 1.1 fpm

- b. Range, 2400 fpm to 5000 fpm
 - 1) Minimum accuracy, +/- 30 fpm
 - 2) Resolution, 1.0 fpm
- 11. For instruments not covered above, the following minimum requirements apply:
 - a. Test instruments shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the previous six months to NIST traceable standards.
- E. Test Ports:
 - 1. Pressure / temperature test plugs to allow the use of insertion-type, hand held gauges and meters:
 - a. Housing: Brass
 - b. Core Material: EPDM (Nardel)
 - c. Provide cap retainer strap
 - d. Size: 1/4" NPT
 - e. Length: All pipes, insulated or not: maximum 1-1/2" overall
 - 2. Acceptable Manufacturers:
 - a. Texas Fairfax Company
 - b. Peterson Equipment Company
 - c. Alternate product with prior approval

PART 3 - EXECUTION

3.1 COMMISSIONING CONSTRUCTION ISSUES AND FIELD REPORTS

- A. CxA maintains Commissioning Construction Issues on the online platform CxAlloy® that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents.
- B. The CxA will document any deficiencies observed during construction, checkout and/or testing in a Field Report via the CxAlloy® commissioning website. Each Corrective Action will be summarized in the CxAlloy® Commissioning Construction Issues on CxAlloy®. Contractors remedy and document the correction to the CxA. The CxA will verify corrections depending on their scope and scale.
- C. The CxA will identify any design related issues in RFIs which will be submitted to the Contractor for processing and tracking.

3.2 PREFUNCTIONAL CHECKLISTS

- A. General. Each piece of equipment receives full prefunctional check-out by the responsible contractor. No sampling strategies are used. The prefunctional check-out protocol for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- B. Prefunctional Checklists: The CxA provides Prefunctional Checklists for each System to be Commissioned via the online platform CxAlloy®. Prefunctional Checklists will be completed by the installing Subcontractor and verified by the Contractor and CxA in the company of the installing contractor. Each checklist will include, but not be limited to, the following:
 - 1. Name and identification information of each item being checked.
 - 2. Verification of each item including verification of all required data and construction practices as listed in the Prefunctional Checklists.
 - 3. Notation of any equipment or installation that deviates from approved submittals or the Construction Documents.
 - 4. Name(s) of personnel involved with verification and dates on which verification activities and Prefunctional Checklists were completed. The activity's timestamp and the name of the logged-in user will be automatically recorded via the internal audit log of the CxAlloy® platform when items are completed.
- C. Checklists are provided for specific pieces of equipment and may require check-out and verification by multiple sub-contractors. (For instance, the electrical contractor is required to

complete portions of the checklists for all powered mechanical equipment.) The documents will be assigned to the affected trades as appropriate. Each subcontractor shall be responsible for the checkout and verification of their work. The Contractor shall ensure each required subcontractor has completed their work.

1. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off.
- D. Contractor shall provide a full start-up plan for each system to be commissioned including all subsystems, equipment and components which shall at a minimum include the following documentation:
 1. Manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 2. Manufacturer's normally used field checkout sheets.
 3. The subcontractors shall execute startup and provide the CxA with a signed and dated copy of the completed start-up checklists. Prefunctional checklists completion shall be monitored via the CxAlloy® commissioning website. Contractor to provide email notification to the CxA when startup is completed.
- E. Contractor shall verify 100% of all devices and equipment on the Prefunctional Checklists. Sampling is not acceptable.
- F. Completion of prefunctional checksheets via the CxAlloy® commissioning website shall occur as the installation progresses. Commissioning verification of checksheets shall be scheduled based on bi-weekly notification via email of completed or partially completed prefunctional checksheets by the subcontractors.
- G. Sensor Calibration
 1. Calibration of all sensors shall be included as part of the prefunctional checklists.
 2. Sensor Required Tolerances listed below shall be the criteria for acceptance. The following are default criteria, subject to revision based on accuracy of final approved and installed devices.

<u>Sensor</u>	<u>Required Tolerance (+/-)</u>	<u>Sensor</u>	<u>Required Tolerance (+/-)</u>
Cooling coil, chilled and condenser water temps	0.3F	Flow rates, water	4% of design
AHU wet bulb or dew point	1.0F	Lighting Illumination	3% of design
Hot water coil and boiler water temp	1.0F	Combustion flue temps	5.0F
Outside air, space air, coil air temps	0.5F	Oxygen or CO ₂ monitor	0.1 % pts
Watt-hour, voltage & amperage	1% of design	CO monitor	0.01 % pts
Pressures, air, water and gas	3% of design	Natural gas and oil flow rate	1% of design
Flow rates, air	10% of design	Steam flow rate	3% of design
		Barometric pressure	0.1 in. of Hg

- H. The CxA will verify prefunctional checklists for each piece of primary equipment in the company of the responsible subcontractors.
- I. For lower-level components of equipment, (e.g., VAV boxes, sensors, controllers), the CxA shall observe a sampling of the prefunctional check-out and start-up procedures.

3.3 FUNCTIONAL PERFORMANCE TESTING

- A. Prerequisites for Testing:
 - 1. Systems to be Commissioned have been completed, calibrated, and started; are operating according to the OPR, BoD, and Contract Documents;
 - 2. Instrumentation and controls associated with the Systems to be Commissioned have been completed and calibrated; are operating according to the OPR, BoD, and Contract Documents; and that pretest set points have been recorded.
 - 3. TAB procedures have been completed, and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.
 - 4. Prefunctional Checklists for systems, subsystems, and equipment are completed via the CxAlloy® commissioning website and verified.
 - 5. Perform Pretest procedures including:
 - a. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shut down, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
 - b. Verify each operating cycle after it has been running for a specified period and is operating in a steady-state condition.
 - c. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable or failed. Repeat this test for each operating cycle that applies to system being tested.
 - d. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
 - e. Annotate checklist or data sheet via the CxAlloy® commissioning website when a deficiency is observed.
 - 6. Verify equipment interface with monitoring and control system and TAB criteria; include the following:
 - a. Supply and return flow rates for variable flow and constant volume systems in each operational mode, including maximum and minimum flow/capacity.
 - b. Operation of terminal units in both heating and cooling cycles.
 - c. Minimum outdoor-air intake in each operational mode and at minimum and maximum airflows.
 - d. Building pressurization.
 - e. Total exhaust airflow and total outdoor-air intake.
 - f. Operation of indoor-air-quality monitoring systems.
 - 7. Verify proper responses of monitoring and control system controllers and sensors to include the following:
 - a. For each controller or sensor, record the indicated monitoring and control system reading and the test instrument reading. If initial test indicates that the test reading is outside of the control range of the installed device, check calibration of the installed device and adjust as required. Retest malfunctioning devices and record results on checklist or data sheet.
 - b. Report deficiencies and prepare a construction issue entry on CxAlloy®.
 - 8. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation. For individual room cooling tests, provide temporary heaters to impose a cooling load indicated in BoD. Operational modes may include the following:
 - a. Occupied and unoccupied.

- b. Full load and minimum load.
 - c. Maximum flow and minimum flow.
 - d. Warm up and cool down.
 - e. Economizer cycle.
 - f. Emergency power supply.
 - g. Life-safety alarm modes.
 - h. Temporary upset of system operation.
 - i. Partial occupancy conditions.
 - j. Special cycles.
- B. Objectives and Scope.
- 1. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and function of the systems.
 - 2. In general, each System to be Commissioned should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.
- C. Functional Performance Test Documents:
- 1. The CxA will develop Functional Performance Test Documents through the web-based platform CxAlloy® for each System to be Commissioned including:
 - a. Name and identification code of each item being checked.
 - b. Test number.
 - c. Time and date of test.
 - d. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 - e. Dated signatures of the person performing test and of the witness.
 - f. Individuals present for test.
 - g. Deficiencies.
 - h. Issue number, if any, generated as the result of test.
 - i. Calibration of sensors and sensor function.
 - j. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
 - k. Control sequences for mechanical and electrical systems.
 - l. Responses to control signals at specified conditions.
 - m. Sequence of response(s) to control signals at specified conditions.
 - n. Electrical demand or power input at specified conditions.
 - o. Power quality and related measurements.
 - p. Expected performance of systems, subsystems, and equipment at each step of test. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
 - q. Interaction of auxiliary equipment including interfaces and interlocks.
 - r. Separate entries will be provided for each item to be tested.
 - s. Separate tests will be provided for each mode of operation.
 - 2. The CxA will witness and document the results of functional performance tests using the specific procedural forms, accessible via the CxAlloy® commissioning website, developed for that purpose on CxAlloy®.

3. Reports will include measured data, data sheets, and a comprehensive summary describing the operation of systems at the time of testing.
 4. Data sheets for each controller verifying proper operation of the control system, the system it serves, the service it provides, and its location will be provided.
- D. Test Methods.
1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's graphic trend log capabilities.
 2. Simulated Conditions.
 - a. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
 3. Overwritten Values.
 - a. Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible.
 4. Simulated Signals.
 - a. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
 5. Altering Setpoints.
 - a. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable.
 6. Indirect Indicators.
 - a. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses.
 7. Perform tests using design conditions whenever possible and where required.
 8. Setup.
 - a. Each function and test shall be performed under conditions that simulate actual conditions to the closest practical approximation.
 - b. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the flows, pressures, temperatures, etc. necessary to execute the test under specified conditions.
 - c. At completion of the test, the Contractor shall return all affected building equipment and systems to their pre-test condition.
 9. Sampling.
 - a. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested by the CxA using a sampling strategy.
 - b. No sampling is allowed during execution of construction check-out or in contractor provided testing.
 - c. The following sampling technique will be applied: 20% Sampling—10% Failure Rule.
 - 1) Randomly test at least 20% of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitute the "first sample."
 - 2) If 10% of the units in the first sample fail the functional performance tests, test another 20% of the group (the second sample).
 - 3) If 10% of the units in the second sample fail, test all remaining units in the whole group.

- 4) If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the responsible subcontractor to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.
- E. Coordination and Scheduling.
1. The subcontractors shall provide sufficient notice to the CxA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CxA shall direct, witness and document, via the CxAlloy® commissioning website, the functional testing of all equipment and systems.
 2. Subcontractors are responsible for execution of all tests.
 3. Functional testing is conducted after prefunctional checklists and startups have been satisfactorily completed. The control system is sufficiently reviewed and approved by the CxA before it is used for TAB or to verify performance of other components or systems.
 4. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems.
 5. Testing proceeds from components to subsystems to systems.
 6. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.
- F. Seasonal Testing & Post Occupancy Verification.
1. Subcontractors shall perform seasonal test and opposite seasonal testing for major systems (heating/cooling) that cannot be tested under actual seasonal conditions during construction. Provide opposite season trend logs.
 2. The controls subcontractor shall participate in opposite season testing and also at least one post occupancy site visit with the CxA.
- G. Problem Solving
1. The CxA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems rests with the Contractor, Subcontractors, Architect and Engineering Professionals.
- H. Trend Logs
1. Upon completion of successful functional performance testing, contractor shall submit graphic trend logs to CxA.
 2. Submit color graphic trend log for each piece of controlled equipment for each controlled parameter.
 3. Trend logs shall demonstrate successful performance for a seven day period, unless the controlled process requires a longer timeline.
 4. Trend log color printouts shall be submitted demonstrating successful seasonal performance.
 5. Provide opposite season trend graphs.
 6. Trend logs shall be color graphic, with legends, submitted to CxA in color printout form or electronically in .pdf format.
 7. CxA will recommend acceptance of a specific piece of equipment once the submitted trends are reviewed and approved by CxA.
- I. Test and Verification Field Reports: CxA will record test data, observations, and measurements within CxAlloy®. Photographs, forms, and other means appropriate for the application shall be included with test documentation. CxA will compile test and verification reports and test and verification certificates and include them in the commissioning report.
- 3.4 NON-CONFORMANCE AND APPROVAL OF TESTS
- A. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. The CxA is responsible for verification of system installation and function. The CxA will not overlook deficient work or loosen acceptance criteria to satisfy scheduling or cost issues.

B. Commissioning Issues

1. Cx Associates will document all commissioning issues in the Commissioning Construction Issues using the web-based platform CxAlloy®. These issues will be updated regularly and always available to the Contractor on CxAlloy®. The CxA will notify the applicable parties via email when there are updates to the Commissioning Construction Issues to be addressed.
2. The responsible contractor shall remedy the issue and update the Commissioning Construction Issue on CxAlloy® within two weeks of when the issue is identified.
3. All open issues shall be closed within one month of substantial completion.
4. Time & materials required to verify completion of any open commissioning issues one month after the issue was identified and/or one month after substantial completion shall be back charged to the contractor through the Owner.

C. Non-Conformance.

1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented via the CxAlloy® commissioning website.
2. Should a deficiency be identified during verification or testing, the CxA will discuss the issue with the responsible subcontractor.
 - a. When there is no dispute on the deficiency and the subcontractor accepts responsibility to correct it:
 - 1) The CxA documents the deficiency and the subcontractor's response and intentions and they go on to another test or sequence.
 - 2) After the day's work, the CxA submits the non-compliance reports to the Contractor.
 - b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
 - 1) The deficiency shall be documented with the subcontractor's response and a copy given to the Contractor.
 - 2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the Owner.
 - c. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, provides a statement of correction and provides it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.
3. If it is determined that the system is constructed according to the Contract Documents, Owner will decide whether modifications required to bring the performance of the system to the OPR and BoD documents shall be implemented or if tests will be accepted as submitted. If corrective Work is performed, Owner will decide if tests shall be repeated and a revised report submitted.
4. Cost of Retesting.
 - a. The cost for the subcontractor to re-perform a prefunctional check-out or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
 - b. The time for the CxA to direct any re-verification or retesting required due to failures or lack of completion at the initial verification and/or testing, will be back charged to the Contractor through the Owner at 1.5 times the rate for Cx services.
5. Failure Due to Manufacturer Defect.
 - a. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA. In such case, the subcontractor shall provide the Owner with the following:

- 1) Within one week of notification from the Contractor, the subcontractor or manufacturer's representative shall examine all other identical units making a record of the findings.
 - 2) The findings shall be provided to the CxA within two weeks of the original notice.
 - 3) Within two weeks of the original notification, the Contractor, subcontractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals.
 - (a) *The proposed solutions shall not significantly exceed the specification requirements of the original installation.*
 - 4) The Owner will determine whether a replacement of all identical units or a repair is acceptable.
 - 5) Two examples of the proposed solution will be installed by the subcontractor and the subcontractor will be allowed to test the installations for up to one week, upon which the Owner will decide whether to accept the solution.
 - 6) Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
6. Approval.
- a. The CxA notes each satisfactorily observed checklist item or demonstrated test function on the test form via the CxAlloy® commissioning website. The CxA recommends acceptance of each test to the Owner using a standard form.
- D. Deferred Testing:
1. If tests cannot be completed because of a deficiency outside the scope of the subcontractor responsible for installation of the System to be Commissioned, the deficiency shall be documented and reported to Owner. Deficiencies shall be resolved and corrected by appropriate parties and test rescheduled.
 2. Where seasonal testing is required, appropriate initial performance tests shall be completed, documented, and additional tests scheduled.

3.5 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- A. Training shall be delivered in a coordinated manner to provide building Operations and Maintenance Personnel with a comprehensive understanding of the building, systems, equipment and controls systems.
1. Each subcontractor shall designate a training liaison who is responsible for developing, scheduling, providing all required training submittals and documentation, and ensuring the quality of training provided under contract by each trade.
- B. Training Plans shall be prepared by the contractor and submitted to the CxA and the Owner for review and comment prior to finalizing training plans for each system to be commissioned. Training Plans shall be submitted within one month of submittal approval for major equipment and controls. Training Plans shall include:
1. Trainer qualifications and certifications.
 2. Training content shall include field orientation during installation, classroom instruction and field training after the completion of installation and cover the following elements:
 - a. Equipment included in training
 - b. Intended audience
 - c. Location of training
 - d. Detailed Agenda including, but not limited to:
 - 1) Objectives
 - 2) Subjects covered (description, duration of discussion, special methods, etc.)
 - 3) Description of training rigor

- 4) Duration of training on each subject
 - e. Hand-outs
 - f. Instructor for each subject
 - g. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 - h. Instructor resumes
 - 3. For primary equipment, the Controls subcontractor shall provide an overview of the system, and discussion of the associated control and other interfaces.
 - 4. Contractor shall provide edited and clearly labeled videotapes of training sessions for future training use by the Owner.
 - C. Complete O&M manuals and as-built documents shall be submitted for review prior to training and used to support the training sessions.
 - D. The CxA will verify and approve the content and adequacy of the training of Owner personnel for Systems to be Commissioned.
 - E. In addition to these general requirements, additional training requirements for Owner personnel are specified in other Divisions.
 - F. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
- 3.6 TEST PORTS
- G. Application: All points.
 - 1. The contractor shall provide test ports (Pete's Plugs) for handheld instrument readings near all piping system sensors in the primary system and for all air system devices.

END OF SECTION

SECTION 019999
PROJECT CLOSEOUT

PART 1 – GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Definitions: Closeout is hereby defined to include general requirements near the end of contract duration, in preparation for final acceptance, final payment, normal termination of contract, occupancy and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in Sections of Division 02 through 34 as applicable.
- B. Time of closeout is directly related to “Substantial Completion”, and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been noted as substantially complete at different dates, that time variation (if any) shall be applicable to other provisions of this section.

1.2 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. General: Two weeks prior to requesting inspection of “substantial completion” (for either entire work or portions thereof), complete the following and list exceptions ...
 - 1. List “substantially complete” areas for portion claimed with certifications and supporting documentation in accordance with the contract documents (properly installed and ready for operation), and itemize incomplete items (Contractor issued final “Punch List”), value of incomplete work, and reasons for being incomplete with supporting documentation.
 - 2. No GWB/SAT ceiling material shall be installed in the project area until “all” work above the ceiling line has been completed, tested, inspected, approved and accepted by specified agents and the Project Engineer/VA-COR in advance with “all” associated test/inspection reports issued demonstrating compliance with the contract requirements.
 - 3. Complete start-up testing of systems, and instructions to Government’s operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools, equipment, and similar elements.
- B. Inspection: Upon receipt of Contractor’s request, the Contracting Officer will either proceed with inspection or advise Contractor that prerequisites are not fulfilled. Following initial inspection, the Contracting Officer will either approve “substantial completion”, or issue a “Deficiency Report” itemizing work which must be performed and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspections (“Deficiency Report”) will form the basis of the “Punch List” to be completed for final acceptance.

1.3 PREREQUISITES TO FINAL ACCEPTANCE

- A. General: Prior to requesting final inspection for final acceptance and final payment, as required by General Provisions and Conditions, complete the following and list known exceptions (if any) ...
 - 1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted.
 - 2. Submit copy of Contractor final Punch List including resolution of Deficiency Reports resulting from earlier inspections stating that each item has been

- completed, resolved or otherwise delayed for acceptable circumstances with supporting documentation.
3. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
 4. Submit record documents in the format specified.
 5. Submit final record information (eg, electrical panel schedule, equipment data sheets).
 6. Provide tools, spare parts, extra stocks of materials, and similar physical items.
 7. Make final change-over of locks and transmit keys to the Contracting Officer and advise Government personnel of change-over in security provisions.
 8. Complete final cleaning up requirements, including touch-up painting of marred surfaces.
 9. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Re-inspection: Upon receipt of Contractor's notice that all work has been completed, including resolution of Deficiency Reports resulting from earlier inspections, the Contracting Officer will re-inspect the work. Upon completion of re-inspection, the Contracting Officer will either proceed to final acceptance or issue a Punch List itemizing work not completed and obligations not fulfilled as required for final acceptance. If necessary, re-inspection will be repeated until work is accepted.

1.4 RECORD DOCUMENTS

- A. General: As work progresses, prepare and maintain record documents as specified herein. Each record shall be certified by the General Contractor. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location accessible to the Contracting Office for reference during normal working hours. Upon completion, turn record documents over to the Contracting Officer.
- B. Record Drawings: Maintain a white-print set (blue-line or black-line) of contract drawings (including amendment and change order drawings) and shop drawings in clean, undamaged condition, with mark-up of actual installations which vary from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark-up new information which is recognized to be of importance, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date. Note related CO (change order) and/or RFI numbers where applicable. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
1. Four (4) weeks prior to the final inspection, the Contractor shall provide the Project Engineer/VA-COR with 8 complete sets (4 full size, 4 reduced size) of CAD quality drawings on vellum (reproducible, clean & legible).
 2. AutoCAD (verify required version) files in the format consistent with the VA's standards on PC CD disks with all the above information incorporated.
 3. Adobe Acrobat PDF files for each AutoCAD file on PC CD disks with all the above information incorporated.
 4. The draftsmanship and information shall be comparable in all ways to the original documents, and shall be dated and noted "As-Built".

- C. Record Specifications: Maintain one copy of specifications, including amendments, change orders and similar modifications issued in printed form during construction, and mark-up variations in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a late date by direct observation. Note related record drawing information and product data, where applicable.
- D. Record Product Data, Certifications and Laboratory Test Reports: Maintain one copy of each product data submittal, product certification, and laboratory test report and mark-up significant variations in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be easily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications.
- E. Record Samples and Salvaged Items: Immediately prior to date(s) of substantial completion, the Contacting Officer or designated representative will meet with Contractor on site, and will determine which (if any) of submitted samples and salvaged items maintained by Contractor during progress of the work are to be retained by the Government. Comply with the Project Engineer/VA-CORs instructions for packaging, identification marking, and delivery.
- F. Miscellaneous Record Submittals: Refer to other Sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order, appropriately identified and bound, ready for continued use and reference. Turn over to the Contacting Officer prior to final acceptance.

1.5 OPERATION AND MAINTENANCE MANUALS

- A. General: Submit one (1) hard copy and two (2) electronic copy sets of operation and maintenance manuals (with parts/shop/service details) for each mechanical and electrical system (except as otherwise specified), for each piece of equipment, and for other systems and components specified in the technical Sections of the specification. Organize manuals into suitable volumes of manageable size, as approved by the Contacting Officer. Manuals shall have table of contents (TOC), and be assembled to conform to the TOC with tab sheets covering each subject. The instructions shall be legible and easy to read. Manuals shall be hard bound and sheets consistent in size; where oversize drawings are necessary they shall be folded. The organized document shall be labeled "Operation and Maintenance Manual" with the project name, building location, contact and project numbers appearing on the cover.
- B. Contents: Manuals shall include, but not be limited to, the following data ...
 - 1. Detailed description of each system and each of its components, including layout showing piping, valves, and controls and other components, and including diagrams and illustrations where applicable.
 - 2. Wiring and control diagrams with data to explain detailed operation and control of each component. Provide installed electrical panel schedules using the VA format.
 - 3. Control sequence describing start-up, operation, and shut-down.
 - 4. Procedure for starting.
 - 5. Procedure for operating.

6. Shut-down instructions.
7. Installation instructions.
8. Maintenance and overhaul instructions.
9. Emergency instructions and safety precautions.
10. Corrected shop drawings.
11. Approved equipment data sheet using the VA format.
12. Approved certifications and laboratory test reports (where applicable).
13. Copies of warranties.
14. Test procedures.
15. Parts list, including source of supply, recommended spare parts, and service organization convenient to building site.
16. Name, address, and telephone number of each subcontractor who installed equipment and systems, and local representative for each type of equipment and each system.
17. Other pertinent data applicable to the operation and maintenance of particular systems or equipment and/or other data specified in technical Sections of the specification.

1.6 APPROVED SUBMITTALS

Provide Contracting Officer with one copy of each final approved submittal package with all review notations & remarks indicated prior to the time that system or equipment tests are performed, and two additional copies 2 weeks before either the start of operation by the Government or any instruction period specified (whichever comes first).

PART 2 – PRODUCTS

2.1 GENERAL

- A. Keys & Special Tools: Provide Project Engineer/VA-COR with all keys and special tools that might be necessary for access, maintenance, and operation of installed items.
- B. Installed Equipment: Provide services from each manufacturer of all installed equipment or a designated representative, approved by the manufacturer, to train facility personnel in the operation of the equipment.

PART 3 – EXECUTION

3.1 INSTRUCTIONS TO GOVERNMENT PERSONNEL

- A. Each applicable trade shall provide qualified, factory-trained representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each system and piece of equipment. Instructions for different items of equipment that are component parts of a complete system shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the Project Engineer/VA-COR and shall be considered concluded only when the Project Engineer/ VA-COR is satisfied in regard to complete and thorough coverage of information.

- B. Instructional services of competent instructors shall be provided for a minimum of 4 hours of onsite training to designated Government employees covering the overall installation, operational methods, adjustments, care and periodic maintenance requirements for their systems.
- C. Each instructor shall be familiar with all parts of their respective system and shall be trained in operating theory as well as practical operation and maintenance practices. Factory trained instructors shall be employed wherever practical and available. The Department of Veterans affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the Project Engineer/VA-COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.
- D. Utilize the maintenance manual for the system or equipment as a text for instruction. **Instruction shall include a full and extensive review of the maintenance and operation manual.** Failure to execute this task shall require additional training sessions when this information is made available.
- E. Unless otherwise required or approved, the instruction shall be given during the regular work week after the equipment has been accepted and turned over to the Government for regular operation. Where significant changes or modifications in equipment are made under the terms of the guarantee, additional instruction shall be provided as may be necessary to acquaint the operating personnel of the changes or modifications. When more than four man-days (32 hours) of instruction are specified in other Sections, approximately half of the time shall be classroom instruction and the other half at the site of the system or equipment.
- F. Upon completion, submit written acknowledgment with documentation to the Project Engineer demonstrating that the required instructions were successfully completed for each discipline.

3.2 FINAL CLEANING

- A. Cleaning shall include dusting, washing, HEPA vacuuming and other required sanitizing of all surfaces within immediate and adjacent affected areas. All affected areas shall be cleaned, polished and hygienically sanitized including but not limited to floors, walls, partitions, ceilings (including above removable ceiling systems ceiling tiles), fixtures, lenses, windows, equipment, furniture (built-in or free standing), shelves counters, cabinets, doors, drawers. Comply with manufacturer's instructions for cleaning operation. Close off access to areas as cleaning is completed. **Project phasing shall require cleaning to be performed in various phases.**
- B. The following minimum requirements shall be performed in addition to special cleaning requirements specified in other Sections:
 - 1. Remove markings that are not required as permanent labels.
 - 2. Vacuum clean carpeted surfaces and similar soft surfaces.
 - 3. Clean transparent materials, including mirrors and glass, to a polished clear condition. Replace broken glass and damaged transparent materials.
 - 4. Clean exposed exterior and interior hard-surface finishes, to a dirt-free condition, free of dust, stains, films and similar noticeable substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
 - 5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
 - 6. Wet mop concrete floors in non-occupied spaces.

7. Strip, wash, wax and polish to a sanitary clean condition all floor surfaces within the construction boundary and outside the boundary throughout areas of construction traffic flow throughout the project.
 8. Clean HVAC systems within the construction area to the requirements specified.
 9. HEPA vacuum the inside/outside sections of the building baseboard perimeter heating fin tube components within the construction area to insure clean and healthy operation.
 10. Wet wipe surfaces of equipment clean. Remove excess lubrication and other substances.
 11. Clean and polish plumbing fixtures to a sanitary condition free of stains.
 12. Clean light fixtures and lamps of debris and stains to function with full efficiency.
 13. Clean other items to a condition of sanitation acceptable for intended service use.
- C. Damaged surfaces and items within the contract limits shall be patched, repaired, refinished, painted and/or replaced as necessary with materials comparable to the surrounding material and surface equal to new conditions unless otherwise noted or directed by the Project Engineer/VA-COR. Finished surfaces shall be indistinguishable from the surrounding area.
- D. Protection Removal: Except as otherwise indicated or requested by the Contacting Officer, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.

3.3 PARTIAL CHECKLIST PRIOR TO BENEFICIAL OCCUPANCY

The Contractor is required to ensure that all the following list items are completed:

1. Mechanical Systems:
 - a. Completion of Mechanical System Inspecting & Testing Checklist as specified in Section 23 05 11, REQUIREMENTS FOR MECHANICAL INSTALLATIONS.
 - b. Verification of Air Conveyance System Cleanliness as specified in Section 23 31 00, HVAC DUCTS AND CASINGS.
 - c. Equipment is operating correctly, air/water/steam flow balanced and thermostatic sensors control temperature as designed.
 - d. All parameters met per specifications (actual measurements) with documentation.
 - e. Equipment labeled, access doors tagged with belt and filter sizes designated.
 - f. Balancing Report for all HVAC piping and duct systems.
 - g. Mechanical/Plumbing System Valve Schedule sheets.
 - h. As-built plans with pipe/ductwork diagrams.
 - i. Equipment Data Records – Removed and/or Installed.
2. Medical Gas Systems:
 - a. Full test and certification including flow rates, gas quality, cross-connections, fitting inspection, workmanship, local alarms, shutoff valves, etc per NFPA 99.

- b. Valve signage for the medical gases, framed and permanently affixed to wall.
 - c. Inspection/test shall include participation of VA Medical Gas Administrator and Respiratory Therapist.
- 3. Electrical Systems:
 - a. Completion of Electrical System Inspecting & Testing Checklist as specified in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
 - b. Completion of NEC Compliance Checklist as specified in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
 - c. All parameters met per specifications (actual measurements) with documentation.
 - d. All panelboard labeled, circuits traced out, directories updated and panelboard schedule sheets completed (in typed format).
 - e. Each receptacle and switch identified as to circuit & panelboard number.
 - f. Master electrical one-liner updated.
 - g. As-built plans with wiring diagrams.
 - h. Equipment Data Sheets.
- 4. Hospital Communication Systems –
 - a. Computer networks, special system alarms to digitizers, fire alarms.
 - b. Code Blue, Code Green, Emergency Call, intercoms, et al, etc.
 - c. HVAC energy management system.
- 5. Warranty –
 - a. Contractor shall provide name and telephone number of qualified service organization to perform emergency repairs on a 24-hour basis. Each trade shall provide a minimum 1 year (24 hour on call) labor/parts service for equipment troubleshooting and correction. Warranties' starting dates may not be the same for all systems so they must be explicitly stated with supporting documentation.

3.4 CONTRACT COMPLETION

- A. Notification: Contractor shall notify the Contracting Officer in writing with supporting documentation, when all work has been completed in accordance with the contract requirements.
- B. Acceptance: Final Inspection shall not be performed until Contractor issued final Punch List work is completed or otherwise resolved for acceptance with supporting documentation. All test and documentation for electrical and mechanical systems must be complete per contract requirements. Additional final Punch Lists may be developed in collaboration with Project A/E including Project Engineer/VA-COR, Contracting Officer, Department Service (customer) and appropriate technical personnel from the Department of Veterans Affairs.
- C. Keys issued to the Contractor by the VA shall be returned to the Project Engineer/VA-COR at the completion of beneficial occupancy. Project completion is not achieved until all assigned VA keys have been returned.

END OF SECTION

ATTACHMENTS FOLLOW

ATTACHMENT A: *Equipment Data Record ... 1 Page*

**Equipment Data Record
Contractor Removed and/or Installed Equipment**

VA Project Name & Number:

General Contractor Name & Address:

Subcontractor Name & Address:

Manufacturer:

Vendor:

Project Device Name:

Mfg's Device Name:

Model #:

Serial #:

VA #:

Bar Code #:

Acquisition Date:

Acquisition Value:

Life Expectancy:

Warranty Expiration Date:

Equipment Location:

Facility Utilities Altered:

Filter Size/Type/Qty:

Belt Size/Type/Qty:

M & O Comments:

SECTION 024100
DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. General: The work described in this Section consists of selective demolition, cleaning, removal and legal disposal of all structures, equipment and materials indicated for demolition, or careful removal and temporary storage of materials and equipment indicated for salvage and re-use, or salvage and delivery to the Government. No attempt is made in this Section to list the entire scope of selective demolition required on this project or to describe each element to be removed. Drawings indicate both existing construction and final construction. It is the responsibility of the Contractor to determine for itself the scope and nature of the existing materials, equipment and finishes required for removal or salvage, based on the information provided in the full set of Contract Documents.
 - 1. Remove all equipment, devices, wiring, conduit, and other material that are inactive or inoperable. Do not abandon materials or equipment in place.
 - 2. Terminate all utilities at their point of connection.
 - 3. Require contractors to conduct non-destructive testing (e.g., GPR) of building slabs and walls before coring through the structure, to identify and avoid existing utility lines.
- B. Permits: Obtain and pay for all demolition and construction permits required by local authorities having jurisdiction and other regulatory agencies and utility companies.
- C. Selective demolition – General:
 - 1. Refer to Drawing 31-AS-106 - FIRST FLOOR DEMOLITION PLAN for additional information.
 - 2. Refer to the hazardous materials Drawings and Specifications for required abatement prior to any demolition.
 - 3. Contractor shall perform all demolition work in sequence with and in the area as indicated on Phasing Drawings.
 - 4. Contractor shall construct temporary walls to eliminate dust and debris from migrating to adjacent areas. refer to the Specifications for infection control requirements.
 - 5. Contractor shall maintain means of egress in all areas temporarily affected by demolition activity. Provide an Interim Life Safety Plan at Each Phase.
- D. Selective demolition and removal work includes, but is not limited to:
 - 1. Remove designated existing acoustical ceiling tile, suspension system, and all accessories.
 - 2. Remove designated existing window, frame, glazing and sill.
 - 3. Remove designated portion of exiting exterior wall (brick with CMU back-up) from floor to window head above, including cabinet heater and concrete curb below. refer to structural drawings for new shelf angle.
 - 4. Remove designated portion of existing brick face below floor elevation to allow for expansion joint installation.
 - 5. Remove designated existing flooring and base (resilient and carpet), and associated adhesive/mastic down to concrete floor. Prepare concrete slab to receive new flooring. refer to specifications for floor preparation.
 - 6. Remove designated existing built-in counter, base, and wall cabinets.

7. Remove designated existing signage and return to the Owner.
 8. Remove designated terracotta (masonry) partition in its entirety, (from floor to underside of concrete deck above).
 9. Remove GWB and stud partition in its entirety, from floor to underside of deck above door, hardware and door frame. For powered doors, remove all wiring back to panel.
 10. Remove existing door, hardware and door frame. For powered doors, remove all wiring back to panel.
 11. Remove all furnishings, utilities, equipment and fixtures, not indicated for salvage or re-use, and abandoned materials of all kinds.
 12. Remove from site all abandoned, disconnected and dismantled fire protection, plumbing and mechanical equipment, including piping, conduits, system wiring, meters and other devices.
 13. Remove from site all abandoned, disconnected and dismantled electrical fixtures and equipment, including conduits, wiring, meters and other devices.
 14. In addition to demolition specifically shown, cut, move or remove existing construction to remain as necessary to provide access or to allow alterations and new work to proceed. Coordinate such relocation's and removal to accommodate the demands and requirements of other trades.
 15. Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
- E. General: Subcontractors representing each individual trade are under contract with the General Contractor.
1. Selective demolition and removal work by individual utility, mechanical and electrical trade subcontractors includes, but is not limited to the following:
 - a. Each trade subcontractor shall Disconnect cut, cap and make safe all utilities, equipment and fixtures which are not indicated for salvage or re-use, or otherwise indicated to be abandoned in place as well as any abandoned materials of any kind.
 - 1) Disconnect cut, cap and make safe, all utility services indicated to be demolished at their primary source. Obtain the approval from authorities having jurisdiction, or applicable service provider prior to the execution of the work.
 - 2) Cut, cap and make safe all existing utility services indicated to be abandoned in place, where so indicated on the Drawings.
 - b. The plumbing subcontractor shall disconnect, detach and dismantle all existing abandoned plumbing systems and equipment including, but not limited to, fixtures, equipment, water heaters, piping, hangers, valves, insulation and appurtenances.
 - 1) Piping at slab will be disconnected by plumbing contractor.
 - 2) Suspended hangers, piping, equipment, fixtures and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by the Plumbing trade Subcontractor.
 - c. The HVAC subcontractor shall disconnect, detach, dismantle all existing abandoned heating, ventilating, and air conditioning systems including, but not limited to, air handlers, air conditioners, pumps, cabinet unit heaters, unit

- heaters, radiation, exhaust fans, intakes, louvers, diffusers, grilles, and all related piping, ductwork, controls, and appurtenances.
- 1) Suspended hangers, equipment, ductwork and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by HVAC subcontractor.
 - d. The Electrical subcontractor shall disconnect, detach, dismantle all existing abandoned electrical systems and equipment including, but not limited to, panelboards, light fixtures, fire alarm, intercom, speakers, wiring devices, and all related conduit and appurtenances.
 - 1) Suspended wiring, conduit, hangers, fixtures, equipment, and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by the Electrical subcontractor.
 - e. Remove, salvage and furnish to the General Contractor designated equipment, fixtures or other items so identified. Refer to notes on Drawings.
 - f. Identify locations of utilities for work of other sections.
- F. Remove, salvage, and furnish to Owner for maintenance stock, or other future use, including but not limited to the following products. Carefully package and clearly identify prior to delivery to Owner.
1. New designated windows that were installed as part of the Windows Project, that will be removed as part of this project.
 2. Existing designated headwall material.
 3. Existing casework.
 4. Door hardware.
 5. Brick masonry.
- G. Conduct walk-through of existing site prior to commencement of selective demolition work and jointly identify and tag with Owner items required to be salvaged. These products in general would be in addition to those indicated on Drawings.
1. All salvaged products not designated for re-use in project, shall be furnished to the Owner for its own use, carefully packaged and clearly identified.
- H. Identify locations of utilities for work of other sections.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 010000 - GENERAL REQUIREMENTS: Procedural and administrative requirements for temporary facilities and controls, including:
 1. Temporary heat.
 2. Temporary barriers and barricades.
 3. Temporary fire protection.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- E. Section 019999 - PROJECT CLOSEOUT.

- F. Section 030136 - RESURFACING OF CAST-IN-PLACE CONCRETE:
 - 1. Grind down high spots in existing concrete surfaces to specified tolerances.
 - 2. Shot blast clean existing concrete slabs free of dirt, laitance, corrosion, or other contamination ready to receive finish flooring.
 - 3. Prepare substrates, level and patch existing concrete surfaces, and concrete surfaces disturbed by the Work of this Contract.
- G. Division 21 - FIRE SUPPRESSION:
 - 1. Disconnection, salvage, re-working and re-installation of sprinkler system.
 - 2. Disconnection and dismantling designated fire suppression systems and components.
- H. Division 22 - PLUMBING:
 - 1. Disconnection, salvage, re-working and re-installation of plumbing system.
 - 2. Disconnection and dismantling designated plumbing systems and components.
- I. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING (HVAC):
 - 1. Disconnection, salvage, re-working and re-installation of roof-top ventilator ducts.
 - 2. Disconnection and dismantling designated mechanical systems and components.
- J. Division 26 - ELECTRICAL:
 - 1. Disconnection and dismantling designated electrical systems and components.
 - 2. Disconnection, salvage, and re-installation of designated light fixtures.
- K. Individual specification sections: Cutting and patching incidental to work of individual specification sections shall be performed by respective trades, except as specified in Section 017329 - CUTTING AND PATCHING.
- L. Individual specification sections: Utility shutoffs by respective trades.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ANSI A10.6 – Safety Requirements for Demolition Operations.
 - 2. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.4 OWNERSHIP OF REMOVED MATERIALS

- A. If during the work, articles of unusual value, or of historical or archaeological significance, are encountered the ownership of such articles is retained by the Owner, and information regarding their discovery shall be immediately furnished to the Architect. Resolution shall be handled as a Change in the Work.
- B. Ownership of materials, equipment and furnishings designated for salvage for re-use in this Project or designated for Owner's use is retained by the Owner.
- C. Ownership of materials, equipment and furnishings to be removed from the Project which are not defined by the above two paragraphs is retained by the Contractor; if any of these are considered of salvageable value to the Contractor, they may be removed from the Project as work progresses.
 - 1. On-site storage or sale of removed items is prohibited.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Comply with all requirements of this contract relative to protection, scheduling and coordination with the Owner.
2. Hazardous materials: When hazardous materials are encountered, they shall be handled, removed, and disposed of in accordance with all regulatory agency requirements.
3. Coordinate and arrange with utility, mechanical and electrical trades for their disconnecting, rerouting and maintenance of existing services leading to adjacent occupied buildings, as part of the work of this Contract.
4. Coordinate Work of this Section with related utilities work identified in the appropriate Drawings and specifications.

B. Pre-Demolition Meeting: At least two weeks prior to commencing the work of this Section, conduct a pre-demolition conference at the Project site. Coordinate time of meeting to occur prior to installation of work under the related sections named below.

1. Required attendees: Project Engineer/VA COR, Architect, Contractor's project manager and on-site superintendent, demolition subcontractor's project superintendent, and representatives of related utility trades.
 - a. Review conditions of existing construction to be demolished.
 - 1) Review extent and location of selective demolition.
 - 2) Review special demolition and salvage procedures required for historic building elements.
 - 3) Exploratory demolition and concealed conditions.
 - b. Review shoring and bracing procedures, and structural load limitations of existing structure.
 - c. Review special requirements for temporary protection of existing finishes and materials to remain.

C. Sequencing:

1. Coordinate and arrange with mechanical and electrical trades for their disconnecting, rerouting and maintenance of existing services in the buildings as required, as part of the work of this Contract.

D. Scheduling:

1. Comply with all requirements of this contract relative to protection, scheduling, phasing, and coordination with the Owner.

1.6 SUBMITTALS

A. Information and Review Submittals:

1. Schedule: Prior to commencement of work, prepare a schedule indicating proposed methods and sequence of operations for demolition work.
 - a. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
 - b. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations. Receive acceptance from the Project Engineer/VA COR and Architect prior to commencing work.

2. Shop drawings: Indicate demolition sequencing and locations of salvageable items.
 3. Design Data: Submit calculations for bracing and shoring, signed and sealed by professional engineer registered in the State of Vermont.
 4. Permits: Submit copy of permits required by regulatory agencies for demolition.
 5. Special Procedure Submittals: Submit copies of written agreements from private landowners, landfill operators, or other agencies accepting disposal of demolished materials at least two weeks prior to commencement of demolition work.
- B. Closeout Submittals: Submit the following under provisions of Section 019999 – PROJECT CLOSEOUT.
1. Record Documentation: Indicate actual location of capped site utilities.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes and VA Hospital Standards for demolition work, safety of structure, dust control, and disposal of debris. Conform to procedures applicable when discovering hazardous materials or contaminated substances.
1. The Contractor is directed not to disturb or attempt removal of any discovered hazardous materials or contaminated substances. Immediately notify both the Project Engineer/VA COR and Architect upon discovery of such conditions.
 2. Removal or containment of the hazardous materials or contaminated substances shall be performed by an abatement specialist under separate contract with the Owner.
- B. Obtain and pay for required permits and licenses required from authorities prior to commencing demolition work. Arrange and pay for legal disposal of removed materials and equipment, obtain proper disposal receipts for verification.
- C. Notify affected utility companies and Owner before starting work and comply with utility company requirements.
- D. Do not close or obstruct egress width to exits. Do not disable or disrupt building fire or life safety systems without 3 days prior written notification to the Owner.

1.8 QUALITY ASSURANCE

- A. General: Conduct the work in a manner giving prime consideration to protection of the public; protection from the weather, control of noise, shocks and vibration; control of dirt and dust; orderly access for and storage of materials; protection of existing buildings; protection of adjacent surfaces and property; coordination and cooperation with the Owner at all times.
1. Comply with all requirements of this contract relative to protection, scheduling and coordination with the Owner.
- B. Qualifications:
1. Demolition subcontractor: Company specializing in performing work of this section with minimum 3 years documented experience.
 2. Shoring and bracing design: Design shoring, and bracing, under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

1.9 SITE CONDITIONS

- A. Comply with wind and weather conditions established at pre-demolition meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Condition of Structures: Owner assumes no responsibility nor makes any claim as to the actual condition or structural adequacy of any existing construction to be demolished. The Contractor shall investigate and assure himself of the condition of the work to be demolished and shall take all precautions to ensure safety of persons and property.
 - 1. Notify both the Project Engineer/VA COR and Architect, if any type of hazardous chemicals, gases, explosives, flammable material, unmarked containers, or similar dangerous substances are discovered. Cease work in affected areas until directed by the Project Engineer/VA COR and Architect. Continue work in other areas.
- B. The Contractor shall have examined the existing conditions per requirements of the Conditions of the Contract and Division 1 - General Requirements, and reviewed Contract Documents prior to commencement of demolition. Coordinate and verify scope of selective demolition with other portions of work specified in other sections, and under separate Contract. Change orders will not be issued for the removal of any exposed to view materials or equipment, which are either indicated on the Drawings for removal, or not indicated, but necessary to remove for the Work of this Project.
 - 1. Before beginning any demolition work, the Contractor shall survey the site and examine the Drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer's approval.
- C. Prior to commencement of selective demolition work, conduct non-destructive testing, as reviewed during the Pre-Demolition Meeting, prior to coring through existing structure. Inspect areas in which work will be performed. Photograph existing damage to structure surfaces, equipment, or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Architect prior to starting work.
- D. Layout of demolition in masonry construction. After General Contractor identifies areas requiring demolition and subsequent patching of masonry. Masonry Sub-contractor shall indicate on walls the extent of masonry cutting and demolition work which will be performed by the General Contractor. Necessary finished patching of openings will be performed by the Masonry Sub-contractor.

3.2 PREPARATION

- A. General: Provide necessary protection of non-work areas of during demolition operations. Provide, erect and maintain temporary barriers as required to protect non-construction related pedestrian and vehicular traffic using the adjacent portions of the site and building.
 - 1. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy of adjacent facility.
- B. Protect existing structures which are not to be demolished. Protect designated materials and equipment to be removed and retained by Owner.

1. Cover or otherwise protect as necessary existing equipment, furniture and furnishing located beyond the immediate demolition work.
 2. Protect existing landscaping materials, structures, and appurtenances which are not to be demolished.
- C. Prevent movement of structure; provide required bracing and shoring.
1. Protect existing active utility services and structures from damage during selective demolition work including during installation of bracing and removal of same. Repair or replace damages to satisfaction of Owner.
- D. Dangerous Materials, After consultation with the Owners Environmental Safety and Health Department: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

3.3 GENERAL REQUIREMENTS FOR SELECTIVE DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas, in compliance with governing laws and buildings, with prime consideration given to the safety, protection and convenience of the public and Owner's personnel.
1. Maintain protected egress and access to the Work at all times.
- B. Perform selective demolition in an orderly and careful manner. Carefully cut materials to be removed to eliminate damage to portions to remain. Protect existing structure designated to remain.
1. Do not demolish building elements beyond what is indicated on Drawings without the Project Engineer/VA COR and Architect's approval.
 2. Except as otherwise required by Project phasing requirements, proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 3. Locate equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 4. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent. Do not throw trash from windows or from roof.
 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 7. Pull nails and fasteners which remain after removal of attached material. Remove lath, strapping and other substructures associated with finishes to be removed.
 8. Where existing finishes are indicated to be removed, remove down to bare subsurface without causing damage to the subsurface.
 - a. After removal of non-asbestos finish flooring materials. Remove underlying mastic and prepare substrate to receive new flooring materials by Shot Blasting method. Create a uniform 20 mil profile. Mechanically scarify areas which cannot be profiled by shot blast method. Thoroughly wash all flooring substrate and leave clean and dry ready for application of new flooring materials.
- C. Cutting openings and holes: Neatly cut openings and holes plumb, square, and true to dimensions required. Cut or drill from the exposed or finished side into concealed surfaces

to avoid marring existing finished surfaces. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.

1. All penetrations in floors and roof shall be framed with miscellaneous metal work prior to cutting and demolition of deck and concrete.
 2. Repair damage done to existing elements of building to remain, except repairs specified to be provided under other Sections. Repairs shall be done in such manner as to closely match construction, appearance and quality of original work.
- D. Use of cutting torches:
1. Do not use cutting torches until work area is cleared of flammable materials.
 2. Maintain adequate ventilation when using cutting torches.
 3. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations.
 4. Maintain fire watch and portable fire-suppression devices during flame-cutting operations. Comply with fire prevention measures specified under Section 010000 – GENERAL REQUIREMENTS, Article 1.5.
- E. Carefully observe existing structure during demolition operations, cease operations immediately if structure appears to be in danger. Immediately notify both Architect and Project Engineer/VA COR. Do not resume demolition operations until directed.
- F. Disconnect, cap and clearly identify designated utilities within demolition areas.
1. Cap and remove abandoned existing utilities back to locations indicated, or to limit line of Contract where terminations are not indicated.
 - a. Pipes to be demolished that require a connection shall be removed to the extent required to install the new connection. Remove pipe sections by saw-cutting, removing a complete pipe section to an existing joint, or other adequate means which results in a clean joint.
 2. Protect and maintain conduits, drains, sewers, pipes, and similar utilities that are not to be demolished
- G. Disconnect existing equipment and fixtures to be removed, or services abandoned, and piping, wiring, and conduit which would otherwise be exposed in the finished work. Remove from site disconnected equipment and fixtures and piping not to be reused.
1. Contractor to remove and dispose of all equipment not tagged or scheduled for reuse.
- H. Abandoned Equipment, Utilities, Systems: Remove in their entirety. Abandonment in place is not acceptable, except where an item is specifically indicated to be abandoned in place.
1. "Abandoned" means the item is not operational in the completed Contract.
 2. Without limitation, remove abandoned pipes, tubing, conduits, wires, cables, ducts, equipment, machines, and all elements and items related to abandoned work including, without limitation, hangers, connectors, anchors, valves, drains, strainers, sumps, panels, mounting boards, grounding rods, ground connectors, boxes, dampers, plenums, insulation, escutcheons, trims, and all other related items.
 3. Where an existing element is indicated to be abandoned in place, the abandoned item shall be cut off and, if hollow, capped.
 - a. Cut off sufficiently below the finished plane to permit space for patching over the abandoned element. The General Contractor shall provide all cutting and

chipping required to recess the cut element, and to coordinate depth of cut-offs required for finishing.

3.4 GENERAL DUST CONTROL

- A. Compliance with requirements for dust protection and air quality control is required for work areas which abut Owner occupied areas. Dust removal and periodic cleaning requirements apply to all work. Contractor shall employ dust and pollution prevention procedures so that a healthy Owner's environment is fully maintained at all times.
 - 1. Compliance with requirements of the following is mandatory and may not be compromised at any point during construction:
 - a. Section 013533 - INFECTION CONTROL PROCEDURES.
 - b. ICRA language, (INFECTION PREVENTION MEASURES) in Section 010000 – GENERAL REQUIREMENTS.
 - 2. Clean up loose debris daily, or more frequently as required, to prevent the wind spreading debris. Keep dumpsters covered when not in use.
 - 3. Cover handcarts carrying debris being transported through Owner occupied areas.
 - 4. Wet down debris (as appropriate) to prevent air pollution by dust rising from demolition work. Wet down dumpsters to prevent fires caused by vandals.
 - 5. Employ tarpaulins on all trucks carrying debris.

3.5 SALVAGE MATERIALS AND PRODUCTS

- A. Carefully salvage and provide safe storage for products designated for salvage, reuse, as indicated on the Drawings, as specified herein, or as requested by Owner for reuse on the project, or to be stored for Owner's future use. Take particular care with finished items and items requiring special handling.
 - 1. Remove items indicated to be salvaged with extreme care to prevent damage.
 - 2. All components and parts of salvaged items shall be saved and packaged.
- B. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area as designated by Owner.
 - 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to

a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION REQUIREMENTS FOR MATERIALS AND SURFACES.

A. Floors, General:

1. Completely remove existing flooring located in areas scheduled to receive new flooring surfaces and as additionally indicated. Remove all finish flooring layers of flooring down to the existing substrate.
 - a. Completely remove flooring systems to substrate, including full removal of all setting beds and adhesives.
2. Remove resilient flooring and adhesive in strict accordance with the technical bulletin entitled " Recommended Work Practices for the Removal of Resilient Floor Covering", as issued by Resilient Floor Covering Institute (RFCI).
3. Patching: The Contractor is responsible for patching of flooring substrates and subfloors. Respective finish flooring trades are responsible for patching of finish flooring systems matching abutting surface.

B. Walls, General:

1. Remove interior walls and partitions as indicated and as needed to accommodate new work.
2. Where existing walls-to-remain are indicated to receive new finishes, completely remove trim and fasteners.
3. Patching: The Contractor is responsible for patching of substrates and back-up systems. Finishes work shall be provided under individual product specification sections.

C. Ceilings, General:

1. Patching: The Contractor shall provide patching of substrates and back-up systems. Ceiling work is specified under individual product specification sections.
 - a. Ceilings which must be temporarily removed for mechanical, plumbing or fire protection work shall be carefully removed and stored for reinstallation when work has been completed under Section 095100 - ACOUSTICAL CEILINGS.

D. Doors and Frames: Where doors and frames are indicated to be removed from walls or partitions which are to remain, remove doors and frames carefully so as to minimize damage to wall. Repair and patch wall as necessary to accommodate new door frame or other new work.

E. Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to Section 017329 - CUTTING AND PATCHING, for additional requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

F. Concrete, General: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

- G. Concrete Slabs (slabs-on-grade): Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- H. Masonry: Demolish in small sections. Except where toothing is required, cut masonry using power-driven saw at junctures with construction to remain. Remove masonry between saw cuts.
- I. Fire Suppression and Sprinkler Equipment: Fire Protection subcontractor is responsible to disconnect, cap and lower to floor items required to be removed, including but not limited to piping, hangers, valves, and insulation.
- J. Plumbing Equipment: Plumbing subcontractor is responsible to disconnect, cap and lower to floor items required to be removed, including but not limited to fixtures, equipment, water heaters, piping, hangers, valves, and insulation.
- K. Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC&R) Equipment:
 - 1. Drain system components designated for disposal of all lubricants, hydraulics, and refrigerants without releasing into atmosphere.
 - 2. HVAC&R subcontractor(s) shall disconnect, cap and lower to floor items required to be removed, including but not limited to, ductwork, piping, fans, VAV boxes, unit ventilators, and all similar system equipment. Contractor is responsible for removal from site and proper disposal.
- L. Electrical Equipment and Lighting Fixtures:
 - 1. Electrical subcontractor(s) shall disconnect, cap and lower to floor items required to be removed, including but not limited to, panelboards, light fixtures, and overhead devices including, fire alarm, intercom, bus ducts. Contractor is responsible for removal from site.

3.7 REPAIRS

- A. Repair all damage done to elements of buildings and structures to remain, except repairs specified to be provided under other Sections, or as indicated for removal in subsequent project phase(s). Repairs shall be done in such manner as to closely match construction, appearance and quality of original work.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated or specified to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. As work progresses, regularly remove demolished materials from site. Do not allow demolished materials to accumulate on-site, except as required for materials determined to be reused, salvaged, or as required for waste segregation and diversion for recycling.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn or bury demolished materials on site, arrange for legal disposal of the same.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.9 CLEANING

- A. Daily cleaning: Sweep all interior and exterior areas affected by demolition operations.

- B. Upon completion of the work of this Section; remove unused tools and equipment, surplus materials, rubbish, debris, and dust. Leave area in raked or broom-clean condition, as appropriate.
- C. Upon completion of the work of this Section; clean adjacent structures and facilities of dust, dirt and debris caused by demolition work to the satisfaction of Owner, owner(s) of adjacent properties, and authorities having jurisdiction.

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SECTION 02 82 11
ASBESTOS ABATEMENT

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PART 1 - GENERAL

1.1 SUMMARY OF THE WORK

1.1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS

Drawings, general provisions of the contract, including general and supplementary conditions and other Division 01 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, requirements for partial owner occupancy during the work, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Contracting Officer for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply. Any actions taken by the Contractor without obtaining guidance from the Contracting Officer shall become the sole risk and responsibility of the Asbestos Abatement Contractor. All costs incurred due to such action are also the responsibility of the Asbestos Abatement Contractor.

1.1.2 EXTENT OF WORK

- A. Below is a brief description of the estimated quantities of asbestos containing materials to be abated. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Contractor shall satisfy himself as the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.
- B. Removal, clean-up and disposal of asbestos containing materials (ACM) and asbestos/waste contaminated elements in an appropriate regulated area for the following approximate quantities;

28,700 square feet of vinyl floor tile and associated mastic

80 square feet of sink undercoating (19 sinks)

11,000 linear feet of brown duct caulking

6,800 square feet of texture coating associated with ceramic wall tile adhesive

1.1.3 RELATED WORK

- A. Section 07 84 00, FIRESTOPPING.
- B. Section 02 41 00, DEMOLITION.
- C. Division 09, FINISHES
- D. Division 22, PLUMBING.
- E. Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION / Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING / Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- F. Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION / Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING / Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION
- G. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION.

- H. Section 22 05 19, METERS AND GAGES FOR PLUMBING PIPING / Section 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING / Section 22 05 33, HEAT TRACING FOR PLUMBING PIPING / Section 22 11 00, FACILITY WATER DISTRIBUTION / Section 22 13 00, FACILITY SANITARY SEWERAGE / Section 22 13 23, SANITARY WASTE INTERCEPTORS / Section 22 14 00, FACILITY STORM DRAINAGE / Section 22 66 00, CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 23 11 23, FACILITY NATURAL-GAS PIPING.
- I. Section 23 21 13, HYDRONIC PIPING / Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING.
- J. Section 23 31 00, HVAC DUCTS AND CASINGS / Section 23 37 00, AIR OUTLETS AND INLETS.

1.1.4 TASKS

The work tasks are summarized briefly as follows:

- A. Pre-abatement activities including pre-abatement meeting(s), inspection(s), notifications, permits, submittal approvals, regulated area preparations, emergency procedures arrangements, and standard operating procedures for asbestos abatement work.
- B. Abatement activities including removal, clean-up and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.
- C. Cleaning and decontamination activities including final visual inspection, air monitoring and certification of decontamination.

1.1.5 CONTRACTORS USE OF PREMISES

- A. The Contractor and Contractor's personnel shall cooperate fully with the VA representative/consultant to facilitate efficient use of buildings and areas within buildings. The Contractor shall perform the work in accordance with the VA specifications, drawings, phasing plan and in compliance with any/all applicable Federal, State and Local regulations and requirements.
- B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved VA Design and Construction Procedures. VA Design and Construction Procedures drawings of partially occupied buildings will show the limits of regulated areas; the placement of decontamination facilities; the temporary location of bagged waste ACM; the path of transport to outside the building; and the temporary waste storage area for each building/regulated area. Any variation from the arrangements shown on drawings shall be secured in writing from the VA representative through the pre-abatement plan of action. The following limitations of use shall apply to existing facilities shown on drawings:
 - No waste storage within building outside of active abatement area
 - Use of approved entry and exit corridors only
 - No asbestos disturbance outside functional abatement containment

1.2 VARIATIONS IN QUANTITY

The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimated which are limited by the physical constraints imposed by occupancy of the buildings and accessibility to ACM. Accordingly, minor variations (+/- 10%) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the contractor shall provide unit prices for newly discovered ACM and those prices shall be used for additional work required under the contractor.

1.3 STOP ASBESTOS REMOVAL

If the Contracting Officer; their field representative; (the facility Safety Officer/Manager or their designee, or the VA Professional Industrial Hygienist/Certified Industrial Hygienist (VPIH/CIH) presents a verbal **Stop Asbestos Removal Order**, the Contractor/Personnel shall immediately stop all asbestos removal and maintain HEPA filtered negative pressure air flow in the containment and adequately wet any exposed ACM. If a verbal Stop Asbestos Removal Order is issued, the VA shall follow-up with a written order to the Contractor as soon as it is practicable. The Contractor shall not resume any asbestos removal activity until authorized to do so in writing by the VA Contracting Officer. A stop asbestos removal order may be issued at any time the VA Contracting Officer determines abatement conditions/activities are not within VA specification, regulatory requirements or that an imminent hazard exists to human health or the environment. Work stoppage will continue until conditions have been corrected to the satisfaction of the VA. Standby time and costs for corrective actions will be borne by the Contractor, including the VPIH/CIH time. The occurrence of any of the following events shall be reported immediately by the Contractor's competent person to the VA Contracting Office or field representative using the most expeditious means (e.g., verbal or telephonic), followed up with written notification to the Contracting Officer as soon as practical. The Contractor shall immediately stop asbestos removal/disturbance activities and initiate fiber reduction activities:

- A. Airborne PCM analysis results equal to or greater than 0.01 f/cc outside a regulated area or >0.05 f/cc inside a regulated area;
- B. breach or break in regulated area containment barrier(s);
- C. less than -0.02" WCG pressure in the regulated area;
- D. serious injury/death at the site;
- E. fire/safety emergency at the site;
- F. respiratory protection system failure;
- G. power failure or loss of wetting agent; or
- H. any visible emissions observed outside the regulated area.

1.4 DEFINITIONS

1.4.1 GENERAL

Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

1.4.2 GLOSSARY

Abatement - Procedures to control fiber release from asbestos-containing materials. Includes removal, encapsulation, enclosure, demolition, and renovation activities related to asbestos containing materials (ACM).

Aerosol - Solid or liquid particulate suspended in air.

Adequately wet - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

Aggressive method - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

Aggressive sampling - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

AHERA - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

Aircell - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

Air monitoring - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air. For personal samples and clearance air testing using Phase Contrast Microscopy (PCM) analysis. NIOSH Method 7402 can be used when it is necessary to confirm fibers counted by PCM as being asbestos. The AHERA TEM analysis may be used for background, area samples and clearance samples when required by this specification, or at the discretion of the VPIH/CIH as appropriate.

Air sample filter - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)

Amended water - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

Asbestos Hazard Abatement Plan (AHAP) - Asbestos work procedures required to be submitted by the contractor before work begins.

Asbestos-containing material (ACM) - Any material containing more than one percent of asbestos.

Asbestos contaminated elements (ACE) - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

Asbestos-contaminated soil (ACS) - Soil found in the work area or in adjacent areas such as crawlspaces or pipe tunnels which is contaminated with asbestos-containing material debris and cannot be easily separated from the material.

Asbestos-containing waste (ACW) material - Asbestos-containing material or asbestos contaminated objects requiring disposal.

Asbestos Project Monitor - Some states require that any person conducting asbestos abatement clearance inspections and clearance air sampling be licensed as an asbestos project monitor.

Asbestos waste decontamination facility - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

Authorized person - Any person authorized by the VA, the Contractor, or government agency and required by work duties to be present in regulated areas.

Authorized visitor - Any person approved by the VA; the contractor; or any government agency representative having jurisdiction over the regulated area (e.g., OSHA, Federal and State EPA).

Barrier - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

Containment Barrier - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

Critical Barrier - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting

secured in place at openings such as doors, windows, or any other opening into the regulated area.

Primary Barrier - Plastic barriers placed over critical barriers and exposed directly to abatement work.

Secondary Barrier - Any additional plastic barriers used to isolate and provide protection from debris during abatement work.

Breathing zone - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

Bridging encapsulant - An encapsulant that forms a layer on the surface of the ACM.

Building/facility owner - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

Bulk testing - The collection and analysis of suspect asbestos containing materials.

Certified Industrial Hygienist (CIH) - A person certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

Class II asbestos work - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

Clean room/Changing room - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

Clearance sample - The final air sample taken after all asbestos work has been done and visually inspected. Performed by the VA's professional industrial hygiene consultant/Certified Industrial Hygienist (VPIH/CIH).

Closely resemble - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

Contractor's Professional Industrial Hygienist (CPIH/CIH) - The asbestos abatement contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of a PIH and may be a certified industrial hygienist (CIH).

Count - Refers to the fiber count or the average number of fibers greater than five microns in length with a length-to-width (aspect) ratio of at least 3 to 1, per cubic centimeter of air.

Crawl space - An area which can be found either in or adjacent to the work area. This area has limited access and egress and may contain asbestos materials and/or asbestos contaminated soil.

Decontamination area/unit - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

VA Total - means a building or substantial part of the building is completely removed, torn or knocked down, bulldozed, flattened, or razed, including removal of building debris.

Disposal bag - Typically 6 mil thick sift-proof, dustproof, leak-tight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

Disturbance - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.

Drum - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be sift-proof, dustproof, and leak-tight.

Employee exposure - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

Encapsulant - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

Encapsulation - Treating ACM with an encapsulant.

Enclosure - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

Equipment room - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber - A particulate form of asbestos, 5 microns or longer, with a length to width (aspect) ratio of at least 3 to 1.

Fibers per cubic centimeter (f/cc) - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.

Filter - Media used in respirators, vacuums, or other machines to remove particulate from air.

Firestopping - Material used to close the open parts of a structure in order to prevent a fire from spreading.

Friable asbestos containing material - Any material containing more than one (1) percent or asbestos as determined using the method specified in appendix A, Subpart F, 40 CFR 763, section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Glovebag - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

High efficiency particulate air (HEPA) filter - An ASHRAE MERV 17 filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

HEPA vacuum - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

Homogeneous area - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

HVAC - Heating, Ventilation and Air Conditioning

Industrial hygienist (IH) - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

Industrial hygienist technician (IH Technician) - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned. Some states require that an industrial hygienist technician conducting asbestos abatement clearance inspection and clearance air sampling be licensed as an asbestos project monitor.

Intact - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Lockdown - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

National Emission Standards for Hazardous Air Pollutants (NESHAP) - EPA's rule to control emissions of asbestos to the environment (40 CFR part 61, Subpart M).

Negative initial exposure assessment - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL.

Negative pressure - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water column gauge inside the negative pressure enclosure.

Negative pressure respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air pressure outside the respirator facepiece.

Non-friable ACM - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Organic vapor cartridge - The type of cartridge used on air purifying respirators to remove organic vapor hazardous air contaminants.

Outside air - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.

Owner/operator - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Penetrating encapsulant - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

Personal sampling/monitoring - Representative air samples obtained in the breathing zone for one or workers within the regulated area using a filter cassette and a calibrated air sampling pump to determine asbestos exposure.

Permissible exposure limit (PEL) - The level of exposure OSHA allows for an 8 hour time weighted average. For asbestos fibers, the eight (8) hour time weighted average PEL is 0.1 fibers per cubic centimeter (0.1 f/cc) of air and the 30-minute Excursion Limit is 1.0 fibers per cubic centimeter (1 f/cc).

Personal protective equipment (PPE) - equipment designed to protect user from injury and/or specific job hazard. Such equipment may include protective clothing, hard hats, safety glasses, and respirators.

Pipe tunnel - An area, typically located adjacent to mechanical spaces or boiler rooms in which the pipes servicing the heating system in the building are routed to allow the pipes to access heating elements. These

areas may contain asbestos pipe insulation, asbestos fittings, or asbestos-contaminated soil.

Polarized light microscopy (PLM) - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.

Polyethylene sheeting - Strong plastic barrier material 4 to 6 mils thick, semi-transparent, flame retardant per NFPA 241.

Positive/negative fit check - A method of verifying the seal of a facepiece respirator by temporarily occluding the filters and breathing in (inhaling) and then temporarily occluding the exhalation valve and breathing out (exhaling) while checking for inward or outward leakage of the respirator respectively.

Presumed ACM (PACM) - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (b).

Professional IH - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH. The PIH may be either the VA's PIH (VPIH) or Contractor's PIH (CPIH/CIH).

Project designer - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B)(5).

Assigned protection factor - A value assigned by OSHA/NIOSH to indicate the expected protection provided by each respirator class, when the respirator is properly selected and worn correctly. The number indicates the reduction of exposure level from outside to inside the respirator facepiece.

Qualitative fit test (QLFT) - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

Quantitative fit test (QNFT) - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

Regulated area - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.

Regulated ACM (RACM) - Friable ACM; Category I non-friable ACM that has become friable; Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

Removal - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.

Repair - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Shower room - The portion of the PDF where personnel shower before leaving the regulated area.

Supplied air respirator (SAR) - A respiratory protection system that supplies minimum Grade D respirable air per ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989.

Surfacing ACM - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.

Surfactant - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

Thermal system ACM - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

Transmission electron microscopy (TEM) - A microscopy method that can identify and count asbestos fibers.

VA Professional Industrial Hygienist (VPIH/CIH) - The Department of Veterans Affairs Professional Industrial Hygienist must meet the qualifications of a PIH, and may be a Certified Industrial Hygienist (CIH).

VA Representative - The VA official responsible for on-going project work.

Visible emissions - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM/ACS or ACM waste material.

Waste/Equipment decontamination facility (W/EDF) - The area in which equipment is decontaminated before removal from the regulated area.

Waste generator - Any owner or operator whose act or process produces asbestos-containing waste material.

Waste shipment record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

Wet cleaning - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

1.4.3 REFERENCED STANDARDS ORGANIZATIONS

The following acronyms or abbreviations as referenced in contract/specification documents are defined to mean the associated names. Names and addresses may be subject to change.

- A. VA Department of Veterans Affairs
810 Vermont Avenue, NW
Washington, DC 20420
- B. AIHA American Industrial Hygiene Association
2700 Prosperity Avenue, Suite 250
Fairfax, VA 22031
703-849-8888
- C. ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212-354-3300
- D. ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103
215-299-5400

- E. CFR Code of Federal Regulations
Government Printing Office
Washington, DC 20420
- F. CGA Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, VA 22202
703-979-0900
- G. CS Commercial Standard of the National Institute of Standards and Technology (NIST)
U. S. Department of Commerce
Government Printing Office
Washington, DC 20420
- H. EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460
202-382-3949
- I. MIL-STD Military Standards/Standardization Division
Office of the Assistant Secretary of Defense
Washington, DC 20420
- J. NIST National Institute for Standards and Technology
U. S. Department of Commerce
Gaithersburg, MD 20234
301-921-1000
- K. NEC National Electrical Code (by NFPA)
- L. NEMA National Electrical Manufacturer's Association
2101 L Street, N.W.
Washington, DC 20037
- M. NFPA National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
800-344-3555
- N. NIOSH National Institutes for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226
513-533-8236
- O. OSHA Occupational Safety and Health Administration
U.S. Department of Labor
Government Printing Office
Washington, DC 20402
- P. UL Underwriters Laboratory
333 Pfingsten Rd.
Northbrook, IL 60062
312-272-8800

1.5 APPLICABLE CODES AND REGULATIONS

1.5.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS

- A. All work under this contract shall be done in strict accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.
- B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be utilized.
- C. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system.

1.5.2 ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITY

The Asbestos Abatement Contractor (Contractor) shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the asbestos abatement project. The Contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment (PPE) including respiratory protection including respirator fit testing, as required by applicable Federal, State and Local regulations. The Contractor shall hold the VA and VPIH/CIH consultants harmless for any Contractor's failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The Contractor will incur all costs of the CPIH/CIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements related to failure to comply with the regulations applicable to the work.

1.5.3 FEDERAL REQUIREMENTS

Federal requirements which govern of asbestos abatement include, but are not limited to, the following regulations.

- A. Occupational Safety and Health Administration (OSHA)
 - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
 - 2. Title 29 CFR 1910 Subpart I - Personal Protective Equipment
 - 3. Title 29 CFR 1910.134 - Respiratory Protection
 - 4. Title 29 CFR 1926 - Construction Industry Standards
 - 5. Title 29 CFR 1910.1020 - Access to Employee Exposure and Medical Records
 - 6. Title 29 CFR 1910.1200 - Hazard Communication
 - 7. Title 29 CFR 1910 Subpart K - Medical and First Aid
- B. Environmental Protection Agency (EPA):
 - 1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
 - 2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)
- C. Department of Transportation (DOT)
 - Title 49 CFR 100 - 185 - Transportation

1.5.4 STATE REQUIREMENTS

- A. Vermont Department of Health (VTDOH)
 - 1. V.S.A. Title 18, Chapter 26 - Vermont Regulations for Asbestos Control (VRAC)

1.5.5 LOCAL REQUIREMENTS

If local requirements are more stringent than federal or state standards, the local standards are to be followed.

1.5.6 STANDARDS

- A. Standards which govern asbestos abatement activities include, but are not limited to, the following:
 - 1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems and ANSI Z88.2 - Practices for Respiratory Protection.
 - 2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA Filter Units, 7th Edition.
- B. Standards which govern encapsulation work include, but are not limited to the following:
 - 1. American Society for Testing and Materials (ASTM)
- C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:
 - 1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 - 2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.
 - 3. NFPA 101 - Life Safety Code

1.5.7 EPA GUIDANCE DOCUMENTS

- A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.
- B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024
- C. Asbestos Waste Management Guidance EPA 530-SW-85-007
- D. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001
- E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

1.5.8 NOTICES

- A. State and Local agencies: Send written notification as required by state and local regulations including the local fire department prior to beginning any work on ACM as follows:
 - Vermont Department of Health
 - Lead and Asbestos Regulatory Program
 - Drawer 30
 - 108 Cherry Street, P.O. Box 70
 - Burlington, VT 0402
- B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification are given to EPA, State, and Local authorities.

1.5.9 PERMITS/LICENSES

- A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations. Including but not limited to:
- 1- Vermont Department of Health
 - 2- US Environmental Protection Agency - NESHAP

1.5.10 POSTING AND FILING OF REGULATIONS

- A. Maintain two (2) copies of applicable federal, state, and local regulations. Post one copy of each in the clean room at the regulated area where workers will have daily access to the regulations and keep another copy in the Contractor's office.

1.5.11 VA RESPONSIBILITIES

Prior to commencement of work:

- A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area. **Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**
- B. Submit to the Contractor results of background air sampling; including location of samples, person who collected the samples, equipment utilized, calibration data and method of analysis. During abatement, submit to the Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. This information shall not release the Contractor from any responsibility for OSHA compliance.

1.5.12 EMERGENCY ACTION PLAN AND ARRANGEMENTS

- A. An Emergency Action Plan shall be developed prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a);(b).
- B. Emergency procedures shall be in written form and prominently posted in the clean room and equipment room of the decontamination unit. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule; layout of regulated area; and access to the regulated area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.
1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
 2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker,

- remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of any/all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.
 - G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3-4 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
 - H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; power failure; negative pressure failure; and supplied air system failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that asbestos abatement work is stopped and wetting is continued until correction of the problem.

1.5.13 PRE-CONSTRUCTION MEETING

Prior to commencing the work, the Contractor shall meet with the VA Certified Industrial Hygienist (VPCIH) to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

- A. Proof of Contractor licensing.
- B. Proof the Competent Person(s) is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person(s) shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training, licensing and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.
- G. A copy of the Contractor's Asbestos Hazard Abatement Plan. In these procedures, the following information must be detailed, specific for this project.
 - 1. Regulated area preparation procedures;
 - 2. Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
 - 3. Decontamination area set-up/layout and decontamination procedures for employees;
 - 4. Abatement methods/procedures and equipment to be used;
 - 5. Personal protective equipment to be used;
- H. At this meeting the Contractor shall provide all submittals as required.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Plan Procedures.
- K. Copies of Safety Data Sheets (SDS) for all chemicals to be utilized on the site.

1.6 PROJECT COORDINATION

The following are the minimum administrative and supervisory personnel necessary for coordination of the work.

1.6.1 PERSONNEL

- A. Administrative and supervisory personnel shall consist of a qualified Competent Person(s) as defined by OSHA in the Construction Standards and the Asbestos Construction Standard; Contractor Professional Industrial Hygienist and Industrial Hygiene Technicians. These employees are the Contractor's representatives responsible for compliance with these specifications and all other applicable requirements.
- B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project. Personnel shall meet required qualifications. Personnel utilized on-site shall be pre-approved by the VA representative. A request for approval shall be submitted for any person to be employed during the project giving the person's name; social security number; qualifications; accreditation card with color picture; Certificate of Worker's Acknowledgment; and Affidavit of Medical Surveillance and Respiratory Protection and current Respirator Fit Test.
- C. Minimum qualifications for Contractor and assigned personnel are:
 1. The Contractor has conducted within the last three (3) years, three (3) projects of similar complexity and dollar value as this project; has not been cited and penalized for serious violations of federal (and state as applicable) EPA and OSHA asbestos regulations in the past three (3) years; has adequate liability/occurrence insurance for asbestos work as required by the state; is licensed in applicable states; has adequate and qualified personnel available to complete the work; has comprehensive standard operating procedures for asbestos work; has adequate materials, equipment and supplies to perform the work.
 2. The Competent Person has four (4) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project within the past three (3) years; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.
 3. The Contractor Professional Industrial Hygienist/CIH (CPIH/CIH) shall have five (5) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed the NIOSH 582 Course or equivalent, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.
 4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating procedures of the Contractor; has one year of asbestos abatement experience within the past three (3) years of similar size and complexity; has applicable medical and respiratory protection

documentation; has certificate of training/current refresher and State accreditation/license.

All personnel should be in compliance with OSHA construction safety training as applicable and submit certification.

1.7 RESPIRATORY PROTECTION

1.7.1 GENERAL - RESPIRATORY PROTECTION PROGRAM

The Contractor shall develop and implement a written Respiratory Protection Program (RPP) which is in compliance with the January 8, 1998 OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910. Subpart I;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program. All respirators used must be NIOSH approved for asbestos abatement activities. The written RPP shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c)(1)(i - ix) - Respiratory Protection Program.

1.7.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR

The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating RPP of similar size and complexity. The RPPC must submit a signed statement attesting to the fact that the program meets the above requirements.

1.7.3 SELECTION AND USE OF RESPIRATORS

The procedure for the selection and use of respirators must be submitted to the VA as part of the Contractor's qualifications. The procedure must be written clearly enough for workers to understand. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

1.7.4 MINIMUM RESPIRATORY PROTECTION

Minimum respiratory protection shall be a full face powered air purifying respirator when fiber levels are maintained consistently at or below 0.5 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

1.7.5 MEDICAL WRITTEN OPINION

No employee shall be allowed to wear a respirator unless a physician or other licensed health care professional has provided a written determination they are medically qualified to wear the class of respirator to be used on the project while wearing whole body impermeable garments and subjected to heat or cold stress.

1.7.6 RESPIRATOR FIT TEST

All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Quantitative fit tests shall be done for PAPRs which have been put into a motor/blower failure mode.

1.7.7 RESPIRATOR FIT CHECK

The Competent Person shall assure that the positive/negative pressure user seal check is done each time the respirator is donned by an employee. Head coverings must cover respirator head straps. Any situation that prevents an effective facepiece to face seal as evidenced by failure of a user seal check shall preclude that person from wearing a respirator inside the regulated area until resolution of the problem.

1.7.8 MAINTENANCE AND CARE OF RESPIRATORS

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and Care of Respirators.

1.7.9 SUPPLIED AIR SYSTEMS

If a supplied air system is used, the system shall meet all requirements of 29 CFR 1910.134 and the ANSI/Compressed Gas Association (CGA) Commodity Specification for Air current requirements for Type 1 - Grade D breathing air. Low pressure systems are not allowed to be used on asbestos abatement projects. Supplied Air respirator use shall be in accordance with EPA/NIOSH publication EPA-560-OPTS-86-001 "A Guide to Respiratory Protection for the Asbestos Abatement Industry". The competent person on site will be responsible for the supplied air system to ensure the safety of the worker.

1.8 WORKER PROTECTION

1.8.1 TRAINING OF ABATEMENT PERSONNEL

Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k)(9) and any additional State/Local requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k)(9)(viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

1.8.2 MEDICAL EXAMINATIONS

Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. A current physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the medical opinion the person has been evaluated for working in a heat and cold stress environment while wearing personal protective equipment (PPE) and is able to perform the work without risk of material health impairment.

1.8.3 REGULATED AREA ENTRY PROCEDURE

The Competent Person shall ensure that each time workers enter the regulated area; they remove ALL street clothes in the clean room of the decontamination unit and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the shower room to the equipment room where they put on non-disposable required personal protective equipment.

1.8.4 DECONTAMINATION PROCEDURE

The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

- A. When exiting the regulated area, remove disposable coveralls, and ALL other clothes, disposable head coverings, and foot coverings or boots in the equipment room.
- B. Still wearing the respirator and completely naked, proceed to the shower. Showering is MANDATORY. Care must be taken to follow reasonable procedures in removing the respirator to avoid inhaling asbestos fibers while showering. The following procedure is required as a minimum:
 1. Thoroughly wet body including hair and face. If using a PAPR hold blower above head to keep filters dry.
 2. With respirator still in place, thoroughly decontaminate body, hair, respirator face piece, and all other parts of the respirator except the blower and battery pack on a PAPR. Pay particular attention to cleaning the seal between the face and respirator facepiece and under the respirator straps.
 3. Take a deep breath, hold it and/or exhale slowly, completely wetting hair, face, and respirator. While still holding breath, remove the respirator and hold it away from the face before starting to breathe.
- C. Carefully decontaminate the facepiece of the respirator inside and out. If using a PAPR, shut down using the following sequence: a) first cap inlets to filters; b) turn blower off to keep debris collected on the inlet side of the filter from dislodging and contaminating the outside of the unit; c) thoroughly decontaminate blower and hoses; d) carefully decontaminate battery pack with a wet rag being cautious of getting water in the battery pack thus preventing destruction. **(THIS PROCEDURE IS NOT A SUBSTITUTE FOR RESPIRATOR CLEANING!)**
- D. Shower and wash body completely with soap and water. Rinse thoroughly.
- E. Rinse shower room walls and floor to drain prior to exiting.
- F. Proceed from shower to clean room; dry off and change into street clothes or into new disposable work clothing.

1.8.5 REGULATED AREA REQUIREMENTS

The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for regulated areas at 29 CFR 1926.1101 (e) are met. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

1.9 DECONTAMINATION FACILITIES

1.9.1 DESCRIPTION

Provide each regulated area with separate personnel decontamination facilities (PDF) and waste/equipment decontamination facilities (W/EDF). Ensure that the PDF are the only means of ingress and egress to the regulated area and that all equipment, bagged waste, and other material exit the regulated area only through the W/EDF.

1.9.2 GENERAL REQUIREMENTS

All personnel entering or exiting a regulated area must go through the PDF and shall follow the requirements at 29 CFR 1926.1101 (j)(1) and these specifications. All waste, equipment and contaminated materials must exit the regulated area through the W/EDF and be decontaminated in accordance with these specifications. Walls and ceilings of the PDF and W/EDF must

be constructed of a minimum of 3 layers of 6 mil opaque fire retardant polyethylene sheeting and be securely attached to existing building components and/or an adequate temporary framework. A minimum of 3 layers of 6 mil poly shall also be used to cover the floor under the PDF and W/EDF units. Construct doors so that they overlap and secure to adjacent surfaces. Weight inner doorway sheets with layers of duct tape so that they close quickly after release. Put arrows on sheets so they show direction of travel and overlap. If the building adjacent area is occupied, construct a solid barrier on the occupied side(s) to protect the sheeting and reduce potential for non-authorized personnel entering the regulated area.

1.9.3 TEMPORARY FACILITIES TO THE PDF AND W/EDF

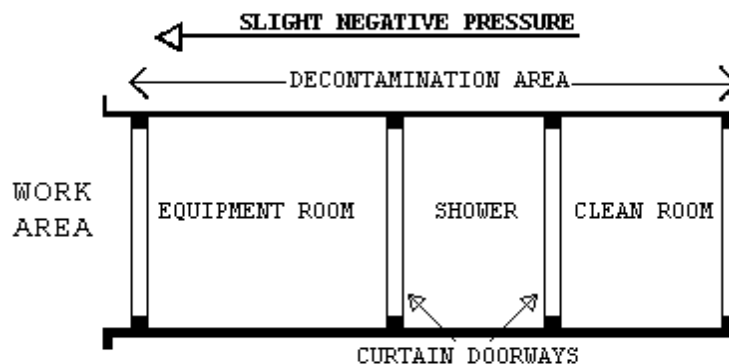
The Competent Person shall provide temporary water service connections to the PDF and W/EDF. Backflow prevention must be provided at the point of connection to the VA system. Water supply must be of adequate pressure and meet requirements of 29 CFR 1910.141(d)(3). Provide adequate temporary overhead electric power with ground fault circuit interruption (GFCI) protection. Provide a sub-panel equipped with GFCI protection for all temporary power in the clean room. Provide adequate lighting to provide a minimum of 50 foot candles in the PDF and W/EDF. Provide temporary heat, if needed, to maintain 70°F throughout the PDF and W/EDF.

1.9.4 PERSONNEL DECONTAMINATION FACILITY (PDF)

The Competent Person shall provide a PDF consisting of shower room which is contiguous to a clean room and equipment room which is connected to the regulated area. The PDF must be sized to accommodate the number of personnel scheduled for the project. The shower room, located in the center of the PDF, shall be fitted with as many portable showers as necessary to insure all employees can complete the entire decontamination procedure within 15 minutes. The PDF shall be constructed of opaque poly for privacy. The PDF shall be constructed to eliminate any parallel routes of egress without showering.

1. Clean Room: The clean room must be physically and visually separated from the rest of the building to protect the privacy of personnel changing clothes. The clean room shall be constructed of at least 3 layers of 6 mil opaque fire retardant poly to provide an air tight room. Provide a minimum of 2 - 900 mm (3 foot) wide 6 mil poly opaque fire retardant doorways. One doorway shall be the entry from outside the PDF and the second doorway shall be to the shower room of the PDF. The floor of the clean room shall be maintained in a clean, dry condition. Shower overflow shall not be allowed into the clean room. Provide 1 storage locker per person. A portable fire extinguisher, minimum 10 pounds capacity, Type ABC, shall be provided in accordance with OSHA and NFPA Standard 10. All persons entering the regulated area shall remove all street clothing in the clean room and dress in disposable protective clothing and respiratory protection. Any person entering the clean room does so either from the outside with street clothing on or is coming from the shower room completely naked and thoroughly washed. Females required to enter the regulated area shall be ensured of their privacy throughout the entry/exit process by posting guards at both entry points to the PDF so no male can enter or exit the PDF during her stay in the PDF.
2. Shower Room: The Competent Person shall assure that the shower room is a completely water tight compartment to be used for the movement of all personnel from the clean room to the equipment room and for the showering of all personnel going from the equipment room to the clean

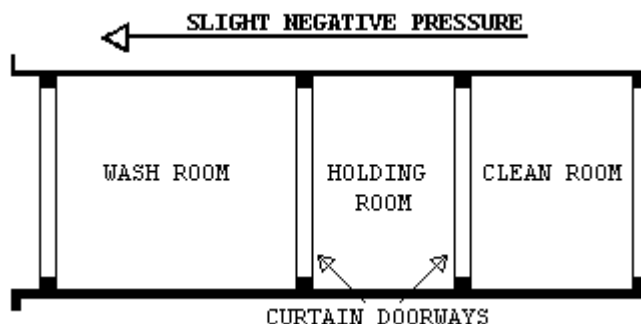
- room. Each shower shall be constructed so water runs down the walls of the shower and into a drip pan. Install a freely draining smooth floor on top of the shower pan. The shower room shall be separated from the rest of the building and from the clean room and equipment room using air tight walls made from at least 3 layers of 6 mil opaque fire retardant poly. The shower shall be equipped with a shower head and controls, hot and cold water, drainage, soap dish and continuous supply of soap, and shall be maintained in a sanitary condition throughout its use. The controls shall be arranged so an individual can shower without assistance. Provide a flexible hose shower head, hose bibs and all other items shown on Shower Schematic. Waste water will be pumped to a drain after being filtered through a minimum of a 100 micron sock in the shower drain; a 20 micron filter; and a final 5 micron filter. Filters will be changed a minimum of daily or more often as needed. Filter changes must be done in the shower to prevent loss of contaminated water. Hose down all shower surfaces after each shift and clean any debris from the shower pan. Residue is to be disposed of as asbestos waste.
3. Equipment Room: The Competent Person shall provide an equipment room which shall be an air tight compartment for the storage of work equipment/tools, reusable personal protective equipment, except for a respirator and for use as a gross decontamination area for personnel exiting the regulated area. The equipment room shall be separated from the regulated area by a minimum 3 foot wide door made with 2 layers of 6 mil opaque fire retardant poly. The equipment room shall be separated from the regulated area, the shower room and the rest of the building by air tight walls and ceiling constructed of a minimum of 3 layers of 6 mil opaque fire retardant poly. Damp wipe all surfaces of the equipment room after each shift change. Provide an additional loose layer of 6 mil fire retardant poly per shift change and remove this layer after each shift. If needed, provide a temporary electrical sub-panel equipped with GFCI in the equipment room to accommodate any equipment required in the regulated area.
 4. The PDF shall be as follows: Clean room at the entrance followed by a shower room followed by an equipment room leading to the regulated area. Each doorway in the PDF shall be a minimum of 2 layers of 6 mil opaque fire retardant poly.



1.9.5 WASTE/EQUIPMENT DECONTAMINATION FACILITY (W/EDF)

The Competent Person shall provide an W/EDF consisting of a wash room, holding room, and clean room for removal of waste, equipment and contaminated material from the regulated area. Personnel shall not enter or exit the W/EDF except in the event of an emergency. Clean debris and residue in the W/EDF daily. All surfaces in the W/EDF shall be wiped/hosed down after each shift and all debris shall be cleaned from the shower pan. The W/EDF shall consist of the following:

1. Wash Down Station: Provide an enclosed shower unit in the regulated area just outside the Wash Room as an equipment bag and container cleaning station.
2. Wash Room: Provide a wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the regulated area. Construct the wash room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. Locate the wash room so that packaged materials, after being wiped clean, can be passed to the Holding Room. Doorways in the wash room shall be constructed of 2 layers of 6 mil fire retardant poly.
3. Holding Room: Provide a holding room as a drop location for bagged materials passed from the wash room. Construct the holding room using 50 x 100 mm (2" x 4") wood framing and 3 layers of 6 mil fire retardant poly. The holding room shall be located so that bagged material cannot be passed from the wash room to the clean room unless it goes through the holding room. Doorways in the holding room shall be constructed of 2 layers of 6 mil fire retardant poly.
4. Clean Room: Provide a clean room to isolate the holding room from the exterior of the regulated area. Construct the clean room using 2 x 4 wood framing and 2 layers of 6 mil fire retardant poly. The clean room shall be located so as to provide access to the holding room from the building exterior. Doorways to the clean room shall be constructed of 2 layers of 6 mil fire retardant poly. When a negative pressure differential system is used, a rigid enclosure separation between the W/EDF clean room and the adjacent areas shall be provided.
5. The W/EDF shall be as follows: Wash Room leading to a Holding Room followed by a Clean Room leading to outside the regulated area. See diagram.



1.9.6 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES

At the washdown station in the regulated area, thoroughly wet clean contaminated equipment and/or sealed polyethylene bags and pass into Wash Room after visual inspection. When passing anything into the Wash Room, close all doorways of the W/EDF, other than the doorway between the washdown station and the Wash Room. Keep all outside personnel clear of

the W/EDF. Once inside the Wash Room, wet clean the equipment and/or bags. After cleaning and inspection, pass items into the Holding Room. Close all doorways except the doorway between the Holding Room and the Clean Room. Workers from the Clean Room/Exterior shall enter the Holding Room and remove the decontaminated/cleaned equipment/bags for removal and disposal. These personnel will not be required to wear PPE. At no time shall personnel from the clean side be allowed to enter the Wash Room.

PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT

2.1 MATERIALS AND EQUIPMENT

2.1.1 GENERAL REQUIREMENTS

Prior to the start of work, the contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CPIH/CIH has submitted verification to the VA's representative.

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable and combustible materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated area until abatement is completed.
- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized location.
- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Polyethylene sheeting for walls in the regulated area shall be a minimum of 4-mils. For floors and all other uses, sheeting of at least 6-mil shall be used in widths selected to minimize the frequency of joints. Fire retardant poly shall be used throughout.
- F. The method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the VA and selected to minimize damage to equipment and surfaces. Method of attachment may include any combination of moisture resistant duct tape furring strips, spray glue, staples, nails, screws, lumber and plywood for enclosures or other effective procedures capable of sealing polyethylene to dissimilar finished or unfinished surfaces under both wet and dry conditions.
- G. Polyethylene sheeting utilized for the PDF shall be opaque white or black in color, 6 mil fire retardant poly.
- H. Installation and plumbing hardware, showers, hoses, drain pans, sump pumps and waste water filtration system shall be provided by the Contractor.
- I. An adequate number of HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements, fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project. All electrically operated hand tools, equipment, electric cords shall be connected to GFCI protection.

- J. Special protection for objects in the regulated area shall be detailed (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water and falling material).
- K. Disposal bags - 2 layers of 6 mil poly for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
- L. The VA shall be provided an advance copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication in the pre-start meeting submittal. Chlorinated compounds shall not be used with any spray adhesive, mastic remover or other product. Appropriate encapsulant(s) shall be provided.
- M. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k)(7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
- N. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a written hazard assessment conducted under 29 CFR 1910.132(d).

2.2 MONITORING, INSPECTION AND TESTING

2.2.1 GENERAL

- A. Perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. OSHA requires that the employee exposure to asbestos must not exceed 0.1 fiber per cubic centimeter (f/cc) of air, averaged over an 8-hour work shift. The CPIH/CIH is responsible for and shall inspect and oversee the performance of the Contractor IH Technician. The IH Technician shall continuously inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the CPIH/CIH shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.
- B. The VA will employ an independent industrial hygienist (VPIH/CIH) consultant and/or use its own IH to perform various services on behalf of the VA. The VPIH/CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that VA patients, employees, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the VPIH/CIH consultant in no way relieves the Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the VPIH/CIH and their services will be borne by the VA except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results. Any repeated final inspections and/or testing, if required, will be paid for by the Contractor.
- C. If fibers counted by the VPIH/CIH during abatement work, either inside or outside the regulated area, utilizing the NIOSH 7400 air monitoring method, exceed the specified respective limits, the Contractor shall stop

work. The Contractor may request confirmation of the results by analysis of the samples by TEM. Request must be in writing and submitted to the VA's representative. Cost for the confirmation of results will be borne by the Contractor for both the collection and analysis of samples and for the time delay that may/does result for this confirmation. Confirmation sampling and analysis will be the responsibility of the CPIH/CIH with review and approval of the VPIH/CIH. An agreement between the CPIH/CIH and the VPIH/CIH shall be reached on the exact details of the confirmation effort, in writing, including such things as the number of samples, location, collection, quality control on-site, analytical laboratory, interpretation of results and any follow-up actions. This written agreement shall be co-signed by the IH's and delivered to the VA's representative.

2.2.2 SCOPE OF SERVICES OF THE VPIH/CIH CONSULTANT

- A. The purpose of the work of the VPIH/CIH is to: assure quality; adherence to the specification; resolve problems; prevent the spread of contamination beyond the regulated area; and assure clearance at the end of the project. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been adequately decontaminated. All air monitoring is to be done utilizing PCM/TEM. The VPIH/CIH will perform the following tasks:
 - 1. Task 1: Establish background levels before abatement begins by collecting background samples. Retain samples for possible TEM analysis.
 - 2. Task 2: Perform continuous air monitoring, inspection, and testing outside the regulated area during actual abatement work to detect any faults in the regulated area isolation and any adverse impact on the surroundings from regulated area activities.
 - 3. Task 3: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.
 - 4. Task 4: Provide support to the VA representative such as evaluation of submittals from the Contractor, resolution of conflicts, interpret data, etc.
 - 5. Task 5: Perform, in the presence of the VA representative, final inspection and testing of a decontaminated regulated area at the conclusion of the abatement to certify compliance with all regulations and VA requirements/specifications.
 - 6. Task 6: Issue certificate of decontamination for each regulated area and project report.
- B. All documentation, inspection results and testing results generated by the VPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the VPIH/CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the VPIH/CIH will be used by the VA to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

2.2.3 MONITORING, INSPECTION AND TESTING BY CONTRACTOR CPIH/CIH

The Contractor's CPIH/CIH is responsible for managing all monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The CPIH/CIH is responsible for the continuous monitoring of all subsystems

and procedures which could affect the health and safety of the Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Contractor/Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be an IH Technician, who shall be trained and shall have specialized field experience in sampling and analysis. The IH Technician shall have successfully completed a NIOSH 582 Course or equivalent and provide documentation. The IH Technician shall participate in the AIHA Asbestos Analysis Registry or participate in the Proficiency Analytic Testing program of AIHA for fiber counting quality control assurance. The IH Technician shall also be an accredited EPA AHERA/State Contractor/Supervisor or Abatement Worker and Building Inspector. The IH Technician shall have participated in five abatement projects collecting personal and area samples as well as responsibility for documentation on substantially similar projects in size and scope. The analytic laboratory used by the Contractor to analyze the samples shall be AIHA accredited for asbestos PAT and approved by the VA prior to start of the project. A daily log shall be maintained by the CPIH/CIH or IH Technician, documenting all OSHA requirements for air personal monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A. This log shall be made available to the VA representative and the VPIH/CIH upon request. The log will contain, at a minimum, information on personnel or area samples, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH/CIH shall collect and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected and one area sample per 1,000 square feet of regulated area where abatement is taking place and one sample per shift in the clean room area shall be collected. In addition to the continuous monitoring required, the CPIH/CIH will perform inspection and testing at the final stages of abatement for each regulated area as specified in the CPIH/CIH responsibilities. Additionally, the CPIH/CIH will monitor and record pressure readings within the containment daily with a minimum of two readings at the beginning and at the end of a shift, and submit the data in the daily report.

2.3 ASBESTOS HAZARD ABATEMENT PLAN

The Contractor shall have established an Asbestos Hazard Abatement Plan (AHAP) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the procedures to be followed during all phases of the work by the Contractor's personnel. The AHAP must be modified as needed to address specific requirements of this project and the specifications. The AHAP shall be submitted for review and approval to the VA prior to the start of any abatement work. The minimum topics and areas to be covered by the AHAPs are:

- A. Minimum Personnel Qualifications
- B. Emergency Action Plan/Contingency Plans and Arrangements
- C. Security and Safety Procedures
- D. Respiratory Protection/Personal Protective Equipment Program and Training
- E. Medical Surveillance Program and Recordkeeping
- F. Regulated Area Requirements - Containment Barriers/Isolation of Regulated Area
- G. Decontamination Facilities and Entry/Exit Procedures (PDF and W/EDF)

ASBESTOS ABATEMENT

- H. Negative Pressure Systems Requirements
- I. Monitoring, Inspections, and Testing
- J. Removal Procedures for ACM
- K. Removal of Contaminated Soil (if applicable)
- L. Encapsulation Procedures for ACM
- M. Disposal of ACM waste/equipment
- N. Regulated Area Decontamination/Clean-up
- O. Regulated Area Visual and Air Clearance
- P. Project Completion/Closeout

2.4 SUBMITTALS

2.4.1 PRE-START MEETING SUBMITTALS

Submit to the VA a minimum of 14 days prior to the pre-start meeting the following for review and approval. Meeting this requirement is a prerequisite for the pre-start meeting for this project:

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.
- B. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function. Provide their qualifications, training, accreditations, and licenses, as appropriate. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
- C. Submit Asbestos Hazard Abatement Plan developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH/CIH.
- D. Submit the specifics of the materials and equipment to be used for this project with manufacturer names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
 - 1. Supplied air system, negative air machines, HEPA vacuums, air monitoring pumps, calibration devices, pressure differential monitoring device and emergency power generating system.
 - 2. Waste water filtration system, shower system, containment barriers.
 - 3. Encapsulants, surfactants, hand held sprayers, airless sprayers, glovebags, and fire extinguishers.
 - 4. Respirators, protective clothing, personal protective equipment.
 - 5. Fire safety equipment to be used in the regulated area.
- E. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of vehicle to be used for transportation; and name, address, and phone number of subcontractor, if used. Proof of asbestos training for transportation personnel shall be provided.
- F. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.
- G. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Personal air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A. Area or clearance air monitoring shall be conducted in accordance with EPA AHERA protocols.
- H. Submit qualifications verification: Submit the following evidence of qualifications. Make sure that all references are current and verifiable by providing current phone numbers and documentation.

1. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project: Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date
 2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years: Project Name; Reason; Date; Reference Name/Number; Resolution
 3. List asbestos regulatory citations (e.g., OSHA), notices of violations (e.g., Federal and state EPA), penalties, and legal actions taken against the company including and of the company's officers (including damages paid) in the last 3 years. Provide copies and all information needed for verification.
- I. Submit information on personnel: Provide a resume; address each item completely; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH/CIH stating that all personnel submitted below have medical records in accordance with OSHA 29 CFR 1926.1101(m) and 29 CFR 1910.20 and that the company has implemented a medical surveillance program and written respiratory protection program, and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.
1. CPIH/CIH and IH Technician: Name; years of abatement experience; list of projects similar to this one; certificates, licenses, accreditations for proof of AHERA/OSHA specialized asbestos training; professional affiliations; number of workers trained; samples of training materials; samples of AHAPs developed; medical opinion; and current respirator fit test.
 2. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person/Supervisor; list of similar projects in size/complexity as Competent Person/Supervisor; as a worker; certificates, licenses, accreditations; proof of AHERA/OSHA specialized asbestos training; maximum number of personnel supervised on a project; medical opinion (asbestos surveillance and respirator use); and current respirator fit test.
 3. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion (asbestos surveillance and respirator use); and current respirator fit test.
- J. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain language the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of AHAPs incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who performs and how is personal air monitoring of abatement workers conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and standard operating procedures; and copies of monitoring results of the five referenced projects listed and analytical method(s) used.
- K. Rented equipment must be decontaminated prior to returning to the rental agency.
- L. Submit, before the start of work, the manufacturer's technical data for all types of encapsulants and other chemicals such as mastic removers, all SDS and application instructions.

2.4.2 SUBMITTALS DURING ABATEMENT

- A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as barrier breeching, equipment failures, emergencies, and any cause for stopping work; and representative air monitoring and results/TWA's/EL's. Submit this information daily to the VPIH/CIH.
- B. The CPIH/CIH shall document and maintain the inspection and approval of the regulated area preparation prior to start of work and daily during work.
 - 1. Removal of any poly barriers.
 - 2. Visual inspection/testing by the CPIH/CIH or IH Technician prior to application of lockdown encapsulant.
 - 3. Packaging and removal of ACM waste from regulated area.
 - 4. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

2.4.3 SUBMITTALS AT COMPLETION OF ABATEMENT

The CPIH/CIH shall submit a project report consisting of the daily log book requirements and documentation of events during the abatement project including Waste Shipment Records signed by the landfill's agent. It will also include information on the containment and transportation of waste from the containment with applicable Chain of Custody forms. The report shall include a certificate of completion, signed and dated by the CPIH/CIH, in accordance with Attachment #1. All clearance and perimeter area samples must be submitted. The VA Representative will retain the abatement report after completion of the project and provide copies of the abatement report to VAMC Office of Engineer and the Safety Office.

2.5 ENCAPSULANTS

2.5.1 TYPES OF ENCAPSULANTS

- A. The following four types of encapsulants, if used, must comply with performance requirements as stated in paragraph 2.6.2:
 - 1. Removal encapsulant - used as a wetting agent to remove ACM.
 - 2. Bridging encapsulant - provides a tough, durable coating on ACM.
 - 3. Penetrating encapsulant - penetrates/encapsulates ACM at least 13 mm (1/2").
 - 4. Lockdown encapsulant - seals microscopic fibers on surfaces after ACM removal.

2.5.2 PERFORMANCE REQUIREMENTS

Encapsulants shall meet the latest requirements of EPA; shall not contain toxic or hazardous substances; or solvents; and shall comply with the following performance requirements:

- A. General Requirements for all Encapsulants:
 - 1. ASTM E84: Flame spread of 25; smoke emission of 50.
 - 2. University of Pittsburgh Protocol: Combustion Toxicity; zero mortality.
 - 3. ASTM C732: Accelerated Aging Test; Life Expectancy - 20 years.
 - 4. ASTM E96: Permeability - minimum of 0.4 perms.
- B. Bridging/Penetrating Encapsulants:
 - 1. ASTM E736: Cohesion/Adhesion Test - 24 kPa (50 lbs/ft²).

2. ASTM E119: Fire Resistance - 3 hours (Classified by UL for use on fibrous/cementitious fireproofing).
 3. ASTM D2794: Gardner Impact Test; Impact Resistance - minimum 11.5 kg-mm (43 in/lb).
 4. ASTM D522: Mandrel Bend Test; Flexibility - no rupture or cracking.
- C. Lockdown Encapsulants:
1. ASTM E119: Fire resistance - 3 hours (tested with fireproofing over encapsulant applied directly to steel member).
 2. ASTM E736: Bond Strength - 48 kPa (100 lbs/ft²) (test compatibility with cementitious and fibrous fireproofing).
 3. In certain situations, encapsulants may have to be applied to hot pipes/equipment. The encapsulant must be able to withstand high temperatures without cracking or off-gassing any noxious vapors during application.

2.5.3 CERTIFICATES OF COMPLIANCE

The Contractor shall submit to the VA representative certification from the manufacturer indicating compliance with performance requirements for encapsulants when applied according to manufacturer recommendations.

PART 3 - EXECUTION

3.1 REGULATED AREA PREPARATIONS

3.1.1 SITE SECURITY

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of Subcontractors, VA employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.
- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent Person shall immediately require any unauthorized person to leave the regulated area and then notify the VA Contracting Officer or VA Representative using the most expeditious means.
- C. A log book shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through a single decontamination unit. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste/equipment load-out area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside; however, they shall be sealed with poly sheeting and taped until needed. In any situation where exposure to high temperatures which may result in a flame hazard, fire retardant poly sheeting must be used.
- E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. A 24 hour security system shall be provided at the entrance to the regulated area to assure that all

entrants are logged in/out and that only authorized personnel are allowed entrance.

- F. The Contractor will have the VA's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the VA's employees.
- G. The regulated area shall be locked during non-working hours and secured by VA Representative or Competent Person. The VA Police should be informed of asbestos abatement regulated areas to provide security checks during facility rounds and emergency response.

3.1.2. SIGNAGE AND POWER MANAGEMENT

- A. Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed the PEL. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.
- B. Shut down and lock out/tag out electric power to the regulated area. Provide temporary power and lighting. Insure safe installation including GFCI of temporary power sources and equipment by compliance with all applicable electrical code and OSHA requirements for temporary electrical systems. Electricity shall be provided by the VA.
- C. Shut down and lock out/tag out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area. Investigate the regulated area and agree on pre-abatement condition with the VA's representative. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil poly. Also, seal any seams in system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6-mil polyethylene disposal bags for staging and eventual disposal as asbestos waste.

3.1.3 NEGATIVE PRESSURE FILTRATION SYSTEM

The Contractor shall provide enough HEPA negative air machines to effect > - 0.02" WCG pressure. The Competent Person shall determine the number of units needed for the regulated area by dividing the cubic feet in the regulated area by 15 and then dividing that result by the cubic feet per minute (CFM) for each unit to determine the number of units needed to effect > - 0.02" WCG pressure. Provide a standby unit in the event of machine failure and/or emergency in an adjacent area.

NIOSH has done extensive studies and has determined that negative air machines typically operate at ~50% efficiency. The contractor shall consider this in their determination of number of units needed to provide > - 0.02" WCG pressure. The contractor shall use double the number of machines, based on their calculations, or submit proof their machines operate at stated capacities, at a 2" pressure drop across the filters.

3.1.3.1 DESIGN AND LAYOUT

- A. Before start of work submit the design and layout of the regulated area and the negative air machines. The submittal shall

indicate the number of, location of and size of negative air machines. The point(s) of exhaust, air flow within the regulated area, anticipated negative pressure differential, and supporting calculations for sizing shall be provided. In addition, submit the following:

1. Method of supplying power to the units and designation/location of the panels.
2. Description of testing method(s) for correct air volume and pressure differential.
3. If auxiliary power supply is to be provided for the negative air machines, provide a schematic diagram of the power supply and manufacturer's data on the generator and switch.

3.1.3.2 NEGATIVE AIR MACHINES (HEPA UNITS)

- A. Negative Air Machine Cabinet: The cabinet shall be constructed of steel or other durable material capable of withstanding potential damage from rough handling and transportation. The width of the cabinet shall be less than 30" in order to fit in standard doorways. The cabinet must be factory sealed to prevent asbestos fibers from being released during use, transport, or maintenance. Any access to and replacement of filters shall be from the inlet end. The unit must be on casters or wheels.
- B. Negative Air Machine Fan: The rating capacity of the fan must indicate the CFM under actual operating conditions. Manufacturer's typically use "free-air" (no resistance) conditions when rating fans. The fan must be a centrifugal type fan.
- C. Negative Air Machine Final Filter: The final filter shall be a HEPA filter. The filter media must be completely sealed on all edges within a structurally rigid frame. The filter shall align with a continuous flexible gasket material in the negative air machine housing to form an air tight seal. Each HEPA filter shall be certified by the manufacturer to have an efficiency of not less than 99.97%. Testing shall have been done in accordance with Military Standard MIL-STD-282 and Army Instruction Manual 136-300-175A. Each filter must bear a UL586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
- D. Negative Air Machine Pre-filters: The pre-filters, which protect the final HEPA filter by removing larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. A first stage pre-filter shall be a low efficiency type for particles 10 µm or larger. A second stage pre-filter shall have a medium efficiency effective for particles down to 5 µm or larger. Pre-filters shall be installed either on or in the intake opening of the NAM and the second stage filter must be held in place with a special housing or clamps.
- E. Negative Air Machine Instrumentation: Each unit must be equipped with a gauge to measure the pressure drop across the filters and to indicate when filters have become loaded and need to be changed. A table indicating the cfm for various pressure readings on the gauge shall be affixed near the gauge for reference or

the reading shall indicate at what point the filters shall be changed, noting cfm delivery. The unit must have an elapsed time meter to show total hours of operation.

- F. Negative Air Machine Safety and Warning Devices: An electrical/mechanical lockout must be provided to prevent the fan from being operated without a HEPA filter. Units must be equipped with an automatic shutdown device to stop the fan in the event of a rupture in the HEPA filter or blockage in the discharge of the fan. Warning lights are required to indicate normal operation; too high a pressure drop across filters; or too low of a pressure drop across filters.
- G. Negative Air Machine Electrical: All electrical components shall be approved by the National Electrical Manufacturer's Association (NEMA) and Underwriters Laboratories (UL). Each unit must be provided with overload protection and the motor, fan, fan housing, and cabinet must be grounded.
- H. It is essential that replacement HEPA filters be tested using an "in-line" testing method, to ensure the seal around the periphery was not damaged during replacement. Damage to the outer HEPA filter seal could allow contaminated air to bypass the HEPA filter and be discharged to an inappropriate location. Contractor will provide written documentation of test results for negative air machine units with HEPA filters changed by the contractor or documentation when changed and tested by the contractor filters

3.1.3.3 PRESSURE DIFFERENTIAL

The fully operational negative air system within the regulated area shall continuously maintain a pressure differential of -0.02" water column gauge. Before any disturbance of any asbestos material, this shall be demonstrated to the VA by use of a pressure differential meter/manometer as required by OSHA 29 CFR 1926.1101(e)(5)(i). The Competent Person shall be responsible for providing, maintaining, and documenting the negative pressure and air changes as required by OSHA and this specification.

3.1.3.4 MONITORING

The pressure differential shall be continuously monitored and recorded between the regulated area and the area outside the regulated area with a monitoring device that incorporates a strip chart recorder. The strip chart recorder shall become part of the project log and shall indicate at least -0.02" water column gauge for the duration of the project.

3.1.3.5 AUXILIARY GENERATOR

If the building is occupied during abatement, provide an auxiliary gasoline/diesel generator located outside the building in an area protected from the weather. In the event of a power failure of the general power grid and the VAMC emergency power grid, the generator must automatically start and supply power to a minimum of 50% of the negative air machines in operation.

3.1.3.6 SUPPLEMENTAL MAKE-UP AIR INLETS

Provide, as needed for proper air flow in the regulated area, in a location approved by the VA, openings in the plastic sheeting to

allow outside air to flow into the regulated area. Auxiliary makeup air inlets must be located as far from the negative air machines as possible, off the floor near the ceiling, and away from the barriers that separate the regulated area from the occupied clean areas. Cover the inlets with weighted flaps which will seal in the event of failure of the negative pressure system.

3.1.3.7 TESTING THE SYSTEM

The negative pressure system must be tested before any ACM is disturbed in any way. After the regulated area has been completely prepared, the decontamination units set up, and the negative air machines installed, start the units up one at a time. Demonstrate and document the operation and testing of the negative pressure system to the VA using smoke tubes and a negative pressure gauge. Verification and documentation of adequate negative pressure differential across each barrier must be done at the start of each work shift.

3.1.3.8 DEMONSTRATION OF THE NEGATIVE PRESSURE FILTRATION SYSTEM

The demonstration of the operation of the negative pressure system to the VA shall include, but not be limited to, the following:

- A. Plastic barriers and sheeting move lightly in toward the regulated area.
- B. Curtains of the decontamination units move in toward regulated area.
- C. There is a noticeable movement of air through the decontamination units. Use the smoke tube to demonstrate air movement from the clean room to the shower room to the equipment room to the regulated area.
- D. Use smoke tubes to demonstrate air is moving across all areas in which work is to be done. Use a differential pressure gauge to indicate a negative pressure of at least -0.02" across every barrier separating the regulated area from the rest of the building. Modify the system as necessary to meet the above requirements.

3.1.3.9 USE OF THE NEGATIVE PRESSURE FILTRATION SYSTEM DURING ABATEMENT OPERATIONS

- A. Start units before beginning any disturbance of ACM occurs. After work begins, the units shall run continuously, maintaining 4 actual air changes per hour at a negative pressure differential of -0.02" water column gauge, for the duration of the work until a final visual clearance and final air clearance has been successfully completed. No negative air units shall be shut down at any time unless authorized by the VA Contracting Officer, verbally and in writing.
- B. Pre-cleaning of ACM contaminated items shall be performed after the enclosure has been erected and negative pressure has been established in the work area. After items have been pre-cleaned and decontaminated, they may be removed from the work area for storage until the completion of abatement in the work area.

- C. Abatement work shall begin at a location farthest from the units and proceed towards them. If an electric failure occurs, the Competent Person shall stop all abatement work and immediately begin wetting all exposed asbestos materials for the duration of the power outage. Abatement work shall not resume until power is restored and all units are operating properly again.
- D. The negative air machines shall continue to run after all work is completed and until a final visual clearance and a final air clearance has been successfully completed for that regulated area.

3.1.3.10 DISMANTLING THE SYSTEM

After completion of the final visual and final air clearance has been obtained by the VPIH/CIH, the units may be shut down. The unit exterior surfaces shall have been completely decontaminated; pre-filters are not to be removed and the units inlet/outlet sealed with 2 layers of 6 mil poly immediately after shut down. No filter removal shall occur at the VA site following successful completion of site clearance. OSHA/EPA/DOT asbestos shall be attached to the units.

3.1.4 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA

3.1.4.1 GENERAL

Seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All surfaces in the regulated area must be covered to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated as a result of the work, shall immediately stop work and clean up the contamination at no additional cost to the VA. Provide firestopping and identify all fire barrier penetrations due to abatement work as specified in Section 3.1.4.8; FIRESTOPPING.

3.1.4.2 PREPARATION PRIOR TO SEALING THE REGULATED AREA

Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. All uncontaminated removable furniture, equipment and/or supplies shall be removed by the VA from the regulated area before commencing work. Any objects remaining in the regulated area shall be completely covered with 2 layers of 6-mil fire retardant poly sheeting and secured with duct tape. Lock out and tag out any HVAC/electrical systems in the regulated area.

3.1.4.3 CONTROLLING ACCESS TO THE REGULATED AREA

Access to the regulated area is allowed only through the personnel decontamination facility (PDF). All other means of access shall be eliminated and OSHA DANGER demarcation signs posted as required by OSHA. If the regulated area is adjacent to, or within view of an occupied area, provide a visual barrier of 6 mil opaque fire retardant poly to prevent building occupant observation. If the adjacent area is accessible to the public,

the barrier must be solid and capable of withstanding the negative pressure.

3.1.4.4 CRITICAL BARRIERS

Completely separate any operations in the regulated area from adjacent areas using 2 layers of 6 mil fire retardant poly and duct tape. Individually seal with 2 layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects/openings in the regulated area. Heat must be shut off any objects covered with poly.

3.1.4.5 PRIMARY BARRIERS

- A. Cover the regulated area with two layers of 6 mil fire retardant poly on the floors and two layers of 4 mil, fire retardant poly on the walls, unless otherwise directed in writing by the VA representative. Floor layers must form a right angle with the wall and turn up the wall at least 300 mm (12"). Seams must overlap at least 1800 mm (6') and must be spray glued and taped. Install sheeting so that layers can be removed independently from each other. Carpeting shall be covered with three layers of 6 mil poly. Corrugated cardboard sheets must be placed between the bottom and middle layers of poly. Mechanically support and seal with duct tape and glue all wall layers.
- B. If stairs and ramps are covered with 6 mil plastic, two layers must be used. Provide 19 mm (3/4") exterior grade plywood treads held in place with duct tape/glue on the plastic. Do not cover rungs or rails with any isolation materials.

3.1.4.6 SECONDARY BARRIERS

A loose layer of 6 mil shall be used as a drop cloth to protect the primary layers from debris generated during the abatement. This layer shall be replaced as needed during the work and at a minimum once per work day.

3.1.4.7 EXTENSION OF THE REGULATED AREA

If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. Decontamination measures must be started immediately and continue until air monitoring indicates background levels are met.

3.1.4.8 FIRESTOPPING

- A. Through penetrations caused by cables, cable trays, pipes, sleeves, conduits, etc. must be firestopped with a fire-rated firestop system providing an air tight seal.
- B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the VA Representative. The contractor shall list all areas of penetration, the type of sealant used, and whether or not the

location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the VA representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the VA Representative or Fire Marshall.

- C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the VA Representative for a sealant system determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

3.1.5 SANITARY FACILITIES

The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project.

3.1.6 PERSONAL PROTECTIVE EQUIPMENT

Provide whole body clothing, head coverings, gloves and foot coverings and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

3.1.7 PRE-CLEANING

The VA will provide water for abatement purposes. The Contractor shall connect to the existing VA system. The service to the shower(s) shall be supplied with backflow prevention.

Pre-cleaning of ACM contaminated items shall be performed after the enclosure has been erected and negative pressure has been established in the work area. All workers performing pre-cleaning activities must don appropriate personal protective equipment (PPE), as specified throughout this document and as approved in the Contractor's work plan. After items have been pre-cleaned and decontaminated, they may be removed from the work area for storage until the completion of abatement in the work area.

Pre-clean all movable objects within the regulated area using a HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location. Drapes, clothing, upholstered furniture and other fabric items should be disposed of as asbestos contaminated waste. Cleaning these asbestos contaminated items utilizing HEPA vacuum techniques and off-premises steam cleaning is very difficult and cannot guarantee decontamination. Carpeting will be disposed of prior to abatement if in the regulated area. If ACM floor tile is attached to the carpet while the Contractor is removing the carpet that section of the carpet will be disposed of as asbestos waste by the Contractor.

Pre-clean will be conducted by the Contractor of all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills

or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After pre-cleaning, enclose fixed objects with 2 layers of 6-mil poly and seal securely in place with duct tape. Objects (e.g., permanent fixtures, shelves, electronic equipment, laboratory tables, sprinklers, alarm systems, closed circuit TV equipment and computer cables) which must remain in the regulated area and that require special ventilation or enclosure requirements should be designated here along with specified means of protection. Contact the manufacturer for special protection requirements.

Pre-clean by the Contractor of all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

3.1.8 PRE-ABATEMENT ACTIVITIES

3.1.8.1 PRE-ABATEMENT MEETING

The VA representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CPIH/CIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the Contractor, the CPIH/CIH, Competent Person(s), the VA representative(s), and the VPIH/CIH. The purpose of the meeting is to discuss any aspect of the submittals needing clarification or amplification and to discuss any aspect of the project execution and the sequence of the operation. The Contractor shall be prepared to provide any supplemental information/documentation to the VA's representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the VA's representative will issue a written order to proceed to the Contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the VA written order to proceed.

3.1.8.2 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS

- A. Perform all preparatory work for the first regulated area in accordance with the approved work schedule and with this specification.
- B. Upon completion of all preparatory work, the CPIH/CIH will inspect the work and systems and will notify the VA's representative when the work is completed in accordance with this specification. The VA's representative may inspect the regulated area and the systems with the VPIH/CIH and may require that upon satisfactory inspection, the Contractor's employees perform all major aspects of the approved AHAP(s), especially worker protection, respiratory systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation. The operational systems for respiratory protection and the negative pressure system shall be demonstrated for proper performance.
- C. The CPIH/CIH shall document the pre-abatement activities described above and deliver a copy to the VA's representative.
- D. Upon satisfactory inspection of the installation of and operation of systems the VA's representative will notify the

Contractor in writing to proceed with the asbestos abatement work in accordance with this specification and all applicable regulations.

3.1.8.3 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS

Before any work begins on the construction of the regulated area, the Contractor will:

- A. Conduct a space-by-space inspection with an authorized VA representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
- B. The VA Representative, the Contractor, and the VPIH/CIH must be aware of AEQA 10-95 indicating the failure to identify asbestos in the areas listed as well as common issues when preparing specifications and contract documents. This is especially critical when demolition is planned, because AHERA surveys are non-destructive, and ACM may remain undetected. A NESHAPS (destructive) ACM inspection should be conducted on all building structures that will be demolished. Ensure the following areas are inspected on the project: lay-in ceilings concealing ACM; ACM behind walls/windows from previous renovations; inside utility chases/walls; transite piping/ductwork/sheets; behind radiators; lab fume hoods; transite lab countertops; roofing materials; below window sills; water/sewer lines; electrical conduit coverings; crawlspaces (previous abatement contamination); flooring/mastic covered by carpeting/new flooring; exterior insulated wall panels; on underground fuel tanks; and steam line trench coverings.
- C. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds, and other movable objects required to be removed from the regulated area have been cleaned and removed or properly protected from contamination.
- D. If present and required, remove and dispose of carpeting from floors in the regulated area.
- E. Inspect existing firestopping in the regulated area. Correct as needed.

3.2 REMOVAL OF ACM

3.2.1 WETTING ACM

- A. Use amended water for the wetting of ACM prior to removal. The Competent Person shall assure the wetting of ACM meets the definition of "adequately wet" in the EPA NESHAP regulation and OSHA's "wet methods" for the duration of the project. A removal encapsulant may be used instead of amended water with written approval of the VA's representative.
- B. Amended Water: Provide water to which a surfactant has been added shall be used to wet the ACM and reduce the potential for fiber release during disturbance of ACM. The mixture must be equal to or greater than the wetting provided by water amended by a surfactant consisting one ounce of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with 5 gallons (19L) of water.
- C. Removal Encapsulant: When authorized by VA, provide a penetrating encapsulant designed specifically for the removal of ACM. The material

must, when used, result in adequate wetting of the ACM and retard fiber release during removal.

3.2.2 SECONDARY BARRIER AND WALKWAYS

- A. Install as a drop cloth a 6 mil poly sheet at the beginning of each work shift where removal is to be done during that shift. Completely cover floors and any walls within 10 feet (3 meters) of the area where work is to be done. Secure the secondary barrier with duct tape to prevent it from moving or debris from getting behind it. Remove the secondary barrier at the end of the shift or as work in the area is completed. Keep residue on the secondary barrier wetted. When removing, fold inward to prevent spillage and place in a disposal bag.
- B. Install walkways using 6 mil black poly between the regulated area and the decontamination facilities (PDF and W/EDF) to protect the primary layers from contamination and damage. Install the walkways at the beginning of each shift and remove at the end of each shift.

3.2.3 WET REMOVAL OF ACM

- A. Adequately and thoroughly wet the ACM to be removed prior to removal with amended water or when authorized by VA, removal encapsulant to reduce/prevent fiber release to the air. Adequate time (at a minimum two hours) must be allowed for the amended water or removal encapsulant to saturate the ACM. Abatement personnel must not disturb dry ACM. Use a fine spray of amended water or removal encapsulant. Saturate the material sufficiently to wet to the substrate without causing excessive dripping. The material must be sprayed repeatedly/continuously during the removal process in order to maintain adequately wet conditions. Removal encapsulants must be applied in accordance with the manufacturer's written instructions. Perforate or carefully separate, using wet methods, an outer covering that is painted or jacketed in order to allow penetration and wetting of the material. Where necessary, carefully remove covering while wetting to minimize fiber release. **In no event shall dry removal occur except when authorized in writing by the VPIH/CIH and VA when a greater safety hazard (e.g., electricity) is present.**
- B. If ACM does not wet well with amended water due to composition, coating or jacketing, remove as follows:
 - 1. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
 - 2. Remove saturated ACM in small sections. Do not allow material to dry out. As material is removed, bag material, while still wet into disposal bags. Twist the bag neck tightly, bend over (gooseneck) and seal with a minimum of three tight wraps of duct tape. Clean /decontaminate the outside of the bag of any residue and move to washdown station adjacent to W/EDF.
 - 3. Fireproofing or Architectural Finish on Scratch Coat: Spray with a fine mist of amended water or removal encapsulant. Allow time for saturation to the substrate. Do not over saturate causing excess dripping. Scrape material from substrate. Remove material in manageable quantities and control falling to staging or floor. If the falling distance is over 20 feet (6M), use a drop chute to contain material through descent. Remove residue remaining on the scratch coat after scraping is done using a stiff bristle hand brush. If a removal encapsulant is used, remove residue completely before the encapsulant dries. Periodically re-wet the substrate with amended water as needed to prevent drying of the material before the residue is removed from the substrate.

4. Fireproofing or Architectural Finish on Wire Lath: Spray with a fine mist of amended water or removal encapsulant. Allow time to completely saturate the material. Do not over saturate causing excess dripping. If the surface has been painted or otherwise coated, cut small holes as needed and apply amended water or removal encapsulant from above. Cut saturated wire lath into 2' x 6' (50mm x 150mm) sections and cut hanger wires. Roll up complete with ACM, cover in burlap and hand place in disposal bag. Do not drop to floor. After removal of lath/ACM, remove any overspray on decking and structure using stiff bristle nylon brushes. Depending on hardness of overspray, scrapers may be needed for removal.
5. Pipe/Tank/Vessel/Boiler Insulation: Remove the outer layer of wrap while spraying with amended water in order to saturate the ACM. Spray ACM with a fine mist of amended water or removal encapsulant. Allow time to saturate the material to the substrate. Cut bands holding pre-formed pipe insulation sections. Slit jacketing at the seams, remove and hand place in a disposal bag. Do not allow dropping to the floor. Remove molded fitting insulation/mud in large pieces and hand place in a disposal bag. Remove any residue on pipe or fitting with a stiff bristle nylon brush. In locations where pipe fitting insulation is removed from fibrous glass or other non-asbestos insulated straight runs of pipe, remove fibrous material at least 6" from the point it contacts the ACM.

3.2.4 WET REMOVAL OF AMOSITE

- A. No Amosite asbestos is known to be present for this project.

3.2.5 REMOVAL OF ACM/DIRT FLOORS AND OTHER SPECIAL PROCEDURES

- A. No dirt floors are part of this project.

3.3 LOCKDOWN ENCAPSULATION

3.3.1 GENERAL

Lockdown encapsulation is an integral part of the ACM removal. At the conclusion of ACM removal and before removal of the primary barriers, the contractor shall encapsulate all surfaces with a bridging encapsulant.

3.3.2 DELIVERY AND STORAGE

Deliver materials to the job site in original, new and unopened containers bearing the manufacturer's name and label as well as the following information: name of material, manufacturer's stock number, date of manufacture, thinning instructions, application instructions and the MSDS for the material.

3.3.3 WORKER PROTECTION

Before beginning work with any material for which an MSDS has been submitted, provide workers with any required personal protective equipment. The required personal protective equipment shall be used whenever exposure to the material might occur. In addition to OSHA/specification requirements for respiratory protection, a paint pre-filter and an organic vapor cartridge, at a minimum, shall be used in addition to the HEPA filter when an organic solvent based encapsulant is used. The CPHI/CIH shall be responsible for provision of adequate respiratory protection. Note: Flammable and combustible encapsulants shall not be used, unless authorized in writing by the VA.

3.3.4 ENCAPSULATION OF SCRATCH COAT PLASTER OR PIPING

- A. Apply two coats of lockdown encapsulant to the scratch coat plaster or piping after all ACM has been removed. Apply in strict accordance with the manufacturer's instructions. Any deviation from the instructions must be approved by the VA's representative in writing prior to commencing the work.
- B. Apply the lockdown encapsulant with an airless sprayer at a pressure and using a nozzle orifice as recommended by the manufacturer. Apply the first coat while the scratch coat is still damp from the asbestos removal process, after passing the visual inspection. If the surface has been allowed to dry, wet wipe or HEPA vacuum prior to spraying with encapsulant. Apply a second coat over the first coat in strict conformance with the manufacturer's instructions. Color the lockdown encapsulant and contrast the color in the second coat so that visual confirmation of completeness and uniform coverage of each coat is possible. Adhere to the manufacturer's instructions for coloring. At the completion of the encapsulation, the surface must be a uniform third color produced by the mixture.

3.3.5 SEALING EXPOSED EDGES

Seal edges of ACM exposed by removal work which is inaccessible, such as a sleeve, wall penetration, etc., with two coats of bridging encapsulant. Prior to sealing, permit the exposed edges to dry completely to permit penetration of the bridging encapsulant. Apply in accordance with 3.3.4 (B).

3.4 DISPOSAL OF ACM WASTE MATERIALS

3.4.1 GENERAL

Dispose of waste ACM and debris which is packaged in accordance with these specifications, OSHA, EPA and DOT. The landfill requirements for packaging must also be met. Transport will be in compliance with 49 CFR 100-185 regulations. Disposal shall be done at an approved landfill. Disposal of non-friable ACM shall be done in accordance with applicable regulations.

3.4.2 PROCEDURES

- A. The VA must be notified at least 24 hours in advance of any waste removed from the containment.
- B. Asbestos waste shall be packaged and moved through the W/EDF into a covered transport container in accordance with procedures in this specification. Waste shall be double-bagged and wetted with amended water prior to disposal. Wetted waste can be very heavy. Bags shall not be overfilled. Bags shall be securely sealed to prevent accidental opening and/or leakage. The top shall be tightly twisted and goose necked prior to tightly sealing with at least three wraps of duct tape. Ensure that unauthorized persons do not have access to the waste material once it is outside the regulated area. All transport containers must be covered at all times when not in use. NESHAP signs must be on containers during loading and unloading. Material shall not be transported in open vehicles. If drums are used for packaging, the drums shall be labeled properly and shall not be re-used.
- C. Waste Load Out: Waste load out shall be done in accordance with the procedures in W/EDF Decontamination Procedures. Sealed waste bags shall be decontaminated on exterior surfaces by wet cleaning and/or HEPA

vacuuming before being placed in the second waste bag and sealed, which then must also be wet wiped or HEPA vacuumed.

- D. Asbestos waste with sharp edged components, i.e., nails, screws, lath, strapping, tin sheeting, jacketing, metal mesh, etc., which might tear poly bags shall be wrapped securely in burlap before packaging and, if needed, use a poly lined fiber drum as the second container, prior to disposal.

3.5 PROJECT DECONTAMINATION

3.5.1 GENERAL

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH/CIH.
- B. If the asbestos abatement work is in an area which was contaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal and cleanings of the surfaces of the regulated area after the primary barrier removal.
- C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.

3.5.2 REGULATED AREA CLEARANCE

Clearance air testing and other requirements which must be met before release of the Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

3.5.3 WORK DESCRIPTION

Decontamination includes the clearance air testing in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and W/EDF facilities, and negative pressure systems.

3.5.4 PRE-DECONTAMINATION CONDITIONS

- A. Before decontamination starts, all ACM waste from the regulated area shall be collected and removed, and the loose 6 mil layer of poly removed while being adequately wetted with amended water and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
 - 1. Primary barriers consisting of 2 layers of 6 mil poly on the floor and 4 mil poly on the walls.
 - 2. Critical barriers consisting of 2 layers of 6 mil poly which is the sole barrier between the regulated area and openings to the rest of the building or outside.
 - 4. Decontamination facilities for personnel and equipment in operating condition and the negative pressure system in operation.

3.5.5 FIRST CLEANING

Carry out a first cleaning of all surfaces of the regulated area including items of remaining poly sheeting, tools, scaffolding, ladders/staging by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping/air blowing methods. Use each surface of a wetted cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning

until there is no visible residue from abated surfaces or poly or other surfaces. Remove all filters in the air handling system and dispose of as ACM waste in accordance with these specifications. The negative pressure system shall remain in operation during this time. Additional cleaning(s) may be needed as determined by the CPIH/VPIH/CIH.

3.5.6 PRE-CLEARANCE INSPECTION AND TESTING

The CPIH/CIH and VPIH/CIH will perform a thorough and detailed visual inspection at the end of the cleaning to determine whether there is any visible residue in the regulated area. If the visual inspection is acceptable, the CPIH/CIH will perform pre-clearance sampling using aggressive clearance as detailed in 40 CFR 763 Subpart E (AHERA) Appendix A (III)(B)(7)(d). If the sampling results show values below 0.01 f/cc, then the Contractor shall notify the VA's representative of the results with a brief report from the CPIH/CIH documenting the inspection and sampling results and a statement verifying that the regulated area is ready for lockdown encapsulation. The VA reserves the right to utilize their own VPIH/CIH to perform a pre-clearance inspection and testing for verification.

3.5.7 LOCKDOWN ENCAPSULATION OF ABATED SURFACES

With the express written permission of the VA's representative, perform lockdown encapsulation of all surfaces from which asbestos was abated in accordance with the procedures in this specification. Negative pressure shall be maintained in the regulated area during the lockdown application.

3.6 FINAL VISUAL INSPECTION AND AIR CLEARANCE TESTING

3.6.1 GENERAL

Notify the VA representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed by the VPIH/CIH starting after the final cleaning.

3.6.2 FINAL VISUAL INSPECTION

Final visual inspection will include the entire regulated area, the PDF, all poly sheeting, seals over HVAC openings, doorways, windows, and any other openings. If any debris, residue, dust or any other suspect material is detected, the final cleaning shall be repeated at no cost to the VA. Dust/material samples may be collected and analyzed at no cost to the VA at the discretion of the VPIH/CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

3.6.3 FINAL AIR CLEARANCE TESTING

- A. After an acceptable final visual inspection by the VPIH/CIH and VA Representative, the VPIH/CIH will perform the final clearance testing. Air samples will be collected and analyzed in accordance with procedures for AHERA in this specification. If work is less than 260 lf/160 sf/35 cf, 5 PCM samples shall be collected for clearance and a minimum of one field blank. If work is equal to or more than 260 lf/160 sf/35 cf, AHERA TEM sampling shall be performed for clearance. TEM analysis shall be done in accordance with procedures for EPA AHERA in this specification. If the release criteria are not met, the Contractor shall repeat the final cleaning and continue decontamination procedures until clearance is

achieved. **All Additional inspection and testing costs will be borne by the Contractor.**

- B. If release criteria are met, proceed to perform the abatement closeout and to issue the certificate of completion in accordance with these specifications.

3.6.4 FINAL AIR CLEARANCE PROCEDURES

- A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured by the AHERA PCM protocol, or 70 AHERA structures per square millimeter (s/mm²) by AHERA TEM.
- B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the VPIH/CIH will secure samples and analyze them according to the following procedures:
 - 1. Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 PCM method or asbestos fibers counted using the AHERA TEM method.
 - 2. Aggressive Sampling: All final air testing samples shall be collected using aggressive sampling techniques except where soil is not encapsulated or enclosed. Samples will be collected on 0.8μ MCE filters for PCM analysis and 0.45μ Polycarbonate filters for TEM. A minimum of 1200 Liters of using calibrated pumps shall be collected for clearance samples. Before pumps are started, initiate aggressive air mixing sampling as detailed in 40 CFR 763 Subpart E (AHERA) Appendix A (III)(B)(7)(d). Air samples will be collected in areas subject to normal air circulation away from corners, obstructed locations, and locations near windows, doors, or vents. After air sampling pumps have been shut off, circulating fans shall be shut off. The negative pressure system shall continue to operate.

3.6.5 CLEARANCE SAMPLING USING PCM - LESS THAN 260LF/160SF:

- A. The VPIH/CIH will perform clearance samples as indicated by the specification.
- B. The NIOSH 7400 PCM method will be used for clearance sampling with a minimum collection volume of 1200 Liters of air. A minimum of 5 PCM clearance samples shall be collected. All samples must be equal to or less than 0.01 f/cc to clear the regulated area.
- C. Random samples shall be collected from areas of soil which have been abated to ensure that the soil has been properly decontaminated. The total number of samples to be collected from the soil areas shall be; <1000 SF of soil - 3 samples; >1000 to <5000 SF of soil - 5 samples; and >5000 SF of soil - 7 samples. The soil samples shall be collected in a statistically random manner and shall be analyzed by PLM method. The clearance level to determine the soil clean is <1% asbestos by weight as analyzed by PLM method. If this level is achieved, the soil areas shall be considered clear. If the levels are >1% asbestos, the areas shall be re-cleaned until the sample results are <1%.

3.6.6 CLEARANCE SAMPLING USING TEM - EQUAL TO OR MORE THAN 260LF/160SF: TEM

- A. Clearance requires 13 samples be collected; 5 inside the regulated area; 5 outside the regulated area; and 3 field blanks.
- B. The TEM method will be used for clearance sampling with a minimum collection volume of 1200 Liters of air. A minimum of 13 clearance

samples shall be collected. All samples must be equal to or less than 70 AHERA structures per square millimeter (s/mm²) AHERA TEM.

3.6.7 LABORATORY TESTING OF PCM CLEARANCE SAMPLES

The services of an AIHA accredited laboratory will be employed by the VA to perform analysis for the PCM air samples. The accredited laboratory shall be successfully participating in the AIHA Proficiency Analytical Testing (PAT) program. Samples will be sent daily by the VPIH/CIH so that verbal/faxed reports can be received within 24 hours. A complete record, certified by the laboratory, of all air monitoring tests and results will be furnished to the VA's representative and the Contractor.

3.6.8 LABORATORY TESTING OF TEM SAMPLES

Samples shall be sent by the VPIH/CIH to a NIST accredited laboratory for analysis by TEM. The laboratory shall be successfully participating in the NIST Airborne Asbestos Analysis (TEM) program. Verbal/faxed results from the laboratory shall be available within 24 hours after receipt of the samples. A complete record, certified by the laboratory, of all TEM results shall be furnished to the VA's representative and the Contractor.

3.6.9 LABORATORY TESTING OF BULK SAMPLES

Samples shall be sent by the VPIH/CIH or CPIH/CIH to a NIST accredited laboratory for analysis by PLM. The laboratory shall be successfully participating in the NIST Bulk Asbestos Analysis (PLM) program. Verbal/faxed results from the laboratory shall be available within 24 hours after receipt of the samples. A complete record, certified by the laboratory, of all TEM results shall be furnished to the VA's representative and the Contractor.

3.7 ABATEMENT CLOSEOUT AND CERTIFICATE OF COMPLIANCE

3.7.1 COMPLETION OF ABATEMENT WORK

After thorough decontamination, seal negative air machines with 2 layers of 6 mil poly and duct tape to form a tight seal at the intake/outlet ends before removal from the regulated area. Complete asbestos abatement work upon meeting the regulated area visual and air clearance criteria and fulfilling the following:

- A. Remove all equipment and materials from the project area.
- B. Dispose of all packaged ACM waste as required.
- C. Repair or replace all interior finishes damaged during the abatement work, as required.
- D. Fulfill other project closeout requirements as required in this specification.

3.7.2 CERTIFICATE OF COMPLETION BY CONTRACTOR

The CPIH/CIH shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

3.7.3 WORK SHIFTS

All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday -Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the VA Representative.

3.7.4 RE-INSULATION

If required as part of the contract, replace all asbestos containing insulation/fire-proofing with suitable non-asbestos material. Provide MSDS's for all replacement materials in advance of installation for VA approval. Refer to Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION.

ATTACHMENT #1

CERTIFICATE OF COMPLETION

DATE: _____ VA Project #: _____

PROJECT NAME: _____ Abatement Contractor: _____

VAMC/ADDRESS: _____

1. I certify that I have personally inspected, monitored and supervised the abatement work of (specify regulated area or Building):
which took place from / / to / /
2. That throughout the work all applicable requirements/regulations and the VA's specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and VA specifications.
6. That the conditions inside the regulated area were always maintained in a safe and healthy condition and the maximum fiber count never exceeded 0.5 f/cc, except as described below.
7. That all abatement work was done in accordance with OSHA requirements and the manufacturer's recommendations.

CPIH/CIH

Signature/Date: _____

CPIH/CIH

Print

Name: _____

Abatement

Contractor

Signature/Date: _____

Abatement

Contractor

Print

Name: _____

ATTACHMENT #2

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____

PROJECT ADDRESS: _____

ABATEMENT CONTRACTOR'S NAME: _____

WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

RESPIRATORY PROTECTION: I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

TRAINING COURSE: I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

MEDICAL EXAMINATION: I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature: _____

Printed Name: _____

Social Security Number: _____

Witness: _____

ASBESTOS ABATEMENT

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ATTACHMENT #3

AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND TRAINING/ACCREDITATION

VA PROJECT NAME AND NUMBER: _____

VA MEDICAL FACILITY: _____

ABATEMENT CONTRACTOR'S NAME AND ADDRESS: _____

1. I verify that the following individual

Name: _____ Social Security Number: _____

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address: _____

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.

3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.

4. I verify that I meet the minimum qualifications criteria of the VA specifications for a CPIH.

Signature of CPIH/CIH: _____ Date: _____

Printed Name of CPIH/CIH: _____

Signature of Contractor: _____ Date: _____

Printed Name of Contractor: _____

ATTACHMENT #4

ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE VA'S ASBESTOS SPECIFICATIONS

VA Project Location: _____

VA Project #: _____

VA Project Description: _____

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the VA related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read VA's Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the VA's Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the VA's Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the VA's Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the VA's Asbestos Specification and all ACM was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature _____ Date _____

Abatement Contractor Competent Person(s) _____ Date _____

- - END- - -

SECTION 030136

RESURFACING OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Grind down high spots in existing concrete surfaces to specified tolerances.
- B. Shot blast clean existing concrete slabs free of dirt, laitance, corrosion, or other contamination ready to receive finish flooring.
- C. Prepare substrates, level and patch existing concrete surfaces, and concrete surfaces disturbed by the Work of this Contract, including:
 - 1. Restore concrete surfaces after conclusion of demolition.
 - 2. Fill openings in suspended slabs where indicated.
 - 3. Patch concrete at slabs-on-grade where trenching has occurred.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 024100 - DEMOLITION: Removal of existing finishes.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ACI 302 - Guide for Concrete Floor and Slab Construction.
 - 2. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - 3. ASTM C 33 - Concrete Aggregates.
 - 4. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch Cube Specimens).
 - 5. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
 - 6. ASTM C 150 - Portland Cement.
 - 7. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
 - 8. ASTM C 928 - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.
 - 9. ASTM C 1708 – Self-leveling Mortars Containing Hydraulic Cements.

1.4 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties for proposed patching underlayment.
 - 2. Concrete Mix Test Reports: Submit Preliminary Design Mix Reports (ACI 301).

3. Manufacturer's instructions: Manufacturer's preparation, mixing, priming, and application instructions.
4. Shop drawings:
 - a. Patching and resurfacing scope drawings: 1/4-inch scale elevations and plans of areas covered by the Work of this Section.
 - b. Reinforcement shop drawings: Plans and details showing bar sizes, spacing, locations, depth of doweling, and quantities of reinforcing steel. Include schedules and diagrams to indicate beds, sizes and lengths of reinforcing members.

1.5 QUALIFICATIONS

- A. Materials manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 3 years experience.
- B. Mixing and application equipment as approved by the manufacturer.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of materials.
- C. Qualifications:
 1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
- D. Perform work to provide homogeneous concrete with required strength, durability, and without planes of weakness, and other structural defects, and free of air pockets, voids, projections, off sets of plane, and other defacements on exposed surfaces.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
- B. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.
- C. Storage and Handling Requirements:
 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
- D. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage, unless the Project Engineer/VA COR and the Architect specifically authorizes correction thereof and usage on project.

1.8 ENVIRONMENTAL CONDITIONS

- A. Do not place cementitious underlayment when ambient temperature is below freezing.

- B. When air temperature has fallen or is expected to fall below 40 degrees. F (4 degrees. C), heat water and aggregates before mixing to attain concrete at point of placement with temperature of 50 degrees F, 80 degrees F maximum.
- C. Do not place concrete underlayment on surfaces that are covered with standing water, snow, or ice.

PART 2 – PRODUCTS

2.1 DESCRIPTION

- A. General Description: Interior Work consisting of:
 - 1. Cement and polymer-based, trowel applied underlayment and patching mortar, for conditions:
 - a. Feather to 1/2 inch thick.
 - b. 1/2 to 3 inches thick.
 - 2. Portland cement concrete fill.

2.2 UNDERLAYMENT AND PATCHING MORTAR

- A. General: Provide products that are compatible with flooring adhesives.
- B. Concrete resurfacing and underlayment for applications over 1/2 inch thick and up to 3 inches thick: Factory blended portland cement-based product with latex admixture, having the following performance characteristics:
 - 1. Thickness Range: From 1/2 inch to 3 inch maximum thickness. Provide without added aggregate, unless recommended by manufacturer for thickness required.
 - a. Silpro: 1/2 to 3/4 inch without aggregate; use 3/8 inch pea stone for 3/4 to 3 inch thickness.
 - b. Ardex: 1/2 inch to 2 inches without aggregate; Use 3/8 pea stone for 2 to 3 inch thickness.
 - c. Bonsal (Pro Spec): 1/2 inch to 2 inches without aggregate; Use 3/8 pea stone for 2 to 3 inch thickness.
 - 2. Working Time: At least 30 minutes at 70°F.
 - 3. Compressive Strength: ASTM C109, minimum 6,000 psi after 28 days.
 - 4. Tensile Strength: ASTM C190, minimum 710 psi after 28 days.
 - 5. Flexural Strength: ASTM C348, minimum 1,200 psi after 28 days.
 - 6. Shear Bond Strength: ASTM C1042, minimum 1,540 psi after 28 days.
 - 7. Acceptable products:
 - a. Ardex: "SD-T".
 - b. Bonsal (Pro Spec): "Premium Patch 100".
 - c. Silpro: "Mascrete Topping and Structural Repair Mortar with Silpro C21".
- C. Water: Clean and potable.
- D. Primers: Unless otherwise recommended by underlayment and patching mortar manufacturer for substrate material, condition, and porosity encountered:
 - 1. Ardex: "P-51".
 - 2. Bonsal (Pro Spec): "118 Primer".
 - 3. Silpro: "C 21 All Acrylic".

2.3 CONCRETE FILL MATERIALS

- A. Minimum compressive strength of slabs on grade, and topping slabs on metal deck: 4000 psi at 28 days, unless otherwise indicated on the structural Drawings.

- B. Maximum water to cement ratio: 0.45.
- C. Concrete Materials:
 - 1. Cement conforming to ASTM C 150, Type II - Normal.
 - 2. Fine aggregates conforming to ASTM C 33; natural sand.
 - 3. Course aggregates conforming to ASTM C 33; crushed stone or gravel.
 - 4. Water: Clean and potable.
- D. Concrete bonding agent: Two component epoxy bonding agent conforming with ASTM C881, Type 2.

2.4 ACCESSORIES:

- A. Cleaning Agent: Commercial Muriatic acid.
- B. Perimeter Joint Filler: Glass fiber strips, compressible to 50 percent original thickness under load of 25 pounds per square inch with full recovery. Conforming to ASTM C612, Class 2.

2.5 SOURCE QUALITY CONTROL

- A. Manufacturer Services: Make arrangements to have Manufacturer's representative (employed by manufacturer) on-site during Work of this Section to periodically review installation procedures. A minimum of 3 site visits are required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Beginning of installation means acceptance of existing conditions.
- B. The Contractor shall inspect and sound the areas involved to determine the full extent of the work involved and shall outline the limits of work involved using a marking crayon, paint or other suitable method for review by the Project Engineer/VA COR and the Architect.

3.2 PREPARATION - GENERAL

- A. The contractor shall be responsible for grinding, filling and smoothing the Patient Bathroom floors to achieve a safe and effective slope-to-drain. Coordinate with the Architectural and Plumbing Drawings for suggested drain locations.
- B. Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using acid; rinse surface with clean water and allow to dry.
- C. Remove loose and friable materials from depressions and edges so new material bonds to sound existing construction.
- D. Flush out cracks and voids with Muriatic acid to remove laitance and dirt. Chemically neutralize by rinsing with water.
- E. Apply recommended number of coats of specified primer, at strength recommended for the substrate, by the primer manufacturer.
- F. Preparation for patching holes and depressions:
 - 1. Edges: Confirm edges are saw cut. Broken and fractured edges are not acceptable.
 - 2. Shape for slabs-on-grade: Confirm excavated shape has a greater surface area at the bottom than at the top to create a "dovetail slot" where the new concrete fill is mechanically locked.
 - 3. Shape for supported slabs: Confirm sound support and formwork at limits of placement.

- G. Where concrete patching, filling, or topping is required to "feather edge", saw cut a minimum 3/4 inch wide by 3/8 inch deep bonding channel in the concrete substrate at the point of feather edging.

3.3 RESURFACING WORK - GENERAL

- A. For spalling slab areas: Saw-cut around spalled areas to a depth of 1/2 to 3/4 inch. Angle bottom of saw cut away from spalled areas to provide keying. Chip out spalled area to saw cuts, chip area flat and level. Fill voids flush with surface with underlayment patching material.
- B. In locations where concrete is loose, chipped or missing to a depth of more than 3 inches; dowel stainless steel reinforcing into existing concrete. Drill holes in existing concrete equal to depth of repair; insert 1/4-inch diameter stainless steel dowels and pack solid with high-strength non-shrink grout.

3.4 FILLING WITH CONCRETE

- A. Install all framing, formwork and dowels required for the placing of concrete and for bonding new concrete to existing.
- B. Shortly before placing concrete, saturate the perimeter edges of the openings with water. After the free or glistening water disappears, the edges shall be given a thorough coating of neat cement slurry mixed to the consistency of thick paste and scrubbed in with a stiff bristle brush.
- C. Place mix and strike level with adjacent surfaces.
- D. Texture of finished concrete shall match that of existing abutting concrete.

3.5 APPLICATION - CONCRETE UNDERLAYMENT AND PATCHING MORTAR

- A. Surface Preparation:
 - 1. Clean substrate free of grease, wax, curing compounds and all other foreign materials. Substrates shall be solid and sound; remove all soft or crumbly materials.
 - 2. Make adhesion tests as recommended by manufacturer to ensure good bond to substrate. Acid etch polished floors. Completely strip sealed floors of existing sealer compounds.
 - 3. Prime subfloors as recommended by underlayment manufacturer, using the correct primer for porous and non-porous subfloors.
- B. Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this Section.
- C. Mix product directly from sealed package with water in proportions recommended by manufacturer. Where recommended by product manufacturer, add crushed stone aggregate and blend to dry mix prior to adding latex admixture. Avoid over watering.
- D. Apply underlayment and patching mortar while primer is still tacky. Place and trowel underlayment to the desired thickness. Do not use a power trowel. Steel trowel finish where underlayment will be a substrate for a finished flooring surface.
- E. If two or more layers of underlayment are applied, place second layer after first layer has set to walkable hardness.
- F. Where depressions occur, fill depressed area level with abutting surfaces.
- G. Install expansion joint filler at:
 - 1. Perimeter of placements.
 - 2. Around penetrations through decks.

3.6 TOLERANCES

- A. Installation Tolerances: The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Document and shall not be added to allowable tolerances indicated for other work.
 - 1. Allowable Variation from True Level: 1/8" in 10'-0" when measured with a 10 foot long straight edge in all directions.

3.7 DEFECTIVE UNDERLAYMENT

- A. Defective underlayment and patching mortar: Defined as material not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Refinish or remove and replace underlayment and patching mortar surfaces that are too rough to receive finish flooring or where physical properties do not meet specified requirements.
- C. Repair or replacement of defective underlayment will be determined by the Project Engineer/VA COR and the Architect.

END OF SECTION

SECTION 030513
CONCRETE SEALERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install concrete sealers/coatings on exposed-to-view concrete floors where shown and as scheduled on the Drawings

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. AASHTO M233 – Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.
 - 2. ASTM C156 – Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete.
 - 3. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
 - 4. ASTM C1315 - Liquid Membrane-Forming Compounds, having Special Properties for Curing and Sealing Concrete
 - 5. South Coast Air Quality Management District, Rule 1113 – Architectural Coatings (in effect on January 1, 2004).

1.4 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder.
 - a. Include certification of data indicating Volatile Organic Compound (VOC) content of all coatings.
 - 2. Samples of each level of slip resistance, aggregate, and pattern available in the specified products from the proposed manufacturer.

1.5 QUALITY ASSURANCE

- A. Use an applicator approved by the manufacturer, experienced in the approved materials, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.6 ENVIRONMENTAL CONDITIONS

- A. Work shall be done only under optimum conditions as recommended by manufacturer. Surfaces over which sealer is to be applied shall be completely dry (minimum 30 days since concrete placement) and thoroughly clean. Maximum moisture content is 8 percent.
- B. Minimum ambient and surface temperature for application shall be 45°F (7.2°C) during application, and for a minimum of 24 hours after application

1.7 PRODUCT HANDLING

- A. Deliver materials to the job site and store in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS AND PERFORMANCE

- A. Transparent non-yellowing water based acrylic sealer having a minimum of 10 percent solids, complying with South Coast Air Quality Management District, Rule 1113 – Architectural Coatings (in effect on January 1, 2004) with a maximum VOC limit of 100 g/L. Subject to compliance with the requirements specified herein, and consisting of the following performance criteria:
 - 1. Properties:
 - a. Dry Time: Approximately 2-3 hours @ 70 degrees F (21 degrees C) for recoating or light foot traffic. Wait 12 hours for heavy traffic. Dry time is temperature, humidity and wind dependent.
 - b. Moisture Vapor Transmission per ASTM D1653 A: 40 g/sq m /24 hours.
 - c. Accelerated Weathering per ASTM G53: Non-Yellowing after 4,000 hours QUV.
 - 2. Chemical Resistance:
 - a. Reagent - Stain Resistance, (one hour exposure):
 - 1) Ketchup - Excellent (no effect).
 - 2) Mustard - Excellent (no effect).
 - 3) Kool-Aid - Excellent (no effect).
 - 4) Grape Juice - Excellent (no effect).
 - 5) Coffee - Excellent (no effect).
 - 6) Chocolate Syrup - Excellent (no effect).
 - 7) Tincture of Iodine - Excellent (no effect).
 - 8) Coal Tar - Excellent (no effect).
 - b. Chemical Resistance, (one hour exposure with no evaporation):
 - 1) Used Motor Oil - Excellent (no effect).
 - 2) DI Water- Excellent (no effect).

- 3) 10% Sodium Hydroxide - Excellent (no effect).
 - 4) 10% Sodium Chloride - Excellent (no effect).
 - 5) 10% Calcium Chloride - Excellent (no effect).
 - 6) 3% Trisodium Phosphate - Excellent (no effect).
 - 7) 10% Ammonia - Excellent (no effect).
 - 8) 10% Hydrochloric Acid - Fair.
 - 9) Brake Fluid - Poor.
 - 10) 100 proof alcohol - Poor.
 - 11) Gasoline - Poor.
 - 12) Skydrol - Poor.
- B. Color: Milky white liquid that dries clear.
- C. VOC: Actual VOC = 95 g/L. Compliant with all Canadian and U.S. VOC regulations for sealers including Federal EPA, OTC, LADCO, SCAQMD and CARB.
- D. Estimating Guide: 200 - 300 sq. ft./gallon (4.9-7.4 sq m/L) per application, 2 applications recommended.
- E. Primer/bonding agent: As recommended by sealer manufacturer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Upon acceptance of completed existing surfaces, thoroughly remove all dust and debris by sweeping or vacuum cleaning.
- B. Remove laitance, curing sealers, existing adhesives and other foreign matter from concrete surfaces with necessary techniques such as shot blasting, Muriatic acid etching, surface freezing and power scarification.
- C. Surface preparation required if a curing compound has been applied to substrate surfaces.
1. Thoroughly etch concrete surfaces using well mixed solution consisting of two parts by volume water diluted with one part by volume 30 percent commercial grade hydrochloric acid at a rate of one quart per ten square feet. Apply evenly to thoroughly saturated areas and scrub into surfaces using stiff-bristled broom. Allow solution to activate undisturbed for not less than five minutes or for duration of boiling effect.
 2. Thoroughly remove etching solution by washing down surfaces with clean water; flooded at least three separate times at a rate of two gallons per ten square feet; thoroughly remove all contaminants that may be engrained or latent in surfaces.
 3. Perform a test application of a square foot in three locations, such as beneath casework. Allow to set for 72 hours, and test adhesion as recommended by the manufacturer.

3.2 APPLICATION

- A. Apply sealer with manufacturer's recommended sprayer, at recommended rate of 400 square feet per gallon. Apply second coat when sealer is dry to touch. Allow sealer to cure undisturbed for a minimum period of 6 hours. Maintain temperature at 60 degrees Fahrenheit minimum until floor surfacing has completely dry.

END OF SECTION

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SECTION 042000
UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install:
 - 1. Masonry infill of existing openings, as indicated on Drawings and as required to patch existing masonry at new construction, backed by cold-formed metal framing.
 - 2. Place, install and build-in, as work progresses, the following products and materials furnished under the indicated Sections:
 - a. Anchor bolts, wood blocking, and anchorage items furnished or set by other trades as specified in individual Sections.
 - b. Steel lintels furnished by Section 055000 - METAL FABRICATIONS.
- B. Remove existing masonry construction as required to accommodate new construction.
 - 1. Make openings in existing masonry for new doors, tooth jambs. Clean salvaged materials and reinstall.
 - 2. Tooth all existing construction to receive new, reconfigured, and patched masonry.
- C. Clean and point exposed to view surface masonry.

1.2 RELATED REQUIREMENTS

- A. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- B. Section 024100 - SELECTIVE DEMOLITION: Removal of existing masonry for salvage and reuse.
- C. Section 054000 - COLD FORMED METAL FRAMING: Masonry veneer backed up by structural light gage metal framing.
- D. Section 055000 - METAL FABRICATIONS: Steel lintels at masonry openings.
- E. Section 061000 - ROUGH CARPENTRY: Setting and temporary bracing of hollow metal frames occurring in masonry, and removal of temporary centering when frames have been built into the masonry.
- F. Section 078400 - FIRESTOPPING.
- G. Section 079200 - JOINT SEALANTS: Sealant, caulking materials, and compressible joint bead back-up, in conjunction with masonry work.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Project Engineer/VA-COR and the Architect.
 - 1. Masonry Standards Joint Committee (MSJC) [The Masonry Society (TMS)/American Concrete Institute (ACI)/American Society of Civil Engineers (ASCE)]: TMS 602/ACI 530.1/ASCE 6 - "Specifications for Masonry Structures"
 - 2. ASHRAE 90.1-2007 - Energy Standard for Buildings.
 - 3. ASTM A 82 - Steel Web, Plain, for Concrete Reinforcement.
 - 4. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
 - 5. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

6. ASTM A 497 - Welded Wire Fabric; Deformed, for Concrete Reinforcement.
 7. ASTM A 641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
 8. ASTM B 117 - Salt Spray (Fog) Testing.
 9. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
 10. ASTM C 5 - Quicklime for Structural Purposes.
 11. ASTM C 55 - Concrete Building Brick.
 12. ASTM C 144 - Aggregate for Masonry Mortar.
 13. ASTM C 150 - Portland Cement.
 14. ASTM C 207 - Hydrated Lime for Masonry Purposes.
 15. ASTM C 270 - Mortar for Unit Masonry.
 16. ASTM C 387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
 17. ASTM C 595 - Blended Hydraulic Cement.
 18. ASTM C 652 - Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
 19. ASTM C 778 – Specification for Standard Sand.
 20. ASTM C 780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 21. ASTM C 954 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
 22. ASTM C 1019 - Method of Sampling and Testing Grout.
 23. ASTM C 1072 - Method for Measurement of Masonry Flexural Bond Strength.
 24. ASTM C 1329 – Standard Specification for Mortar Cement.
 25. ASTM C 1357 – Test Methods for Evaluating Masonry Bond Strength.
 26. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
 27. ASTM D 2000 - Classification System for Rubber Products.
 28. ASTM E 119 - Fire Tests of Building Construction and Materials.
 29. ASTM E 447 - Compressive Strength of Masonry Prisms.
 30. ASTM E 488 - Strength of Anchors in Concrete and Masonry Elements.
 31. ASTM E 518 - Test Method for Flexural Bond Strength of Masonry.
 32. American National Standards Institute Building Code requirements.
 33. MCAA – Hot and Cold Weather Masonry Construction.
- B. The following reference materials are hereby made a part of this Section by reference thereto:
1. UL Fire Resistance Directory.
 2. BIA applicable Technical Notes, Research Reports and Standards, including, but not limited to the following
 - a. BIA Research Report Number 15 – Causes and Control of Efflorescence in Brickwork.
 - b. BIA Technical Notes, Number 20 - Cleaning Brick Masonry.
 3. IMI: Masonry Construction Guide Manual.

1.4 SUBMITTALS

- A. Submit the following under provisions of:
1. Literature: Manufacturer's product data sheets, specifications, performance Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES data, physical properties for each item furnished hereunder.
 2. Material certificates: Provide for the following, signed by manufacturer and Contractor certifying that each material complies with requirements.

- a. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 - b. Each material and grade indicated for reinforcing bars.
 - c. Each type and size of joint reinforcement.
 - d. Each type and size of anchors, ties, and metal accessories.
3. Material test reports from a qualified independent laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
 - a. Mortar complying with the property requirements of, and tested in accordance with ASTM C 270.
 - b. Mortar complying with the proportion requirements of ASTM C 270 and tested in accordance with ASTM C 780.
 - c. Grout mixes: Include description of type and proportions of grout ingredients.
 - d. Masonry units; report for tests performed within the previous six months.
4. Shop drawings:
 - a. Provide elevations of masonry work showing jointing patterns and coursing; indicate locations of expansion and control joints.
5. Verification samples:
 - a. Samples of each masonry accessory or anchorage item required.
 - b. Masonry units, including:
 - 1) Brick to match existing.

1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing the masonry work of this Section with minimum of 10 years documented experience. Work shall be done by skilled workmen, fully instructed as to the requirements of these Specifications and adequately supervised during the work.

1.6 QUALITY ASSURANCE

- A. Single-source responsibility for facing units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- B. Single-source responsibility for mortar materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- C. Single source responsibility for prepackaged mortar materials: Obtain masonry cement or masonry mortar from a single manufacturer. Where colored mortar is required provide batch tickets confirming all materials are from a single production run to ensure uniformity of the mix.
- D. Regulatory Requirements: Obtain certificate of compliance from authority having jurisdiction indicating approval of specified products.

1.7 DELIVERY, STORAGE AND HANDLING

- A. General: Do not deliver cement, lime, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures, and ensure that materials are in perfectly fresh condition when brought for use. Protect masonry units and manufactured products of all types from wetting by rain or snow, and keep covered when not in use.

- B. Masonry Face Units: Handle all masonry units carefully in transit and on the site, so as to keep units whole, with edges sharp, and faces clean and undamaged. Deliver all masonry units on pallets; or handle units individually, and properly stack same.
- C. Aggregates: Deliver, store and handle aggregate materials so as to prevent contamination with earth or other foreign materials.
 - 1. Store cement, lime and similar products under cover and from direct contact with earth or floor slabs.
- D. Manufactured items: Deliver manufactured products in original containers plainly marked with product identification and manufacturer's name.
 - 1. Store metal accessories and the like under cover and from direct contact with ground, and in manner to prevent rust.
- E. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or which show other evidence of damage, unless the Project Engineer/VA-COR and the Architect specifically authorizes correction thereof and usage on project.

1.8 ENVIRONMENTAL CONDITIONS

- A. Hot and cold weather requirements shall be in accordance with the recommendations of the Masonry Industry Council as contained in the document "*HOT AND COLD WEATHER MASONRY CONSTRUCTION*" published by the MCAA (Masonry Contractor's Association of America). Enforcement for these requirements shall take place under the following conditions which modify those in the referenced document.
 - 1. The recommended hot weather requirements for 100 degrees Fahrenheit (37.8 degrees Celsius) shall be enforced for this project when ambient temperatures are above 90 degrees Fahrenheit (32.2 degrees Celsius) under all wind conditions including zero velocity.
 - 2. Cold weather requirements shall be enforced when ambient temperatures fall below 40 degrees Fahrenheit (4.4 degrees Celsius).

1.9 SEQUENCING

- A. Phasing: Refer to Section 011000 - SUMMARY, and Drawings for phasing and milestone completion requirements which affect the General Contractor's Work and the Work of this Section.
- B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Subcontract, have been received and approved by the Project Engineer/VA-COR and the Architect.
- C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Project Engineer/VA-COR and the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

1.10 COORDINATION

- A. Coordinate work of this Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.
- B. Coordinate work with that of other trades which require placement and building-in of, as work progresses, anchor bolts, wood blocking, hollow metal frames, aluminum window units and anchorage items.
- C. Examine all Drawings as to requirements for the accommodation of work of other trades. Provide all required recesses, chases, slots, and cutouts. Place anchors, bolts, sleeves and

other items occurring in the masonry work. Take every precaution to minimize future cutting and patching. Closely coordinate the location and placement of such items.

PART 2 - PRODUCTS

2.1 BRICK UNITS

- A. Facing brick: ASTM C 216, Type FBS Grade SW, in size, texture and color to match existing brick.
 - 1. Provide corners with two faces to match general brick wall finish.
 - 2. Provide special shapes as indicated on Drawings and for applications where forms, size or finish cannot be produced from standard shapes.
 - 3. Provide bullnose corners to match existing construction.
- B. Building brick: ASTM C 62, Grade SW, solid units in size to match facing brick.

2.2 MORTAR

- A. Prepackaged mortar (ready mix)
 - 1. General: complying with ASTM C 1142, factory blended consisting of:
 - a. Portland cement: Comply with ASTM C 150, Type I.
 - b. Hydrated lime: Type S, complying with ASTM C 207.
 - c. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C144.
 - d. Admixtures: Prepackaged mortar mixes contain manufacturer's own proprietary admixtures, additional field admixtures are strictly prohibited.
 - e. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.
 - f. Pigments: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C-979.
 - 1) Mortar Color: As selected by Architect from manufacturer's full range of standard colors.
- B. Mortar types:
 - 1. Mortar for non-load bearing masonry above grade: ASTM C 270 type N using the property specification.
 - 2. Mortar for pointing, dirt and stain resistant type: ASTM C 270 type N using the property specification with added aluminum tristearate, calcium stearate, or ammonium stearate to a quantity of 3 percent of Portland cement weight.

2.3 GROUT MIXES

- A. Grout: Ready mixed, non-metallic high-strength controlled expansion grout of flowable consistency, conforming to ASTM C 1107 with minimum compressive strength of 8,000 pounds per square inch (55.2 MPa) at 28 days.
 - 1. Products which may be considered as equal include the following, or approved equal:
 - a. Five Star Products, Inc., Fairfield CT, product "Five Star Grout."
 - b. L&M Construction Chemicals, Omaha NE, Product: "Crystex."
 - c. BASF Construction Chemicals, Cleveland, OH., product "Masterflow 713".
 - d. Sika Corporation, Lyndhurst, NJ., product "SikaGrout 212".
 - e. ChemMasters, Madison, OH., product "Conset".

2.4 REINFORCEMENT AND ANCHORAGE MATERIALS

- A. Single wythe longitudinal reinforcement for concrete masonry unit walls and partitions: in overall width 1-5/8 inches less than the overall wall thickness, as manufactured by Dur-O-Wal, Hohmann, AA Wire, or equal.

1. Interior partitions: Ladder design, 9 gage ASTM A 641 class 1 galvanized wire.
 2. Provide preformed reinforcing sections at intersections of masonry walls and partitions, and whenever walls and partitions change direction.
- B. Veneer anchorage for metal stud curtain wall system shall be twin screw anchor plate design with "U" shaped adjustable pintle. Back plate shall be fabricated from 12 gage stainless steel sheet metal conforming to ASTM A 1008, in length required to suit insulation thickness with double leg pintle formed from 3/16 inch diameter cold drawn stainless steel wire tie conforming to ASTM A 82. All components shall be Type 304 stainless steel. Size ties to penetrate a minimum of two-thirds of the depth of veneer when measured from the back face. Anchor spacing shall be as specified in herein below.
1. Subject to compliance with the requirements specified herein, manufacturers offering concrete masonry products which may be incorporated in the work include the following, or approved equal:
 - a. Hohmann & Barnard model number HB-213 with pintle wire tie.
 - b. Heckmann model number 213 with 282 pintle wire tie.
 - c. Wire Bond Inc., model number RJ-711 with 1800 pintle wire tie
 2. Fastener Screws:
 - a. Stainless steel, equal to Dur-o-Wal (300 series) model number D/A 995.
 3. Washers: Stainless steel equal to Hohmann & Barnard model number HB-200.
- C. Concealed through-wall flashing: Flexible self-sealing, self-healing, fully adhering composite flexible flashing, .8 mm (32 mils) of self adhesive rubberized asphalt integrally bonded to .2 mm (8 mils) of cross-laminated, high-density polyethylene film to provide a min. 1 mm (40 mil) thick membrane. Membrane shall be interleaved with silicone-coated release paper until installed. Provide with manufacturer recommended surface conditioners and termination mastics.
1. Product:
 - a. Grace Construction Products, product: "Perm-A-Barrier Wall Flashing".
 - b. Carlisle Waterproofing, product: "CCW-705".
 - c. W.R. Meadows, product: "Air-Shield Thru-Wall Flashing".
 2. Minimum performance characteristics.
 - a. Water Vapor Transmission: ASTM E 96, Method B – 2.9 ng/m²sPa (0.05 perms) maximum
 - b. Water Absorption: ASTM D 570 – Max. 0.1% by weight
 - c. Puncture Resistance: ASTM E 154 – 178 N (40 lbs.)
 - d. Tear Resistance:
 - 1) Initiation – ASTM D 1004 – minimum 58 N (13.0 lbs.) M.D.
 - 2) Propagation – ASTM D 1938 – minimum 40 N (9.0 lbs.) M.D.
 - e. Lap Adhesion at -4°C (25°F): ASTM 1876 – 880 N/M (5.0 lbs./in.) of width
 - f. Low Temperature Flexibility – ASTM D 1970 – Unaffected to -43°C (-45° F)
 - g. Tensile Strength: ASTM D 412, Die C Modified – Minimum 5.5 MPa (800 psi)
 - h. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412, Die C – Min. 200%
 3. Surface primer: Latex based, water dispersed liquid for substrate as recommended by wall flashing manufacturer.

4. Termination mastic: Rubberized asphalt-based mastic with 200 grams/liter max VOC content for use in sealing flashing membrane terminations and punctures, as recommended by wall flashing manufacturer.
 - a. Product:
 - 1) Grace Construction Products, "Bituthene Mastic".
 - 2) Carlisle Waterproofing, product: "CCW-704".
 - 3) W.R. Meadows, Inc., product "Pointing Mastic".
- D. Flashing drip edge: Fabricated sheet metal flashing from unpolished 26 gage Type 302/304 stainless steel with 45 degree exposed hemmed edge designed to extend beyond the masonry face a minimum of 3/16 inch and into the masonry veneer a minimum of 3 inches under the concealed flashing.

2.5 FLASHING MATERIALS

- A. Concealed through-wall flashing: Flexible self-sealing, self-healing, fully adhering composite flexible flashing, .8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to .2 mm (8 mils) of cross-laminated, high-density polyethylene film to provide a min. 1 mm (40 mil) thick membrane. Membrane shall be interleaved with silicone-coated release paper until installed. Provide with manufacturer recommended surface conditioners and termination mastics.
 1. Product:
 - a. Grace Construction Products, product: "Perm-A-Barrier Wall Flashing".
 - b. Carlisle Waterproofing, product: "CCW-705".
 - c. W.R. Meadows, product: "Air-Shield Thru-Wall Flashing".
 2. Minimum performance characteristics.
 - a. Water Vapor Transmission: ASTM E 96, Method B – 2.9 ng/m²sPa (0.05 perms) maximum
 - b. Water Absorption: ASTM D 570 – Max. 0.1% by weight
 - c. Puncture Resistance: ASTM E 154 – 178 N (40 lbs.)
 - d. Tear Resistance:
 - 1) Initiation – ASTM D 1004 – minimum 58 N (13.0 lbs.) M.D.
 - 2) Propagation – ASTM D 1938 – minimum 40 N (9.0 lbs.) M.D.
 - e. Lap Adhesion at -4°C (25°F): ASTM 1876 – 880 N/M (5.0 lbs./in.) of width
 - f. Low Temperature Flexibility – ASTM D 1970 – Unaffected to -43°C (-45° F)
 - g. Tensile Strength: ASTM D 412, Die C Modified – Minimum 5.5 MPa (800 psi)
 - h. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412, Die C – Min. 200%
 3. Surface primer: Latex based, water dispersed liquid for substrate as recommended by wall flashing manufacturer.
 4. Termination mastic: Rubberized asphalt-based mastic with 200 grams/liter max VOC content for use in sealing flashing membrane terminations and punctures, as recommended by wall flashing manufacturer.
 - a. Product:
 - 1) Grace Construction Products, "Bituthene Mastic".

- 2) Carlisle Waterproofing, product: "CCW-704".
- 3) W.R. Meadows, Inc., product "Pointing Mastic".

2.6 ACCESSORIES

- A. Compressible filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self-expanding, continuous in length, and in width to fill the joint to a point 3/4 inch back from each face of wall or partition.
- B. Building paper (to maintain joints open for subsequent application of sealant and backer rod): N°. 15 asphalt saturated felt.
- C. Cleaning solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.7 MIXING MORTARS AND GROUT

- A. General: Mix mortar and grout in accordance with the requirements of ASTM C270, and ASTM C476 as applicable.
 1. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason.
 2. Control batch sizes to allow for use within manufacturer's recommended pot life.
 3. Retempering will be permitted only within the first two hours of initial mix or shorter times as directed by manufacturers.
 4. Discard all mortar and grout which exceeds the time limits allowed by the manufacturer .Discard mortar that has partially set.
- B. Maintain sand uniformly damp immediately before mixing process.
- C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
 1. Mortar color to closely match existing mortar.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.
- E. Pouring grout shall be fluid consistency (as fluid as possible for pouring without separation of constituent parts).

2.8 SOURCE QUALITY CONTROL

- A. Preconstruction testing: The Contractor will employ and pay a qualified independent testing laboratory to perform the following preconstruction testing indicated as well as other inspecting and testing services required by referenced unit masonry standard or indicated herein for source quality control:
 1. Mortar efflorescence: Test each mortar type which will be exposed to weather for efflorescence in accordance with the "Wick test" procedure in BIA Research Report Number 15, The Causes and Control of Efflorescence in Brickwork", Section 4.4. Mortar mixes which show efflorescence shall not be used in the Work.
 2. Mortar composition and properties will be field evaluated per ASTM C 780 for compressive strength, consistency, mortar aggregate ratio, water content, air content, and splitting tensile strength.
 3. Grout compressive strength will be tested per ASTM C 1019 for compressive strength and slump.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the work of this Section.
- B. Verify built-in and other items provided by separate Sections of the work are properly sized and located.

- C. Verify foundation walls supporting masonry is constructed within tolerances required by code
- D. Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

- A. Existing exposed steel supporting masonry:
 - 1. Remove surface corrosion to bare metal using a right-angle grinder. Seal the separation between the steel and masonry with caulk for small cracks and with dry-pack grout for larger cracks.
 - 2. Prime and paint the steel lintels. Refer to Exterior Painting Schedule.
- B. Existing exposed steel supporting masonry to be replaced:
 - 1. Remove the outer wythe of brick up to the nearest header course. Replace the corroded lintels with galvanized steel lintels of the same size. Install appropriate flashing and waterproofing systems. Reconstruct the outer wythe of brick.
 - 2. Prime and paint the steel lintels. Refer to Exterior Painting Schedule.
- C. Direct and coordinate placement of metal anchors supplied to other Sections.
- D. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- E. Protect surfaces of windows, frames, as well as similar finish products with painted and integral finishes, from mortar droppings and stains.

3.3 INSTALLATION - GENERAL

- A. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase recess and jamb of openings and between adjacent chases and recesses.
- B. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- C. Establish lines, levels and coursing indicated. Protect from displacement.
- D. Match existing masonry: Match coursing, bonding, color, and texture of new masonry with existing masonry.
- E. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- F. Isolate masonry partitions from vertical structural framing and where indicated on the Drawings. Maintain joints free from mortar, ready to receive sealant and joint bead back-up.
- G. Provide compressible filler at tops of interior masonry partitions abutting structural above.

3.4 COURSING, BONDS AND JOINTS

- A. Coursing, joints and bond pattern when abutting existing construction shall match existing, use running bond at all other locations.
- B. Joints:
 - 1. Exposed to view masonry: except as specified below, fill all joints with mortar, strike off flush, and when mortar is thumb print hard tool joints with a non-staining tool. Joints shall be free of drying crack.
 - a. Horizontal joints
 - 1) Interior joints (all): Tool joints flush.
 - b. Vertical joints (all): Tool joints flush.

2. Concealed from view masonry, including masonry which will be concealed by flashings and similar materials: Fill joints with mortar and strike joints flush. Concave tool exterior joints below grade.

3.5 CONTROL JOINTS

- A. Locate control joints where shown on Drawings, at corners adjacent to openings in masonry, changes in wall height and intersections with structural walls as approved by the Project Engineer/VA-COR and the Architect.
 1. Do not continue horizontal joint reinforcement through control joints.
- B. Form vertical control joints with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
 1. Size control joints in accordance with the requirements of Section 079200 - JOINT SEALANTS.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturers recommendation.

3.6 LAYING MASONRY - GENERAL

- A. Build the masonry walls and partitions in the various combinations and thickness to match existing construction and as indicated on the Drawings.
- B. Erect all masonry work in compliance with the line and level tolerances specified herein. Hold uniform joint sizes to match existing masonry. Correct, or replace, as directed by the Architect, non-conforming masonry work at no additional cost to the Contract.
- C. Lay out coursing before setting to minimize cutting closures or jumping bond, Avoid the use of less-than-half-size units.
- D. Laying masonry units:
 1. Lay solid masonry units in full bed of mortar, with full head joints; uniformly joint with other work.
 2. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
 3. Interlock intersections and external corners.
 4. Cut all exposed masonry with a motor-driven carborundum blade saw to ensure straight and clean, unchipped edges.
 - a. Lay no unit having chipped edges or face defects where such unit would be exposed to view. Remove any such unit, if installed, and replace with an undamaged unit, and bear all costs therefore.
 5. Do not spread any more mortar than can be covered before surface of mortar has begun to dry.
 6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove entirely, clean off mortar, and reset with fresh mortar.
 7. Except for cleaning down and repointing, finish all masonry as the walls and partitions are carried up.
- E. Build-in reinforcement and anchorage items as the work progresses, grouting for secure anchorage.
- F. Provide complete protection against breakage and weather damage to all masonry work, including substantial wood boxing around door jambs, over the tops of walls and wherever necessary to protect work at all stages of completion. Protect masonry when not roofed over, at all times when masons are not working on the walls. Apply tarpaulins or waterproof paper, properly weighted, or nailed, to assure their remaining in place to protect masonry from all possible hazards.

- G. Point and fill all holes and cracks in new mortar joints with additional fresh mortar; do not merely spread adjacent mortar over defect or use dead mortar droppings. Do all pointing while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar, and tool or rake joints as specified herein.
- H. Protect all masonry from rain prior to, and during the installation thereof. If the temperature is in excess of 80 degrees Fahrenheit at time of installation, lightly moisten contact surfaces of masonry units by brushing with water.
- I. Cold/Hot Weather Procedures: No masonry work shall be laid in temperatures below 40 degrees Fahrenheit without the submittal to and review by the Project Engineer/VA-COR and the Architect of cold weather procedures.
 - 1. In ambient temperatures below 40 degrees Fahrenheit make provisions to adequately protect the masonry materials and the finished work from frost, including heating of masonry materials.
 - a. Heat enclosed work areas as necessary to adequately protect the work of this Section. Such additional temporary heat and protection measures required is in addition to the protection furnished by General Contractor under provisions of Section 010000 – GENERAL REQUIREMENTS, which occurs from November 1st to March 31st.
 - 2. No frozen work shall be built upon nor shall anti-freeze admixtures be permitted in the mortar mix.
 - 3. Any completed work found to be affected by frost shall be taken down and rebuilt at no additional expense to the Government.

3.7 FLASHING

- A. Provide and build-in through-wall flashings at lintels, heads and sills of openings and infill openings. Additionally provide flashing where indicated on the Drawings, as specified herein and all conditions which may be considered similar to those indicated on the Drawings.
 - 1. Apply surface conditioner over dirty and dusty surfaces, over concrete block, over surfaces having irregular or rough texture, and those conditions where recommended by wall flashing manufacturer.
 - 2. Extend flashing to back up wall, turn up a minimum of 8 inches and terminate as follows:
 - a. Metal stud and gypsum sheathing - terminate behind sheathing, securing top edge of flashing to face of stud with 1/2" type S-12 low profile head screws.
 - 3. Apply flashings to substrates, when properly positioned, remove release paper and adhere to substrate, press firmly into place.
 - 4. Overlap adjacent pieces 2 inches (50 mm) and roll all seams with a steel hand roller, or blunt object.
 - 5. At heads, sills and other horizontal terminations of flashing, turn-up ends a minimum of 2 inches (50 mm), cut and make careful folds to form a pan and seal with flashing mastic.
 - 6. Install flashing dripedge with hemmed 45 degree edge extending beyond face of masonry. Prior to removing release paper, trim bottom edge of through-wall flashing back 1/2 inch to 3/4 inch from outside face of masonry. Flashing shall not be permanently exposed to sunlight. Adhere to top surface of dripedge.
 - 7. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.

8. Seal all punctures with an elastic cement mastic recommended by flashing manufacturer.
- B. Build-in counter flashing as indicated in the Drawings and as specified herein.
 1. Clean surface of masonry smooth and free from projections that might puncture or otherwise damage flashing membrane.
 2. Carefully fit flashing around projections, neatly fold and bed in mastic or mortar so as to direct moisture to the outside. Form flashing to required profiles without wrinkles or buckles and install in such a manner as to direct moisture to the outside.

3.8 BUILDING-IN WORK

- A. As work progresses install built-in metal door, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items to be built-in the work.
- B. Install built-in items plumb and level; take care not to distort alignment of such items.
- C. Bed anchors of metal frames in adjacent mortar joints. Fill frame voids solid with grout except where joints are indicated to receive caulking and sealant. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
 1. Rake joints to receive sealant to a uniform depth of 3/4 inch for installation of caulking and sealant.
- D. Do not build-in organic materials subject to deterioration.

3.9 BUILDING-IN LINTELS

- A. Install loose lintels over all openings, whether or not scheduled.
- B. Where not detailed otherwise, maintain the following minimum bearings for lintels on each side of opening:
 1. 3 inches bearing on steel.
 2. 8 inches bearing on masonry.
- C. Install loose lintels over all openings, whether or not scheduled. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 1. Openings up to 42 inches wide: Place two N^o4 reinforcing bars 1 inch from bottom web.
 2. Openings from 43 inches wide up to 78 inches wide: Place two N^o5 reinforcing bars 1 inch from bottom web.
 3. Openings over 79 inches wide: Reinforce as detailed in Drawings, consult the Project Engineer/VA-COR and the Architect if not detailed.
 4. Do not splice reinforcing bars.
 5. Support and secure reinforcing bars from displacement. Maintain position with 1/2 inch of dimensioned position.
 6. Place and consolidate grout fill without displacing reinforcing.
 7. Allow masonry lintels to attain specified strength before removing temporary supports.

3.10 REINFORCEMENT AND ANCHORAGE

- A. Place masonry joint reinforcement in first and second horizontal joint above and below openings. Extend 16 inches each side of opening.
- B. Place joint reinforcement in first and second joint below top of walls.
- C. Lap joint reinforcement ends minimum 6 inches .
- D. Install preformed units (or optional field-formed units) at corners, reveals, and offsets in exterior masonry, at intersections of all masonry walls and partitions, and wherever walls and partitions change directions.

- E. Do not bridge control and expansion joints in the wall system.
- F. Anchor ends of walls to structure with anchors spaced 24 inches, except as otherwise shown.
 - 1. Horizontal reinforcing at 24" o/c and vertical reinforcing at 16" o/c.
- G. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.11 FIELD QUALITY CONTROL

- A. Field inspection will be performed under the provisions of Division 1 – GENERAL REQUIREMENTS (Section 014529 - TESTING LABORATORY SERVICES).
- B. Testing frequency: Tests and evaluations listed in this article shall be performed during construction for each section of wall area infill.
- C. Evaluation of Quality Control tests: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from source quality control tests comply with minimum requirements indicated.

3.12 PROTECTION OF WORK

- A. Loading: Do not apply loading for at least 12 hours after building masonry walls and partitions. Do not apply concentrated loads for at least 3 days after building masonry columns, walls or partitions.
- B. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to un-constructed wythe and hold cover in place.
- C. Stain prevention: Provide protection and prevent grout, mortar, and soil from staining the face of exposed masonry and building finishes. Protect base of walls from rain-splashed mud and mortar splatter.
 - 1. Remove immediately all grout, mortar, and soil that come in contact with such masonry.

3.13 TOLERANCES

- A. Maximum variation from true surface level for exposed to view walls and partitions:
 - 1. Unit-to-unit tolerance: 1/16 inch.
 - 2. Surface, overall tolerance: 1/4 inch in 10 feet in any direction and 1/2 inch in 20 feet or more.
 - a. Where both faces of single wythe wall or partition will be exposed to view, request and obtain decision from the Project Engineer/VA-COR and the Architect as to which face will be required to conform to the specified surface level tolerance.
- B. Maximum variation from plumb: For lines and surfaces of walls do not exceed 1/4 inch in 10 feet, 3/8 inch in any story up to 20 feet maximum. At expansion joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet.
- C. Maximum variation from level: For lines of sills, tops of walls and other conspicuous lines, do not exceed 1/8 inch in 3 feet, or 1/4 inch in 10 feet and 1/2 inch in 30 feet.
- D. Maximum variation of linear building line: For position shown in plan relating to columns, walls and partitions, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet.

- E. Maximum variation in specified height: 1/2 inch per story.
- F. Maximum variation of joint thickness: 1/8 inch in 3 feet.

3.14 CLEANING

- A. Progress Cleaning:
 - 1. General: Maintain site free of waste materials, debris, and rubbish resulting from the work of this Section.
 - a. Remove from work areas surplus and waste materials resulting from the work of this Section. Remove on a continual on-going basis through-out the term of construction.
 - 2. During the progress of the work, keep the exposed surfaces of masonry clean at all times, and protected against damage. As each segment of the masonry is erected, dry-brush the surfaces free from mortar spots and droppings.
- B. Prior to performing the final cleaning work, examine all face joints in exposed masonry to locate cracks, holes or other defects in the mortar; and point up all such defects and fill with mortar as specified herein. Where necessary, in the opinion of the Project Engineer/VA-COR and the Architect, cut out defective joints in masonry and replace with new materials, exercising extreme care to match original work.
- C. At a time approved by the Project Engineer/VA-COR and the Architect, perform final cleaning operations on all masonry as specified herein and as recommended by applicable BIA Technical Notes.
 - 1. Perform the final cleaning work only when the ambient temperature is above 40 degrees Fahrenheit, and rising.
 - 2. Do not use wire brushes or other abrasive tools in the cleaning operations.
 - 3. Perform final cleaning operations from the top down. If masonry cleaning work is performed after windows, doors, frames, and other work has been installed, provide complete protection for said items; be fully responsible for any damage due to the cleaning operations.
 - 4. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 5. Perform final cleaning of masonry units by scrubbing with stiff bristle fiber brushes and clear water, changing the water frequently.
- D. Provide suitable protective coverings for all other surfaces and materials during the final cleaning procedures, and bear full responsibility for correcting any damage caused by these operations, to the satisfaction of the Project Engineer/VA-COR and the Architect.

END OF SECTION

SECTION 054000
COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall framing, as indicated on the Drawings.
 - 2. Exterior non-load-bearing infill wall framing.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 042000 - UNIT MASONRY: Brick masonry veneer construction for exterior walls backed by structural light gage metal framing.
- E. Section 061000 - ROUGH CARPENTRY: Wood blocking and curbing.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING: Framing for interior partitions 12 feet and less in height.

1.3 SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.
- B. Provide calculations for loadings and stresses for all framing, as it relates to the sections, and as indicated on the Drawings, including shop drawing / engineered drawing requirement for the level 7 Electrical and IT Room ceilings and Total Care Bathrooms, under the Professional Structural Engineer's seal. Show how design load requirements and other performance requirements have been satisfied.
 - 1. The Professional Engineer shall be experienced in design of this Work and licensed in State of Vermont
- C. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- D. Informational submittals:

1. Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 - QUALITY REQUIREMENTS and as may be supplemented in "Quality Assurance" Article.
- E. Qualification Data: For testing agency.
 1. Product test and research reports: Provide all applicable reports.
 2. Manufacturers: Company specializing in manufacturing the products specified.
 - a. Professional Engineer Qualifications: Design structural elements under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Vermont.
 - b. Installer/Applicator: Company with a minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
 - c. Welders Certificates: Utilize only qualified welders employed on the Work. Submit verification that Welder's are AWS D1.1 and D1.4 qualified within the previous 12 months.

1.4 QUALITY ASSURANCE

- A. Product Tests: Mill certificates or data from a qualified independent testing agency.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- C. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. Dietrich Industries, Inc., Pittsburgh, PA.
 2. Gold Bond Building Products/National Gypsum Company, Charlotte, NC.
 3. Marino Industries Corp., South Plainfield, NJ.

2.2 MATERIALS

- A. Recycled content of Steel: Use maximum available percentage of recycled steel. Steel framing products incorporated into the work shall contain not less than 30 percent of recycled steel.
- B. Steel Sheet: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 1. Framing:
 - a. Grade: 33 (230) for minimum uncoated steel thickness of 0.0428 inch (1.09 mm) and less; 50 (340), Class 1 or 2 for minimum uncoated steel thickness of 0.0538 inch (1.37 mm) and greater.
 - 1) Coating: G90 (Z275).

- C. Steel Sheet: ASTM A 570/A 570M, hot rolled or ASTM A 611, cold rolled; cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free, rust-inhibitive primer complying with performance requirements in FS TT-P-664, of grade as follows:
 - 1. Connectors Grade: 33 (230) or C, Type 1 or 2, for minimum uncoated steel thickness of 0.0428 inch (1.09 mm) and less; 40 (275) or D, Type 1 or 2, for minimum uncoated steel thickness of 0.0538 inch (1.37 mm) and greater.
 - a. Coating: G90 (Z275).

2.3 FRAMING MEMBERS

- A. Studs: Manufacturer's standard C-shaped steel studs complying with ASTM C 955. Formed of ASTM A-653/653M steel, G90 (Z275) galvanized, channel shaped with lipped flanges, punched web, size as shown on Drawings, thickness and grade as required by structural design calculations.
- B. Tracks: Manufacturer's standard U-shaped steel track complying with ASTM C 955. Formed of ASTM A-653/653M steel, same designation, coating, and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as required by structural design calculations.
- C. Vertical Deflection Clips (non-load-bearing framing): Manufacturer's standard bypass and head clips as required, capable of isolating wall stud from upward and downward vertical displacement of primary structure using mechanical fasteners.
 - 1. VertiClip® including step bushings. Mechanical attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations, by The Steel Network, Inc. (TSN) or approved equal.
 - a. TSN product "VertiClip SL": Exterior head of wall.
 - b. TSN product "VertiTrack VTX": Exterior head of wall pre-assembled with track.
 - c. TSN product "VertiClip SLB": By-pass structural pour stop at floor slab.
 - d. TSN product "VertiClip SLT": By-pass floor slab or structure.
 - e. TSN product "VertiClip SLS": By-pass structure.

2.4 ANCHORS AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Power-Actuated Fastening Systems : Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- D. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

COLD-FORMED METAL FRAMING

2.5 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: Liquid zinc coating containing 95 percent metallic zinc, by weight in the dried film; recognized under the Component Program of Underwriter's Laboratories, Inc. as an equivalent to hot-dip galvanizing; conforming to FS DOD-P-21035A for repair of hot-dip galvanizing and meeting the requirements. Acceptable products include:
 - 1. ZRC Worldwide Inc., Marshfield MA, product: "ZRC Cold Galvanizing Compound."
 - 2. Duncan Galvanizing, Everett MA, product: "ZIRP".
 - 3. American Polywater Corp., Stillwater, MN, "CG Zinc-Rich Cold Galvanizing".

2.6 PRE-ERECTION FABRICATION

- A. Framing components may be pre-assembled into panels prior to erecting. Fabricate panels square with framing members fitted, reinforced, and braced to suit design requirements; attach components in a manner to prevent racking.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Install framing members in one-piece lengths.
- E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Include details on Drawings showing expansion-joint construction and locations.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

COLD-FORMED METAL FRAMING

- H. Install insulation, specified in Section 072100 - Thermal Insulation, in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
 - 1. Anchor Spacing: 24 inches (610 mm) unless otherwise shown on the Drawings.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
 - 1. Stud Spacing: 16 inches o.c., unless otherwise shown on the Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
 - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
 - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

COLD-FORMED METAL FRAMING

- I. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm) unless otherwise shown on the Drawings. Fasten at each stud intersection.
 - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
- J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Construction Manager and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Construction Manager's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

**SECTION 055000
METAL FABRICATIONS**

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of miscellaneous metals, and ornamental iron where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.
- B. Furnish and install:
 - 1. Unistrut system.
 - 2. Supplemental soffit support framing.
 - 3. Support framing at new window and door openings through existing masonry assemblies.
 - 4. Above ceiling supports for patient lifts and similar products furnished under other sections.
 - 5. Hot dipped galvanized loose lintels at exterior wall renovation, as necessary
- C. Furnish the following items for installation under related sections:
 - 1. Anchors, bolts, inserts, and sleeves, required to attach miscellaneous metals for embedment into concrete under Section 033000 - CAST-IN-PLACE CONCRETE.
- D. Perform all drilling and cutting in miscellaneous metal items required for the attachment of other items.
- E. Remove hardware and fittings from existing metal framing, and patch with metal paste filler.
- F. Perform all shop-painting for all surfaces of exposed to view galvanized and non-galvanized metals, and post-erection touch-up of shop prime coat, using the same material as shop-prime coating.
- G. Perform application of liquid zinc touch-up to all welds of galvanized steel items furnished hereunder.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 061000 - ROUGH CARPENTRY: Wood blocking.
- D. Section 064000 - ARCHITECTURAL WOODWORK: Countertops requiring fabricated steel supports.
- E. Section 092216 - NON-STRUCTURAL METAL FRAMING: Non-loadbearing metal framing systems for interior partitions and ceilings.
- F. Section 099100 - PAINTING: Applied finish coatings other than those specified herein.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Project Engineer/VA COR and the Architect.
 - 1. ASTM A 36 - Structural Steel.

2. ASTM A 53 – Pipe, Steel, Black and Hot-Dipped, Zinc-coated, Welded and Seamless Steel Pipe.
3. ASTM A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
4. ASTM A 123 - Zinc Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
5. ASTM A 153 - Zinc-Coating on Iron and Steel Hardware.
6. ASTM A 167 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
7. ASTM A 276 –Stainless and Heat- Resisting Steel Bars and Shapes.
8. ASTM A 283 - Carbon Steel Plates, Shapes, and Bars.
9. ASTM A 307 - Carbon Steel Externally Threaded Standard Fasteners.
10. ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
11. ASTM A312/A312M - Seamless and Welded Austenitic Stainless Steel Pipes
12. ASTM A 361 - Zinc Coated (Galvanized) Iron or Steel Roofing sheets.
13. ASTM A 385 – Providing High Quality Zinc Coatings.
14. ASTM A 386 - Zinc Coating on Assembled Steel Products.
15. ASTM A 446 - Zinc Coated (Galvanized) Steel Sheets of Structural Quality, Coils and Cut Lengths.
16. ASTM A 480 – General requirements Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
17. ASTM A 501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
18. ASTM A 525 - Specification for Sheet Steel, Zinc Coated (Galvanized).
19. ASTM A 666 - Stainless and Heat Resisting Chromium-Nickel Steel Sheet Strip, Plate and Flat Bar for Structural and Architectural Applications.
20. ASTM A 780 – Repair of Hot-Dip Galvanizing.
21. ASTM A1011/A1011M - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
22. ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus.
23. ASTM A 575 Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
24. ASTM A576 Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
25. ASTM F 593 - Stainless Steel Bolts, Hex Cap Screws.
26. ASTM F 594 - Stainless Steel Nuts.
27. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
28. AGAI - Inspection Manual for Hot-Dipped Galvanized Products.
29. AISC - Code of Standard Practice for Steel Buildings and Bridges.
30. AISC - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
31. AISI. referenced standards.
32. AWS - Standard Code for Arc and Gas Welding in Building Construction.
33. IPA (Industrial Perforators Association) - Voluntary Standard Tolerances.
34. MIL-P-21035B - Paint High Zinc Dust Content, Galvanizing Repair (Metric) (superseding DOD-P-21035A)
35. NAAMM, applicable publications.

36. SSPC referenced standards.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work of this Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.
 - 2. Be responsible for establishing locations and levels for all work of this Section, except such parts as may be delivered to others and set by them. In such cases assist them in properly locating said parts.
- B. Pre-Installation Meetings: At least two weeks prior to commencing fabrication work of this Section, conduct a pre-installation conference at the Project site. Coordinate time of meeting to occur prior to installation of work under the related sections named below.
 - 1. Required attendees: Project Engineer/VA COR, Architect, Contractor, Installer's Project Superintendent, and representatives of other related trades as directed by the Project Engineer/VA COR, Architect or Contractor.
 - 2. Agenda:
 - a. Scheduling of metal fabrications operations.
 - b. Review of staging and material storage locations.
 - c. Coordination of work by other trades.
 - d. Installation procedures for ancillary equipment.
 - e. Protection of completed Work.
- C. Sequencing:
 - 1. Field Measurements:
 - a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
 - b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
- D. Scheduling: Coordinate the work of this Section with the respective trades responsible for installing inserts and anchorages furnished by this Section; make arrangements for delivery, receipt and installation of inserts and anchorages to prevent delay of the Work.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 - 1. Product Data: Manufacturer's complete product data and specifications for all prefabricated items, shop primer paints, liquid zinc coating, and hydraulic cements, to be furnished hereunder.
 - a. For epoxy anchoring systems: Furnish ICC-ES Code approvals and performance data that includes recommended loading for each application.
 - b. Include large scale details of items of all metal fabrications to be furnished hereunder, showing proposed methods of anchorage to surrounding structure and conditions.
 - c. Include large scale details of metal fabrications supporting work of other trades.
 - 2. Shop Drawings, bearing registration stamp of a Professional Structural Engineer registered in State of Vermont.
 - a. General requirements:
 - 1) Include large scale details of items of all metal fabrications to be furnished hereunder, showing proposed methods of anchorage to surrounding structure and conditions.

- 2) Indicate on the shop drawings all erection marks for various places of miscellaneous metals, and ensure that the actual field pieces bear corresponding marks.
 - 3) Indicate shop built components, and field-built components.
 - 4) Indicate and detail all field installation connections.
 - 5) Indicate weld types and length.
 - 6) Indicate blocking locations.
 - 7) Indicate seam locations in high-strength steel members
- b. Include large scale details of metal fabrications supporting work of other trades.
3. Selection Samples: Sample card indicating Manufacturer's full range of colors of shop applied finishes available for selection by the Project Engineer/VA COR and the Architect.
4. Verification Samples:
 - a. Factory/shop finishes: 3 inch by 6 inch samples of factory-applied coatings and colors proposed for use for approval prior to coating application.
 - b. Provide minimum 24 by 24 inch (or equivalent for shapes) of fabricated and finished ornamental metal components, demonstrating the quality of fabrication work, and finish.
5. Certificates:
 - a. Certificate of Compliance from Galvanizer: Submit notarized Certificate of Compliance with application for payment for galvanizing, signed by galvanizer, indicating compliance with requirements of specifications. Include scope of services provided, and quantity and itemized description of items processed.
 - b. Welders certificates as specified under Article entitled "QUALITY ASSURANCE".
6. Delegated Design Submittals: Provide calculations for loading and stresses for the work of this section, bearing the Professional Structural Engineer's seal. Show how design load requirements and other performance requirements as required by the Building Code have been satisfied.
 - a. Work scope requiring loading and stress calculations includes, but is not limited to the following:
 - 1) Metal fabrications supporting work of other trades.
 - 2) Overhead supports.
 - 3) Lintels at exterior renovated areas.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Galvanizer's tagging: The galvanizer shall mark all lots of material with a clearly visible stamp or tag indicating the name of the galvanizer, the weight of the zinc coating, and the applicable ASTM Specification Numbers.
- C. Qualifications:
 1. Fabricator/Installer: Minimum of 5 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
 2. Welders: Utilize only qualified welders employed on the Work. Submit verification that Welder's are AWS D1.1 and D1.4 qualified within the previous 12 months.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:

1. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Subcontract, have been received and approved by the Project Engineer/VA COR and the Architect.
- B. Storage and Handling Requirements:
 1. Handle and store materials under cover in a manner to prevent defacement, deformation, or other damage to the materials and to shop finishes, and to prevent the accumulation of foreign matter on the metal work. All such work shall be repaired and cleaned prior to erection.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: All materials shall be new stock, free from defects impairing strength, durability or appearance, and of best commercial quality for each intended purpose. Unless specifically called for otherwise, work shall be fabricated from the following:
 1. Steel shapes, plates and bars: ASTM Designation A 36.
 2. Steel pipe: ASTM A53, grade A, seamless pipe, black finish unless otherwise noted.
 3. Stainless steel pipe: ASTM A312/A312M, Grade TP304.
 4. Structural steel tubing, square and rectangular shapes: ASTM A500, Grade B.
 5. Stainless steel tubing: ASTM A554, Grade MT304.
 6. Steel tubular shapes: ASTM A 501.
 7. Steel plates to be bent or cold-formed: ASTM A283, grade C.
 8. Steel bars and bar-size shapes: ASTM A36.
 9. Cold-finished steel bars: ASTM A108.
 10. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
 11. Stainless steel plate and sheet: ASTM A666, Type 304.
 12. Gray iron castings: ASTM A48, class 30.
 13. Malleable iron castings: ASTM A47,
 14. Stainless steel castings: ASTM A743, Grade CF 8 or CF 20.
- B. Recycled content of Ferrous Metals: Use maximum available percentage of recycled steel. Steel incorporated into the work shall contain not less than 25 percent of recycled steel.
- C. Steel materials: to be hot dip-galvanized: Provide steel chemically suitable for metal coatings complying with the following requirements: Carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
- D. Metal surfaces, general: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- E. Wire Rope: Stainless steel aircraft cable 3/8 inch diameter, Type 302/304 alloy, 1x7 construction conforming to Mil-W-87161.

2.2 UNIVERSAL GRID SYSTEM

- A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Unistrut Corporation, Itasca IL.
 1. Acceptable Manufacturers and products: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following.

- a. Unistrut Corporation, Itasca IL., product "Unistrut"
 - b. Cooper US, Inc., Houston TX., product "Cooper B-Line".
 - c. Gleason Partners, LLC., Grand Rapids, MI., product "Strut Channel Systems".
 - d. Thomas & Betts Corporation, Memphis TN, product "Kindorf Superstrut".
2. There are no other manufacturers of this product type available in the United States, fabricators may choose to fabricate grid system components using structural steel shapes, with submittal and approval of complete engineering Drawings and calculations as a substitution.
 3. Finish:
 - a. Electrolytically zinc coated per ASTM B 633 Type III SC 1.
 - B. All channel members shall be fabricated from structural grade steel confirming to the following ASTM specifications:
 1. ASTM A 653 Grade A
 - C. All fittings shall be fabricated from steel conforming to one of the following ASTM specifications:
 1. ASTM A 36, A 575, or A 576.
 - D. All materials shall be stamped and identifiable by manufacturer and part number (where appropriate). Materials that appear damaged, distressed, unidentifiable or rusted shall not be used and will not be accepted.

2.3 SUPPORT FRAMING AT NEW WINDOW AND DOOR OPENINGS

- A. Support framing at new window and door openings through existing masonry assemblies, unless otherwise indicated on the Architectural and Structural Drawings:
 1. Steel angles, lintels and framing complying with ASTM Designation A 36; in accordance with the following schedules:
 - a. Provide one angle for every nominal 4 inch width in 4, 8 and 12 inch width walls/partitions per the following table:

Maximum Opening	Interior Opening	Exterior Opening
Up to 4'-0"	4 x 3-1/2 x 5/16"	4 x 3-1/2 x 3/8"
4'-1" to 6'-0"	5 x 3-1/2 x 5/16"	5 x 3-1/2 x 3/8"
6'-1" to 8'-0"	6 x 3-1/2 x 5/16"	6 x 3-1/2 x 3/8"
 - b. Provide structural tees for 6 inch width walls/partitions per the following table:

Maximum Opening	Structural Tee
Up to 4'-0"	WT4
Up to 6'-0"	WT4 X 9
Up to 8'-0"	WT8 X 13
 - c. Provide lintels 12 inches longer than masonry openings. Where lintel abuts column, provide structural clip connection.
 - d. Lintels occurring in exterior walls shall be galvanized in conformance with the requirements of ASTM A 143, and ASTM A 123.

2.4 FASTENERS

- A. General: Provide all fasteners and attachments as required for work specified herein and as indicated on the Drawings.
 1. Provide all fasteners and attachments of the same material and finish as the metal to which it is applied unless otherwise noted.
 - a. Provide Type 304 stainless-steel fasteners for exterior use.
 - b. Provide Type 304 stainless-steel fasteners for fastening aluminum.
- B. Steel Bolts, Nuts and Washers: ASTM A307, galvanized to ASTM A153 for galvanized components.

- C. Fasteners at blind structural tubes, or other blind conditions: Lindaptor North America, Ann Arbor MI, product: "Type HB Hollo-Bolt", or approved equal.
 - 1. Acceptable Manufacturers, or approved equal.
 - a. Lindaptor North America, Ann Arbor, MI.
 - b. Simplified Building Components, Rochester, NY.
 - c. Avdel USA LLC., Stanfield, NC.
 - 2. Head type: Hexagonal.
 - 3. Material: Hot-dipped galvanized steel.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel type 304 bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- E. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- F. Eyebolts: ASTM A 489.
- G. Machine Screws: ASME B18.6.3.
- H. Lag Bolts: ASME B18.2.1.
- I. Plain Washers: Round, ASME B18.22.1.
- J. Lock Washers: Helical, spring type, ASME B18.21.1

2.5 ACCESSORIES

- A. Adhesive for attaching anchors and for direct pinning: high-modulus, high strength, moisture tolerant, epoxy adhesive. two-component 100 percent solids, epoxy resin complying with ASTM C 881.
 - 1. Minimum performance properties (as cured at 70 degrees F. and 50 percent relative humidity):
 - a. Minimum Compressive Strength, tested per ASTM D-695:
 - 1) at 3 days: 11300 psi (31.0 MPa).
 - 2) at 7 days: 11800 psi (44.8 MPa).
 - 3) at 28 days: 12200 psi (58.6 MPa).
 - b. Shear Strength, tested per ASTM D-732 at 14 days: 6200 psi (43 MPa)
 - c. Minimum Flexural Strength tested per ASTM D-790 at 14 days: 10700 psi (74 MPa).
 - d. Minimum Bond Strength tested per ASTM C-882 at 14 days:
 - 1) Plastic Concrete to Hardened Concrete 2200 psi (13.8 Mpa).
 - 2) Plastic Concrete to Steel 2000 psi (13.8Mpa).
 - e. Maximum Water Absorption, tested per ASTM D-570: 24 hour 0.27%
 - f. Minimum Tensile properties tested per ASTM D-638: Tensile Strength 6900 psi (48 Mpa).
 - 2. Products which may be considered as equal include the following, or approved equal:
 - a. Sika Corporation, Lyndhurst NJ., product: "Sikadur 32 Hi-Mod Gel.
 - b. Simpson Strong Tie, Pleasanton, CA., product "SET High Strength Epoxy".
 - c. Symons Corporation, Des Plaines, IL., product "Rescon Gel anchor 304".
- B. Grout: Ready mixed, non-metallic high-strength controlled expansion grout of flowable consistency, conforming to ASTM C 1107 with minimum compressive strength of 8,000 pounds per square inch (55.2 MPa) at 28 days.
 - 1. Products which may be considered as equal include the following, or approved equal:
 - a. Five Star Products, Inc., Fairfield CT, product "Five Star Grout."

- b. L&M Construction Chemicals, Omaha NE, Product: "Crystex."
 - c. BASF Construction Chemicals, Cleveland, OH., product "Masterflow 713".
 - d. Sika Corporation, Lyndhurst, NJ., product "SikaGrout 212".
 - e. ChemMasters, Madison, OH., product "Conset".
- C. Metal paste filler: 2 component epoxy, high strength, structural adhesive putty:
 - 1. Products which may be considered as equal include the following, or approved equal:
 - a. Abatron, Inc. Gilberts IL, product: "Ferrobond-P".
 - b. Dynatron/Bondo Corp., Atlanta, GA, product: "Bondo Plastic Filler".
- D. Liquid zinc coating, for touch-up of welds, scratches, and abrasions in galvanized steel:
Low VOC organic zinc-rich coating containing 92% metallic zinc, by weight in the dried film (ASTM D520, Type III) and conforming to SSPC Paint 20, Type II, Level 1. Liquid zinc coating shall be recognized under the Component Program of Underwriter's Laboratories, Inc. as an equivalent to hot-dip galvanizing; conforming to MIL-P-21035B and SSPC Paint 29, Type II, Level I, for repair of hot-dip galvanizing and meeting the requirements for Zinc-Rich Paints.
 - 1. VOC limit: not more than 250 g/L.
 - 2. Specified manufacturer and product: ZRC Worldwide, Marshfield MA, product "ZRC-221".
- E. Primer for non-galvanized steel surfaces, modified alkyd rust-inhibitive, high solids primer:
 - 1. Products which may be considered as equal include the following, or approved equal:
 - a. International (Courtaulds Coatings): Interlac 260HS.
 - b. Rust-Oleum: 1069 Heavy Duty Rust Inhibitive Red Primer.
 - c. Sherwin Williams: Kem Flash Primer HS, Red Oxide E61R702.
 - d. Tnemec: 10-99 Red Primer.
 - e. Wibur & Williams (California Products Corporation): 1703 Universal Metal Primer.

2.6 FABRICATION - GENERAL

- A. Metal surfaces shall be clean and free from mill scale, flake, rust and rust pitting; well formed and finished to shape and size, true to details with straight, sharp lines, and angles and smooth surfaces. Curved work shall be to true radii. Exposed sheared edges shall be eased.
- B. Shop fabricate items wherever practicable, accurately fitting all parts and making all joints tight. Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
- C. Do all cutting, punching, drilling, and tapping required for attachment of anchor bolts and other hardware and for attachment of work by other trades. All such work shall be done prior to hot-dip galvanizing of the various components.
- D. Grind all edges of bars and plates completely free from nicks and machine marks, prior to galvanizing and/or shop priming.
- E. Grind all exposed-to-view welds completely smooth and flush to the surface plane of the base metals. Perform welding work prior to galvanizing in all cases, except where field welding is necessary, in which case, completely coat all such welds with two coats of specified liquid zinc coating, after performing grinding operations.
- F. Use screws and bolts only where welding cannot be performed, of sufficient size to ensure against loosening from normal usage of miscellaneous metal items furnished hereunder.
 - 1. Countersink all screw heads and bolt heads as far as practicable. Use not less than two screw, bolts, or other anchorage items, at each connection point.
 - 2. Draw up all threaded connections tightly, after buttering same with pipe joint compound, to exclude water.

- G. Provision for Thermal Movement: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Design, fabricate and install for temperature change range of 120 degrees F, ambient temperature and 180 degrees F, material surfaces.
- H. Carefully coordinate the installation of metal fabrications with the work of trades responsible for the installation of interfacing work, and for the installation of work into the various assemblies furnished hereunder, and permit the installation of the related materials to be made at the appropriate times.
- I. Fit and assemble metal fabrications in largest practical sections for delivery to site, ready for installation.
 - 1. Galvanized assemblies: Where size of assembly is too large for galvanizing kettle, galvanize components prior to fabrication and assemble after galvanizing.

2.7 FABRICATION - STAINLESS STEEL FABRICATIONS

- A. Weld and form edges, ends, and joints, by electric process, with all welded joints ground and polished smooth. Perform all welding so that no mark of any kind shall be noticed on the finished surfaces. Welds and adjoining components shall be homogenous, non-porous, free from pits, cracks, imperfections or discoloration.
 - 1. Hammer and peen flush with adjoining surface wherever materials have been depressed or sunken by a welding operation, and, if necessary re-weld and grind to eliminate low spots.
 - 2. Excessive distortions caused by welding will not be acceptable and shall be cause for rejection and removal from Project Site.
- B. Exercise care in grinding operations to avoid excessive heating of metal and discoloration. Use iron-free abrasives, wheels and belts on stainless steel; do not use the same abrasives, wheels or belts for both steel and stainless steel. Provide a uniform and smooth final polishing with a uni-direction grain for total length of materials. Cross grains and random polishing will not be acceptable and shall be cause for rejection.
- C. Provide a finish consistent throughout the work of this Section.
 - 1. Brake ends free of open texture or orange peel appearance. Where brake work mars the finish of the materials, remove marks by grinding, polishing and finishing.
 - 2. Shear edges free of burrs, projection or fins to eliminate all danger of laceration.
 - 3. Neatly finish mitre joints and bullnosed corners with under edge of the material neatly ground to a uniform condition and in no case will overlapping materials be acceptable.
- D. General exposed to view finish: Number 4, brushed finish.

2.8 FABRICATION - SUPPORTS

- A. Design, engineer and fabricate structural overhead support for equipment, furnishings, and products furnished under Sections, which includes, but is not limited to:
 - 1. Suspended television brackets.
 - 2. Equipment furnished under individual specification sections.
 - 3. Medical equipment.
 - 4. Surgical lights.
 - 5. Owner's furnished equipment.
 - 6. Above ceiling support for intravenous and cubicle curtain track, toilet partitions and similar products furnished under other sections.
- B. Fabricate support system to carry the entire load of supported products to building structure above without transferring any horizontal or vertical load to ceiling system(s). Provide frequently spaced holes for multiple adjustment. Provide diagonal bracing. Use of a "Universal Grid" system members is acceptable.

- C. Fabricate supports for equipment, fixtures, and appurtenances utilizing a "Universal Grid" system with rails extending wall-to-wall, perpendicular to the path of travel of the same.
 - 1. Design, engineer and fabricate supporting framework to support a concentrated load at any single point along the exposed rails, as exerted by the equipment to be purchased by the Owner.
 - a. Installed framework shall have a minimum loading safety factor of 2.5, based upon ultimate strength under static loading conditions.
 - b. The concentrated load shall be the maximum that will be encountered by positioning the equipment at the extremities of its travel (maximal load configurations).
 - c. Base loads on the most severe conditions as may be encountered by any of the manufacturers producing equipment for the type of services of the rooms indicated.
 - 2. Rail shall be on centers as required by equipment manufacturer and allow continuous attachment along any point on the rail.
 - 3. System shall be true, plumb and level to the tolerances indicated, with no more than 1/720th of the span maximum deflection in either plane, when maximum loading conditions are applied due to equipment operations.

2.9 FINISHES - HOT-DIP GALVANIZING

- A. Surface preparation prior to galvanizing: Pickle steel prior to galvanizing in conformance with SSPC-SP8. Remove all rust, dirt, weld flux, weld spatter, and other foreign matter.
- B. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process.
 - 1. Basis-of-Design: "Duncan Galvanizing, Everett, MA., product "Duragalv."
 - 2. Comply with ASTM A 123 for fabricated products and ASTM A 153 for bolts, nuts, washers, and other rough hardware. Provide thickness of galvanizing specified in referenced standards.
 - 3. Wherever possible, perform galvanizing after assembly of items.
 - 4. Galvanized items shall be straightened to remove all warpage and distortion caused by the galvanization process.
 - 5. Fill vent holes after galvanizing (if applicable), and grind smooth.
 - 6. Touch-up all breaks on hot-dip surfaces caused by cutting, welding, drilling or undue abrasion with liquid zinc coating as specified herein above. Apply liquid zinc by brush or spray on all damaged areas in two coats to a total dry film thickness of not less than 3 mils. Apply first coat within two hours after damage to hot-dip film to prevent undue oxidation of exposed surface. On all welds remove weld spatter by power wire brushing or equivalent before applying liquid zinc coating. Repair material should extend at least 3 inches beyond all edges of the damaged galvanized area as possible to assure continuity of galvanic protection.
 - 7. Touch-up of galvanized surfaces with aerosol spray, silver paint, bright paint, brite paint, or aluminum paints is not acceptable.

2.10 FINISHES - SHOP APPLIED COATINGS

- A. Schedule: Shop applied coatings as scheduled at end of Section and as indicated on Drawings.
- B. For non-galvanized steel surfaces:
 - 1. Surface preparation prior to priming: Thoroughly clean all steel of all loose mill scale by power wire brushing or sandblasting. Remove all rust, dirt, weld flux, weld spatter, and other foreign matter by wire-brushing or scraping (power wire-brushing, if necessary). Grind smooth any sharp projections.

2. Shop apply specified primers thoroughly and evenly on the surfaces and worked into the joints and other open areas on the surfaces. Surfaces inaccessible after assembly shall be given two coats. Dry film thickness of primer shall be not less than 2.4 mils per coat.
- C. For hot rolled carbon steel (HRCS) fabrications and shapes exposed to view (interior only condition):
 1. Glass bead blast all fabrications clean to remove mill scale and other residue ensuring not damage or cutting of metal fabrications. Do not remove black layer of iron oxide from base metal.
 2. Treat cleaned metal with JAX steel blackener and apply two coats of matte Permalac lacquer and one coat of acid base free Renaissance Micro-Crystalline Wax
- D. Hot rolled steel with clear powder coat finish (Designated as MTL.1 on Drawings):
 1. Preparation: sheets to be cleaned of remaining manufactured residue with ScotchBrite by hand or glass bead blasted (preferred technique), using soft round edge bead type. Do not cut surface with sand blasting techniques.
 - a. during cleaning do not remove black layer of iron oxide as harder than base metal.
 2. After cleaning treat with JAX steel blackener.
 3. After blackening coat with 2 coats of matte Permalac lacquer
 4. After applying lacquer apply a coat of Renaissance Micro-Crystalline Wax, free of an acid base. Prohibited is use of Birchwood KC products.
 - a. For wax product information, contact: Bauer Fabrication, Eric Bauer
1.802.244.4002
- E. Field touch-up: Shall be the responsibility of the installing contractor and shall include the filling, and touch-up of exposed job made bolt or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and marks, and final cleaning up of the finished surfaces.
 1. Touch-up finishes shall be fully compatible with, and exactly match shop applied finish, color, texture and sheen.

PART 3 - EXECUTION

3.1 ERECTION - GENERAL

- A. General: Accurately set all work to established lines and elevations, and rigidly fasten in place with suitable attachments to the construction of the building. At the completion of the work, check all work, re-adjust as required, and leave in perfect condition. Grind all exposed to view welds smooth to the touch.
- B. Setting bearing and leveling plates:
 1. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
 2. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - a. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - b. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- C. Miscellaneous framing and supports: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and additional requirements indicated on Shop Drawings.

1. Anchor supports for operable partitions, and similar products, securely to and rigidly braced to building structure.

3.2 FIELD WELDING

- A. Field weld components indicated on approved shop drawings in accordance with AWS D1.1. Weld profile, quality, and finish shall be consistent with approved samples and mock-ups.
 1. Welds ground smooth: . For groove welds, the weld shall be made flush to the surfaces of each side and be within + 1/16", -0" of plate thickness.
 2. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required; grind to provide a smooth transition and to match profile on approved mock-up .
 3. Continuous Welds: Where noted on the drawings, provide continuous welds of a uniform size and profile.
 4. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
- B. Immediately after welding, touch-up welds, burned areas and damaged surface coatings.
 1. Thoroughly remove all spatter by power wire-brushing (or if inaccessible, wire brushing) per SSPC, surface preparation specification SP2 or SP3. Allow surface to cool to ambient temperature. Clean surface with solvent wipe to remove oils, grease and dirt in accordance with SSPC surface preparation specification SP1.
 2. Apply one coat of liquid zinc to attain a minimum of 1.5 mils dry film thickness. Coating should extend at least two inches beyond either side of weldment to ensure complete coverage of welded area.

3.3 FIELD BOLTING

- A. Accurately drive all bolts into holes, protecting the bolt heads so as not to damage the thread during the driving. Ensure that bolt heads and nuts rest squarely against the metal. Where structural members have sloping flange faces, provide approved beveled washers at the bolted connections to afford square seating for bolt heads or nuts. Nick bolt threads for unfinished bolts to prevent the nuts from backing off.
 1. Bolt Head Orientation: All bolt heads shall be oriented as indicated on the contract documents. Where bolt-head alignment is specified, the orientation shall be noted for each connection on the erection drawings. Where not noted, the bolt heads in a given connection shall be oriented to one side.
- B. Use an approved calibrated manual or power torque wrench to obtain the proper torque and tension as recommended by the bolt manufacturer for all ASTM A 325 bolts.

3.4 TOUCH-UP

- A. Touch-up all welds, burned areas, scratches, abrasions, on galvanized metals, using specified liquid zinc coating.
- B. Touch-up all welds, scratches, abrasions, and other surface damaged on shop-primed or painted metals, using the same coatings as specified under shop applied finishes, herein above.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Wood blocking for fixed OFCI and OFOI items as indicated on the Drawings.
 - 2. Fire retardant treated plywood backer panels and wood blocking for mounting of miscellaneous equipment.
 - 3. Fire retardant treated plywood wall sheathing beneath gypsum wallboard at interior walls and partitions as blocking for wall-mounted equipment and products.
 - 4. Various wood blockings, edgings, furring, sheathing, and framing members, including fire retardant treatment and wood preservative, as required for receipt of various finishes and surfacing materials, not described herein above.
 - 5. Rough installation of hardware, including bolts, screws, spikes, nails, clips, and connection assemblies, as needed for installation of the rough carpentry work.
 - 6. Various wood blockings, furring, sheathing, and framing members, as detailed, including wood preservative, as required for receipt of various finishes and surfacing materials, not described herein above.
- B. Install the following furnished under the designated Sections: Metal door frames furnished under Section 081113 - HOLLOW METAL DOORS AND FRAMES.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 062000 - FINISH CARPENTRY: Wood interior and exterior trim.
- D. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Furnishing hollow metal framing.
- E. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work.
- F. Section 092900 - GYPSUM BOARD: Wallboard construction work, having taped and compounded joint finish.
- G. Section 099100 - PAINTING: Applied primer and finish coatings to exposed to view rough carpentry work.
- H. Division 26 - ELECTRICAL: Providing and mounting electrical panels and equipment.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 - REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. APA - applicable grades and specifications.
 - 2. APA PRB-108 Performance Standards and Policies for Structural-Use Panels..
 - 3. ANSI A250.11 (formerly SDI 105) - Recommended Erection Instructions for Steel Doors and Frames.
 - 4. ASTM D 3201 - Test Method for Hygroscopic Properties of Fire-Retardant Wood.
 - 5. AWPA Standards and references for preservative treated wood including Standards UC1, UC2, UC3A, UC3B, UC4A, and P5

6. AWPFA Standard UCFA – Fire Protection as Required by Codes Above Ground Interior Construction.
7. AWPFA Standard UCFB – Fire Protection as Required by Codes Above Ground Exterior Construction.
8. AWPFA M4 – Care Of Preservative Treated Wood Products.
9. NER-643: ACQ Preserve® and ACQ Preserve Plus® Wood Preservative Treatment, ICBO Evaluation Service.
10. MIL L-1914OE - Lumber and Plywood, Fire Retardant Treated.
11. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. SPIB Grading Rules, current edition.
13. UL - Building Materials Directory
14. US. Department of Commerce Voluntary Product Standard PS1 for Construction and Industrial Plywood.
15. US. Department of Commerce Voluntary Product Standard PS2 for Wood-Based Structural-Use Panels.
16. US. Department of Commerce Voluntary Product Standard PS-20 - American Softwood Lumber Standard.
17. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber
18. American Lumber Standards Committee, National Lumber Grades Authority for Canadian Lumber, and applicable grading rules and standards of the various lumber associations whose species are being used for grades specified.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate the work of this Section with the respective trades responsible for locating anchorages installed into blocking which is provided under this Section.
 2. Coordinate work of this Section with the work of the various trades responsible for applying finish materials and other items to rough carpentry work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for products specified herein.
 2. Certifications:
 - a. Written certification from the respective treatment plants indicating types of wood preservative treatment and fire-retardant treatment used, treatments method, applications instructions, and conformance to the requirements specified herein.
 - 1) Provide certification that fire retardant treatment materials do not contain ammonium phosphate.
 - 2) Provide report from ICC Evaluation Service on fire retardant treated wood flame spreading, strength, corrosion and hygroscopic properties.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
1. All lumber shall:
 - a. Be new, dressed four sides (S4S), clear and free from warping and other defects.
 - b. Have a moisture content not exceeding 19 percent when delivered to the project.

- c. Be in accordance with the grading rules of the lumber manufacturer's association under whose jurisdiction the lumber is produced and bear the mark of grade and mill identification.
- B. Certifications: Plywood: Conform to the requirements of Product Standard PS-1, and bear applicable APA grade trademarks.
 - a. Plywood for electrical boards treated for retardance, meet Class I or a flame spread rating of 25 or less and bear U.L. label "Classified FRS".

1.7 DELIVERY, STORAGE AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Protect wood materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
 - 2. Store materials in an elevated dry location, protected by waterproof coverings.

PART 2 - PRODUCTS

2.1 BOARD AND SHEET MATERIALS

- A. Lumber for blocking, as indicated or required: Hem-Fir, Douglas Fir, Eastern Spruce, Eastern Hemlock, or Southern Pine, surfaced dried stud or utility grade. Wood members shall be of sizes indicated on the Drawings or of the same size as the members being braced.
 - 1. For blocking used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
 - 2. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.
- B. Furring: Nominal 1 by 3 inches or 1 by 4 inches Douglas Fir, Eastern Spruce, Eastern Hemlock, or Southern Pine, surfaced dried construction grade.
- C. Plywood and sheet products:
 - 1. For substrate beneath gypsum board: Square edge APA graded C-D-X EXT, touch-sanded, 1/2 inch thick, except as otherwise indicated on the Drawings
 - 2. For electric panel board mountings and similar uses: APA graded B-D INT, Group 2 species, touch-sanded, fire-retardant treated, 3/4 inch thick, except as otherwise indicated on the Drawings.
 - 3. For unspecified interior concealed from view locations: APA graded C-D PLUGGED INT, Group 2 species, thickness as indicated on the Drawings.

2.2 WOOD TREATMENTS

- A. Treated wood products shall be produced by a single treatment plant, fully licensed by the chemical manufacturers, and conforming to the requirements specified herein.
 - 1. Toxicity and Environmental Quality:
 - a. Products containing chromium will not be permitted.
 - b. Products containing arsenic will not be permitted.
 - c. Fire-retardant-treated wood products shall be free of halogens, sulfates, ammonium phosphate and formaldehyde.
 - 2. Kiln dry all treated lumber and plywood to the following maximum moisture content after treatment.
 - a. Lumber: 19 percent.
 - b. Plywood 15 percent.
 - c. Discard pieces with defects which might impair quality of work.
 - 3. Quality marks: Each piece of lumber and plywood shall be permanently affixed with a quality mark, containing the following information:
 - a. Identification of the inspection agency.
 - b. Standard to which material was treated.

- c. Identification of the treating plant.
 - d. Fire retardant treated wood shall include: stamp signifying a FR-S rating
 - e. Preservative treated wood shall include: Retention and end use for which product is suitable.
- B. Fire retardant treated wood. Designated as "FRTW"
- 1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:
 - a. Hickson Corporation, product, "Dricon".
 - b. Osmose, Inc., Griffin GA., product "FirePro".
 - c. Hoover Treated Wood Products, Inc., product "PyroGuard".
 - d. Viance, LLC., Charlotte, NC, product: "D-Blaze FRT".
 - 2. Fire retardant treated wood shall comply with the following requirements:
 - a. All fire-retardant lumber and plywood must have an Underwriters Laboratories stamp signifying a FR-S rating certifying a 25 or less flame spread and smoke developed value, when tested in accordance to ASTM E-84, or UBC Standard No. 42-1.
 - b. Corrosion rates: Less than one mil per year for carbon steel, galvanized steel, aluminum, copper and red brass in contact with the fire retardant treated wood when tested in accordance with Federal Specification MIL-L-19140E Paragraph 4.6.5.2.
 - c. The fire retardant treated wood must have an equilibrium moisture content of not more than 25 percent when tested in accordance with ASTM D 3201 procedures at 95 percent relative humidity and 80 degrees Fahrenheit.
 - d. Fire retardant chemical: Registered for use as a wood preservative by the U.S. Environmental Protection Agency.
 - e. Testing: Fire performance and strength properties for both lumber and plywood, of the fire retardant treated wood shall be recognized by issuance of a ICC Evaluation Service Report. Fire retardant chemical must not damage the middle lammella of the wood structure when exposed to 170 degrees Fahrenheit and 90 percent relative humidity for 23 days.
- C. Pressure preservative treated wood. Designated as "PT"
- 1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:
 - a. Osmose, Inc., Griffin GA., product "NatureWood".
 - b. Universal Forest Products, Inc., Grand Rapids MI., product "ProWood ACQ".
 - c. Viance, LLC., Charlotte, NC., product "Preserve"
 - 2. Treatment: Ammoniacal Copper Quaternary Compound (ACQ), arsenic-free and chromium-free chemical "ACQ Preservative" in accordance with AWP Standards. Apply the preservative in a closed cylinder by pressure process in accordance with AWP Standard C15.
 - a. Minimum preservative retention for floor plates, framing, lumber and plywood above ground use: 0.25 pounds per cubic foot (4.0 kg/m³) of ACQ chemical, in accordance with AWP UC1, UC2, UC3A, and UC3B, or NER-643 as appropriate.
 - b. Minimum preservative retention for framing, lumber and plywood in contact with water, ground, concrete and masonry: 0.40 pounds per cubic foot (6.4 kg/m³) of ACQ chemical, in accordance with AWP UC4A, UC4B, UC4C, or NER-643 as appropriate.
 - c. Minimum preservative retention for lumber and plywood in permanent wood foundations: 0.60 pounds per cubic foot (9.6 kg/m³) of ACQ chemical, in accordance with AWP UC4B, or NER-643.
 - 3. Fixation of Chemical: Treated wood shall not be shipped from treatment plant until fixation of the preservative has occurred in the wood.

2.3 ACCESSORIES

- A. Adhesives:
 - 1. General: Provide adhesives approved which are Low-VOC or non-VOC, non-flammable, water-proof after cured, odor free, .
 - 2. Adhesive for lamination and fabrication of wood and plywood items: Exterior adhesives containing no urea formaldehydes, having a VOC limit of 70 g/L.
 - 3. Adhesive for subfloors and underlayment: High strength, waterproof and non-freezing adhesive complying with AFG-01 "Frozen Lumber Test" and ASTM 3498, and having a VOC limit of 50 g/L.
- B. Nails (interior and exterior): Galvanized common nails, of size and type to suit application and as required by state and local building codes.
- C. Screws:
 - 1. Screws for interior applications: Flat head electroplated-galvanized wood screws of the appropriate sizes.
- D. Anchor bolts, expansion bolts and lag screws: Hot-dipped galvanized steel, of the following types:
 - 1. For lumber having actual thickness of 1-1/2 inches or greater to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, 3/8-inch minimum diameter, spaced as shown on drawings, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.
 - 2. For lumber having actual thickness of greater than 7/8-inch but less than 1-1/2 inches to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, at least 1/4-inch diameter of the most appropriate lengths for the specific application, spaced as shown, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.
 - 3. For lumber having actual thickness of 7/8-inch and less: Anchor bolts or expansion bolts, at least 1/4-inch in diameter; or screws, of the most appropriate sizes; in lengths most suitable for the specific application, countersunk, spaced, and staggered.
- E. Protection paper: Canadian red-rosen paper or kraft paper.

PART 3 - EXECUTION

3.1 PREPARATION

- A. All materials shall be inspected before use, with all checked, split and otherwise deficient stock rejected, or used only for miscellaneous blocking, furring or other incidental use. The Contractor shall be responsible for replacing all lumber which, due to warpage, twist, splitting, or checking, results in unsatisfactory work. Such replacement shall be required at any time, whether before or after application of finish material under other Sections.
- B. Verify exact locations of toilet accessories, door stops and similar items with the Project Engineer/VA COR and the Architect prior to installation of blocking for accessories.

3.2 INSTALLATION - GENERAL

- A. Closely coordinate the installation of the rough carpentry work with the work of other trades responsible for the installation of interfacing or overlaying materials, so as not to delay the work of the related trades.
- B. Erect all rough carpentry work plumb, level, and true with tight, close fitting joints, securely attached and braced to surrounding construction, all in a first class workmanlike manner. Counterbore for bolt heads, nuts, and washers where required to avoid interference with other materials. Bear complete responsibility for structural integrity, connections, and anchorage of all rough carpentry work.

- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Use as long lengths as practicable for wood blocking to minimize number of joints, and attach the members with the types, and spacing, of fasteners specified herein.
- E. Install blocking, grounds and furring, as required for proper attachment of the work of other trades, in accordance with the requirements provided by the respective related trades.
 - 1. Spacing for furring and strapping shall not exceed 16 inches on center.
- F. Field cuts of fire retardant treated lumber: Do not rip or mill fire retardant treated lumber. Only end cuts, drilling holes and joining cuts are permitted.
- G. Install concealed from view plywood with specified fasteners spaced not more than 10 inches on centers.
- H. Install fire-treated plywood backer boards with counter-sunk galvanized fasteners, of specified sizes, spaced not more than 12 inches on centers.

3.3 INSTALLATION – EQUIPMENT BACKBOARDS

- A. Provide panel mounting backboards for HVAC, Fire Prevention, Electrical and telephone/data equipment. Fabricate panels using fire-retardant treated 3/4 inch thick panels mounted to fire-retardant treated 2 by 4's. Provide a nominal space of 3-1/2 inches behind panels to permit wiring.

3.4 INSTALLATION - METAL DOOR FRAMES

- A. Place in position all steel frames, furnished under Section 081113 - HOLLOW METAL DOORS AND FRAMES, in accordance with the approved shop drawings and frame schedule.
 - 1. During the installation of metal door frames, after the manufacturer's steel spreader bar has been removed, install wood spreaders at door opening, carefully dimensioned to permit square, true installation of door frames and doors.
 - 2. Spreaders and bracing shall remain in place until doors are installed.
- B. Coordinate installation of frames with the various trades installing abutting wall construction for anchor placement.
 - 1. Place, erect and level all frames into correct scheduled locations, including those in masonry partitions.
- C. Coordinate installation of frames with installation of hardware under Section 062000 - FINISH CARPENTRY and as furnished under Section 087100 - DOOR HARDWARE.
- D. Install frames in accordance with the manufacturer's recommendations, ANSI/SDI-100, SDI-105, and the Door Hardware Institute (DHI) recommendations.
 - 1. Provide rigid temporary bracing for frames as required to ensure maintenance of positioning, and remove only after frames have been permanently anchored.
 - 2. Where exposed fastener heads occur in frames, fill with automotive body filler and sand smooth.

3.5 TOLERANCES

- A. Framing members: Maximum deviation more than 1/4 inch in 10 feet from true or plumb position.
- B. Door frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.6 SCHEDULES

- A. Wood treatment schedule:

- B. Fire retardant treat all equipment backer boards, additionally provide fire retardant treated lumber and plywood where indicated and as additionally noted on Drawings.
- C. Wood blocking schedule: The following schedule lists common items for which blocking is required and may not be indicated on the Drawings. It is not the intention of this schedule to list all conditions requiring blocking or limit the extent of blocking required for completion of the Work; provide all wood blocking, and edgings, required for receipt of various finishes and surfacing materials. Securely anchor wood blocking and run continuous between framing.

1. Blocking schedule:

Items	Nominal size of blocking with fastener notes
Corner guards:	2 by 4 inch
Cubicle curtain & IV track:	2 by 6 inch
Door Frames, having openings exceeding 3'-10" in width:	2 by 4 inch, full height of wall framing
Door frames, cross corridors:	2 by 4 inch, full height of wall framing
Door stops, wall mounted:	1 by 3 inch.
Grab bars:	2 by 6 inch, with 1/4 inch dia. toggle bolts.
Lavatories:	3/4 inch plywood extending full height from floor to top of wall framing. Install lavatories with 1/4 inch dia. toggle bolts
Mirrors, framed:	2 by 4 inch
Shower rods:	2 by 4 inch
Soap dispensers, wall mounted:	1 by 3 inch
Paper towel dispensers, waste receptacles, feminine napkin dispensers:	1 by 3 inch.
Toilet paper dispensers:	2 by 4 inch
Window treatment:	2 by 4 inch
Products bracketed to walls (including sinks, cabinets and similar products):	3/4 inch plywood extending full height from floor to top of wall framing. Install brackets with 1/4 inch dia. toggle bolts

END OF SECTION

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SECTION 061600

SHEATHING

PART 1 – GENERAL

1.1 SUMMARY

- A. The work of this Section consists of exterior sheathing board where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following scope.
- B. Furnish and install the following:
 - 1. Exterior sheathing board.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 042000 - UNIT MASONRY: Installation of metal masonry ties.
- E. Section 054000 - COLD-FORMED METAL FRAMING: Load bearing wall framing.
- F. Section 071113 - BITUMINOUS DAMPPROOFING: Dampproofing over sheathing and joint treatment.
- G. Section 072100 - THERMAL INSULATION: Cavity wall insulation.
- H. Section 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS: Fluid (liquid) air barrier membrane system.
- I. Section 092900 - GYPSUM BOARD: Gypsum board system installation.
- J. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Supply, and return air registers.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
 - 1. ASTM C 646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gauge Steel Studs.
 - 2. ASTM C 1177 – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - 3. GA 201 - Gypsum Board for Walls and Ceilings.
 - 4. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of fire rated assemblies.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Pre-installation Meetings: Installer of the Work of this Section is required to attend pre-installation conference specified under Section 042000 - UNIT MASONRY.
- C. Scheduling:
 1. Do not install sheathing until all pipes, ducts, conduits, and other such items which are to be enclosed thereby, have been permanently installed, inspected and approved.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:
 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
 2. Shop Drawings: Details of any special conditions associated with fireproofing.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Qualifications:
 1. Installer: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
 2. Deliver materials in original unopened packages, containers or bundles bearing brand name, and identification of manufacturer, with labels and package seals intact and legible.
- B. Storage and Handling Requirements:
 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
 - a. Neatly stack board materials flat to prevent sagging.

1.8 WARRANTY

- A. General: Submit warranties under provisions of Section 017800 - CLOSEOUT SUBMITTALS.
- B. Manufacturer Warranty:
 1. Sheathing manufacturer's 12 month warranty for coverage against in-place exposure damage. Warranty shall commence on date of material purchase.
 2. Sheathing manufacturer's 5 year limited warranty covering materials commencing on date of Project Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers and products: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
1. United States Gypsum Company, Chicago, IL (USG), product "Securock Glass-Mat".
 2. Georgia Pacific Corporation, Gypsum Division, Atlanta, GA, product: "DensGlass Gold".
 3. National Gypsum Company, Gold Bond Products Division, Charlotte, NC. (Gold Bond), product: "e2XP Sheathing".

2.2 MATERIALS

- A. Sheathing Board: 5/8 inch thick gypsum sheathing board, as indicated on the Drawings, complying with ASTM C 1177 with fiberglass mat surface front and back with silicone-treated gypsum core conforming with the following requirements:

Properties	Test	Results
Surfacing:		Glass mat
Width:		4'-0" nominal
Length:		10'-0" (+/- 1/4 inch) maximum
Flexural Strength, lb/ft parallel (4'-0" weak direction):	ASTM C 473	100 pounds
Humidity Deflection, (inches):	ASTM C 473	1/8 inch, maximum
Linear Expansion with Change Moisture (in/in % RH):	ASTM C 518	6.25×10^{-6} , maximum
Thermal resistance "R" (in/ft ² °F/Btu):	ASTM C 518	0.56 minimum
Weight (per 1,000 sq ft):	ASTM C 1177	2,500 pounds minimum
Bending Radius	ASTM C 1177	8 feet, minimum
Mold growth:	ASTM D 3273	Score 10 with no mold detected
Racking Strength, lbs/ft, dry (ultimate):	ASTM E 72	>654 pounds per foot
Surface burning characteristics:	ASTM E 84	Flame spread: 10, maximum
Permeance (ng/Pa•s•m ²):	ASTM E 96 (dry cup method)	17 perms, maximum
Combustibility:	ASTM E 136	Noncombustible
Coefficient of Thermal Expansion (in/in/°F):	ASTM E 228 modified	8.5×10^{-6} , maximum

2.3 ACCESSORIES

- A. Fasteners for 5/8 inch thick sheathing: Type S-12 fine thread rust resistant self-drilling screws, for applying single layer sheathing board to light gage metal framing.
1. Fastener length for layer sheathing application: 1-1/4 inch [32 mm].
 2. Fastener length for double layer sheathing application: 2 inch [50 mm].

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 - 1. Beginning of installation means acceptance of existing substrate and project conditions.
- B. Inspect framing and other substrates; verify that they are in proper condition to receive the work of this Section.
 - 1. Verify that surface of framing and furring members to receive sheathing does not vary more than 1/4 inch from the placement of faces of adjacent members.

3.2 INSTALLATION

- A. Install sheathing in strict compliance with manufacturer's recommended installation instructions and as specified here, comply with all applicable code requirements.
 - 1. Install specified control joints where indicated on Drawings. Run vertical control joints continuously to top of wall.
- B. Secure sheathing with long dimension perpendicular to wall studs with ends over firm bearing, stagger joints where possible. Use maximum lengths possible to minimize number of joints.
 - 1. Install sheathing with panel edge joints no greater than 1/8 inch (maximum) spacing to abutting sheathing panels and at all sheathing termination edge and end joints.
 - 2. For metal framing: Install screws with 8 inch on center spacing 1/2 inch in from edge around perimeter of each sheathing board, and 8 inches on center in field.
 - 3. Drive fasteners tight and flush with surface of sheathing, do not countersink.
 - 4. Locate fasteners minimum 1/2 inch from edges and ends of sheathing panels

3.3 CLEANING

- A. General: Clean work under provisions of Section 017000 - EXECUTION.
 - 1. Daily clean work areas by sweeping and disposing of debris, and scraps.
 - 2. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION

SECTION 062000
FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install:
 - 1. Adjustable wall mounted shelving with standards and brackets.
- B. Install the following furnished under the designated Sections:
 - 1. Plastic laminated shelves (for wall mounted adjustable shelving) furnished by Section 064000 - ARCHITECTURAL WOODWORK.
 - 2. Wood trim, paneling and wall base furnished by Section 064000 - ARCHITECTURAL WOODWORK.
 - 3. Steel doors furnished by Section 081113 - HOLLOW METAL DOORS AND FRAMES.
 - 4. Wood doors furnished by Section 081400 - WOOD DOORS.
 - 5. Door hardware, thresholds, weatherstripping, seals and gaskets furnished by Section 087100 - DOOR HARDWARE.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 061000 - ROUGH CARPENTRY: Wood blocking, framing, curbs, nailers, and backer boards.
- D. Section 064000 - ARCHITECTURAL WOODWORK: Furnishing and installing cabinetry, and other built-in-place furniture.
- E. Section 079200 - JOINT SEALANTS: Sealant and backing materials, for joints between casework, countertops and abutting surfaces.
- F. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Furnishing hollow metal doors.
- G. Section 081400 - WOOD DOORS: Furnishing wood doors.
- H. Section 087100 - DOOR HARDWARE: Furnishing finish hardware, weatherstripping, thresholds, seals and gaskets for installation under this Section 06 20 00.
- I. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work, and attachment.
- J. Section 092900 - GYPSUM BOARD: Drywall construction work having taped and compounded finish.
- K. Section 099100 - PAINTING: Field applied primer (excluding backpriming) and finish coatings.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 - REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ANSI A250.11 (formerly SDI 105) - Recommended Erection Instructions for Steel Doors and Frames.
 - 2. AWI Quality Standards, Eighth edition

3. APA - applicable grades and specifications.
4. FS MM-L-736 - Lumber; Hardwood.
5. PS-1 - Construction and Industrial Plywood.
6. PS-20 - American Softwood Lumber Standard.
7. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
8. SPIB Grading Rules, current edition.
9. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber
10. American Lumber Standards Committee, National Lumber Grades Authority for Canadian Lumber, and applicable grading rules and standards of the various lumber associations whose species are being used for grades specified.

1.4 SUBMITTALS

- A. Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 1. Literature: Manufacturer's product data sheets, specifications, performance data, installation instructions for hardware, adhesives and accessories furnished hereunder.
 2. Shop drawings:
 - a. Large scale design details, minimum 1-1/2 inch to one foot scale, showing profiles, jointing and fastening methods; and complete installation details.
 - b. Provide full scale drawings of wood trim elements showing all profiles and dimensions.
 - c. Provide shop drawings bearing dimensions of actual measurements taken at the project.
 3. Samples: Provide samples as requested by the Project Engineer/VA COR and the Architect for selection of colors and finishes.

1.5 QUALITY ASSURANCE

- A. Quality Standards: All materials, workmanship and finishes shall meet AWI Premium grade quality standards.
- B. Install work in accordance with the latest specified AWI quality standards, except that standing and running trim joints shall be field mitered and fitted.
- C. Discard lengths of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacture with respect to surfaces, sizes or patterns.

1.6 DELIVERY STORAGE AND HANDLING

- A. Do not deliver interior finish carpentry materials to the project until all concrete, masonry, plaster, and other wet work has been completed and dry.
- B. Ship and handle all materials and fabricated items in a manner which will prevent damage thereto, and store all materials and fabricated items at a dry, elevated, ventilated, and protected interior location maintaining 60 degrees Fahrenheit and a maximum relative humidity of 55 percent.

PART 2 – PRODUCTS

2.1 WOOD MATERIALS, GENERAL

- A. General: Materials, as fabricated and installed, shall comply with specified grades of the latest addition AWI Quality Standards.
- B. Moisture content:

1. Wood for interior use shall have a moisture content between 5 and 10 percent, when delivered to the project.

2.2 BOARD AND PANEL MATERIALS

- A. Plywood and panel products:
 1. Shelving to receive paint, where plastic laminate shelving is not being used: 3/4 inch thick Birch veneer plywood (AA) with 3/8 inch hardwood edge banding at all edges.
- B. Provide other finish carpentry products, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Project Engineer/VA COR and the Architect.

2.3 CLOSET AND SHELVING HARDWARE

- A. Adjustable shelving, wall mounted standards and brackets:
 1. Acceptable manufacturers, include but are not limited to the following:
 - a. Spur Systems International Limited.
 - b. Knappe & Vogt, Grand Rapids, MI.
 2. Standards (uprights): 14 gage double tracked uprights, in epoxy powder-coat finish, color as selected by the Project Engineer/VA COR and the Architect from manufacturer's full range of colors.
 - a. Locate uprights no greater than 24 inches on center.
 3. Brackets: 14 gage formed brackets, color and finish matching standards,
 - a. Depth (typical): 270mm (10-1/2 inch depth), or as otherwise indicated on Drawings.

2.4 ACCESSORIES AND HARDWARE

- A. Glue for lamination and fabrication of wood, plywood and particle board items: Exterior Grade, phenolic resin glue.
- B. Nails for interior trim items: 6d and 8d coated or galvanized finish nails, except as otherwise specified herein.
- C. Screws: Flat-head wood screws of the appropriate sizes, galvanized finish for interior use.
- D. Bolts, nuts, washers, blind fasteners, lags: Galvanized, of size and type to suite application as indicated in the drawings.
- E. Paint for back-priming:
 1. ICI / Dulux: Ultra Hide N°. 2010-1200 Acrylic Primecoat.
 2. Moore: "Moore Fresh Start", N°. 023
 3. Pittsburgh: "Sun-Proof Exterior House & Trim Latex Wood Primer", 72-1 Series
 4. Sherwin-Williams: "A100 Exterior Latex Wood Primer", N°. B42W41

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of blocking, backing and support framing for all finish carpentry work.
- B. Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

- A. Prime all wood surfaces of items or assemblies to be in contact with cementitious and masonry materials, prior to installation.

3.3 INSTALLATION – GENERAL CARPENTRY

- A. Comply with installation requirements of AWI (Architectural Woodwork Institute) Quality Standards, Eighth edition for Premium Grade quality work.

- B. Dress and sand woodwork until free from machine and tool marks, abrasions, raised grain, or other defects that will show through the finish on surfaces exposed to view. Wherever possible, carry out sanding on a shop belt sander, not in the field. Sandpaper field joints and leave in perfect condition for finishing.
- C. Make all joints tight, and form to conceal shrinkage. Glue all miters having a dimension of 4 inches or more from heel to point. Joints shall be glued tight and so formed as to conceal shrinkage. Cope trim at returns and miter at corners to produce tight-fitting joints with full surface contact throughout length of joint.
- D. Make a minimum of splices and joints in running trim, and where such splices and joints occur, fasten securely, with all exposed surfaces having smooth, continuous planes. Stagger joints in adjacent or relate members. Use scarf joints for end-to-end joints.
- E. Scribe and cut work to fit adjoining work closely. Refinish cut surfaces in prefinished items.
- F. All nails in interior finished work shall be blind nailed wherever possible. Nail trim with finish nails only, set using appropriate nailpunch and fill with matching wood filler. Sand smooth wood filler. Do not fasten trim with screws or bolts unless otherwise directed, or is to be subsequently covered with smaller trim.
- G. Woodwork shall be properly framed, closely fitted and accurately set to the required lines and levels and shall be rigidly secured in place. Shim as required using concealed shims to achieve specified tolerances.
- H. Cover exposed edges of plywood shelving with 3/8 inch hardwood edging. Width of edging to match thickness of shelving.

3.4 INSTALLATION - PREFABRICATED PRODUCTS INSTALLED UNDER THIS SECTION

- A. Do not commence installation of products until immediately adjacent surfaces have been completely installed and finished.
- B. Perform installation work in accordance with the approved shop drawings and the manufacturer's installation instructions.
- C. Install products absolutely level and in true line, with units securely anchored to the surrounding construction.
- D. Remove all tape and other packing materials; thoroughly clean and polish all exterior and interior surfaces.
- E. Touch-up all scratches and other surface defects, using same materials and colors as shop finish.

3.5 INSTALLATION - DOORS AND HARDWARE

- A. Install doors in accordance with the manufacturer's recommendations, ANSI/SDI-100, ANSI A250.11, and the Door Hardware Institute recommendations.
- B. Install hardware in accordance with manufacturer's instructions and requirements of referenced organizations, and the requirements of Section 087100 - DOOR HARDWARE.
 - 1. Use the templates provided by hardware item manufacturer.
 - 2. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.
 - a. Conform to ANSI 117.1 for positioning requirements for the handicapped.
 - b. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute (DHI.)
 - c. WDMA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors".
 - 3. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements
 - 4. Prefit hardware before finish is applied, remove and reinstall after finish is completed. Install hardware so that parts operate smoothly, close tightly and do not rattle.

- 5. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- C. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant, forming tight seal between threshold and surface to which set. Securely and permanently anchor thresholds, using countersunk non-ferrous screws to match color of thresholds (stainless steel screws at aluminum thresholds).
- D. Tools for maintenance: All special tools packaged with hardware items shall be saved, tagged/identified as to product use, and turned over to the Owner upon completion of the Work.
- E. Clean adjacent surfaces soiled by hardware installation.
- F. Prior to Final Inspection make final check and adjustment of all hardware, clean operating items as necessary to restore proper function and finish of hardware.

3.6 TOLERANCES

- A. Maximum variation for wood work from true position of 1/8 inch in 8 feet for plumb and level and with a maximum of 1/16 inch offsets in adjoining surfaces intended to be flush.
- B. Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.7 ADJUSTING

- A. Adjust doors for smooth and balanced movement.

3.8 CLEANING

- A. Daily clean work areas by sweeping and disposing of scraps and sawdust.
- B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.
- C. Remove protective material from pre-finished surfaces.

3.9 PROTECTION

- A. During the operation of finish carpentry, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

END OF SECTION

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SECTION 064000
ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Plastic laminate casework.
 - 2. Plastic laminate countertops with hardwood nosing.
 - 3. PVC edging of plastic laminate at edges of doors, drawer fronts, casework fronts, countertops and shelving.
 - 4. Exposed blocking and blocking concealed by the work of this Section required for the installation of architectural woodwork.
 - 5. Hardware for work of this Section, including custom fabricated hardware and accessories.
- B. Furnish the following products to be installed under the designated Sections:
 - 1. Plastic laminate shelves with hardwood nosing, (for wall mounted adjustable shelving) for installation under Section 062000 - FINISH CARPENTRY.
 - 2. Wood trim, having shop-applied transparent finish, for installation by Section 062000 - FINISH CARPENTRY.
- C. Make all cut-outs within casework items as required to accommodate sinks, piping, conduit, and other mechanical and electrical work, from templates provided by the respective mechanical and electrical trades.
- D. Provide glass shelving and perform shop-glazing of casework, furniture and accessories items fabricated by this Section.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 055000 - METAL FABRICATIONS: Supports for countertops.
- D. Section 061000 - ROUGH CARPENTRY: Concealed wood blocking and nailers.
- E. Section 062000 - FINISH CARPENTRY:
 - 1. Installation of plastic laminate shelving furnished under this Section 06 40 00.
 - 2. Installation of wood interior trim and wall base furnished under this Section 06 40 00.
 - 3. Installation of wood paneling furnished under this Section 06 40 00.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work.
- G. Section 092900 - GYPSUM BOARD: Wall board construction work, having taped and compounded joint finish.
- H. Division 22 - PLUMBING: Plumbing fixtures and piping.
- I. Division 26 - ELECTRICAL: Electrical connections for power, lighting, and data.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. ASTM D 523 - Standard Specification for Specular Gloss.
 2. AWI (Architectural Woodwork Institute) Architectural Woodwork Standards (1st Edition, 2009)
 3. AWI Quality Certification Program.
 4. APA Grades and Specifications.
 5. National Lumber Grades Authority, American Lumber Standards, and Grading Rules and Standards of the various lumber associations whose species are being used, with grade-marks for same.
 6. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber; and Product Standard (PS):
 - a. PS-1 - Construction and Industrial Plywood Standard.
 - b. PS-20 - American Softwood Lumber Standard.
 - c. PS-51-71 – Hardwood Plugged Plywood Standard.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
1. Field Measurements: Where possible the woodwork manufacturer shall take field measurements before preparation of shop drawings and fabrication to ensure proper fitting of Work.
 - a. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
 2. Field dimensions which are not controlled by Project conditions: The woodwork manufacturer is responsible for details and dimensions not controlled by Project conditions and shall show on his shop drawings all required field measurements beyond his control.
 - a. The Contractor shall acknowledge the woodwork fabricator's need for accurate field dimensions prior to custom fabrication.
 - b. The Contractor and the woodwork manufacturer shall cooperate to establish and maintain these field dimensions.
- B. Scheduling:
1. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
 2. Coordinate schedule of construction, size of access, and route to location of installation to prevent delay of installation due to physical impediments. Any work involving the demolition and reconstruction of partitions, walls, floors, roofing, windows, or doors to place and install the work of this Section shall be performed at no additional cost to the Owner.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, for each item furnished hereunder, including, but not limited to: Fastenings, adhesives, hardware, and accessories.
 - a. Provide additional information required for fillers and finish products: Include, chemical, functional, and environmental characteristics, limitations and special application requirements. Identify available colors, shades, and gloss.
2. Shop drawings bearing dimensions of actual measurements taken at the project, include at least the following, which are in addition to shop drawing requirements described in AWI Quality Standards:
 - a. 1/4 inch scale elevations and plans of each casework item.
 - b. Large scale design details of minimum 1-1/2 inch to 1-foot scale, showing abutting materials, installation conditions, clearances. Show woodwork profiles, jointing and fastening methods; details of drawers and doors.
 - c. Full size or half-full size sections, showing individual components, profiles and jointing.
3. Selection Samples:
 - a. Plastic laminate chips for initial color selection by the Project Engineer/VA COR and the Architect.
 - b. Chain of PVC edging materials.
 - c. Provide additional samples as requested by the Project Engineer/VA COR and the Architect for initial selection of material colors and finishes.
4. Verification Samples:
 - a. Cabinet hinge with manufacturer's product literature.
 - b. Drawer slide with manufacturer's product literature.
 - c. 12 inch long samples of solid hardwoods illustrating maximum range of color variations and applied transparent shop finish.
 - d. 12 by 12 inch samples of plastic laminate (of each color required for project).
 - e. 12 inch length samples of plastic edging material (of each color required for project).
 - f. One each of all cabinet hardware. (approved cabinet hardware samples will be returned to Contractor and may become part of the Work).
5. Certificates:
 - a. Certify that all composite wood and agrifiber products used on this Project do not contain urea-formaldehyde resin.
 - 1) Written certification from Millworker, that only "formaldehyde free" manufactured composite panel products are incorporated into the Work, including all concealed components. Composite panel products include but are not limited to particle board (PB), Medium Density Fiberboard (MDF) and similar manufactured products.
6. Manufacturer's Instructions: Provide installation instructions and templates for hardware and field applied items.

1.6 QUALITY ASSURANCE

- A. Quality Standards: All work performed under this Section shall be as defined in the referenced AWI "Quality Standards" for PREMIUM GRADE, as modified herein by this Specification Section.

B. Qualifications:

1. Fabricator/Installer: Work of this section shall be performed by a shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in service performance.

1.7 MOCK-UPS

- A. Refer to Section 014339 - MOCK-UPS

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. General: The woodwork manufacturer, woodwork installer and the Contractor are jointly responsible to make certain that woodwork is not delivered until the building and storage areas are sufficiently dry so that the woodwork will not be damaged by excessive changes in ambient humidity and relative moisture content.
2. Concrete, masonry, plaster, tile and marble setting and polishing and other wet work shall be completed and dry before delivery, storage and installation of woodwork items.
3. Sequence deliveries to avoid delays and to minimize on-site storage.

B. Storage and Handling Requirements:

1. Ship and handle all materials and fabricated items in a manner which will prevent damage thereto, and store all materials and fabricated items at a dry, elevated, ventilated, and protected interior location.

1.9 SITE CONDITIONS

- A. Temperature: Maintain ambient temperature above 55 degrees Fahrenheit for 5 calendar days before, and during installation of architectural woodwork; maintain temperature after installation until Owner's Final Acceptance.
- B. Relative Humidity: Maintain a relative humidity between 25 and 55 percent for a minimum period of 5 calendar days before, and during, installation of architectural woodwork; maintain relative humidity after installation until Owner's Final Acceptance.

PART 2 - PRODUCTS

2.1 WOOD MATERIALS – GENERAL REQUIREMENTS

- A. General requirements: New, dressed four sides (S4S), and free from warping and other defects.
- B. Hardwood nosing at plastic laminate countertops and shelves:
1. Species: Select White Maple, plain sawn.
- C. Panel Products: Composite panel products and plywood shall be "no added urea-formaldehyde", including all concealed components.
1. Softwood plywood with each sheet bearing the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or identification index, and shall show glue type, grade and compliance with APS-1. Plywood shall be a minimum of 5 ply for ½ inch thick and above, and 7 ply for plywood 1-1/4 inch thick or thicker.
 - a. Plywood cores for plastic laminate shall be exterior type and species group, with veneer grade "A-C".

- b. Plywood shelving for painted or stained finish shall be interior type of any species group, with veneer grade "A-B" for stained finish and grade "B-C" for painted finish
- 2. Moisture Content:
 - a. Solid hardwood(s) scheduled for transparent finish: Moisture content shall not exceed 8 percent when delivered to Project.
 - b. Typical (hardwood and softwoods): Moisture content of wood shall be between 5 and 10 percent when delivered to the project.
- D. Concealed supports for edge and corner backing shall be kiln dried birch or poplar, meeting AWI Premium Grade Standards.
- E. Blocking and furring at base and walls shall comply with American Softwood Lumber Standard PS 20-70 and with specific grading requirements of SPIB: Kiln dried (KD15), Structural Light Framing, N^o. 2 grade, free of warping and large knots.
- F. Internal concealed framing for casework: Kiln-dried, (KD15), eastern pine, poplar, eastern spruce, or southern pine, conforming to AWI Premium grade.
- G. Fir plywood for concealed from view applications in conjunction with the various casework items: APA C-C PLUGGED EXT.

2.2 PLASTIC LAMINATE FACING

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 - 1. Basis of Design: Ralph Wilson Plastics Co. (Wilsonart), Temple, TX.
 - 2. Formica Corp., Cincinnati, OH.
 - 3. Laminart, Elk Grove Village, IL.
 - 4. Pioneer Plastics Corp. (Pionite), Auburn, ME.
 - 5. Nevamar Corp., Odenton, MD.
- B. Plastic laminate, general purpose, conforming to NEMA LD3.1 -1991 Grade GP50, nominal 0.050 inch thickness, in a low non-directional texture in color price group selected by the Project Engineer/VA COR and the Architect.
 - 1. General purpose grade laminate shall be used for all exposed to view surfaces including
 - a. Exposed outward face of cabinet fronts and closure trim.
 - b. Cabinet doors (all sides).
 - c. Drawer fronts (all sides).
 - d. Interior surfaces of open cabinets (without doors).
 - e. Plastic laminated trim.
 - 2. General purpose grade laminate shall be used for counter tops except where colored core laminate is indicated.
- C. Plastic laminate, cabinet interior grade, conforming to NEMA LD3-1985 Grade CL20, 0.020 inch nominal thickness, in a low non-directional texture in solid color price group as selected by the Project Engineer/VA COR and the Architect.
 - 1. Cabinet interior grade laminate may be used for the interior surfaces of all 'closed cabinets,' where general purpose grade is not required.
 - 2. All shelving shall be cabinet interior grade.

- D. Plastic laminate, unfinished balancing (backer) sheet, conforming to NEMA LD3-1985 undecorated laminate, Grade BK20, 0.020 inch nominal thickness.
- E. Edging:
 - 1. Edging for plastic laminate shelving: Flexible polyethylene tee moulding, having a 3/4 inch face, equal to Outwater Plastics, Woodridge NJ., (telephone 800 835-4400), model number 105-679, in color as selected by the Project Engineer/VA COR and the Architect.

2.3 BACKING FOR LAMINATES AND VENEERS

- A. All laminate components with the exception of all toe spaces: Mattformed three layer medium density panel (PB), graded M2 per ANSI A 208.1 with a minimum density of 48 pounds per cubic foot or equivalent hardwood plugged plywood complying with PS 51-71.
 - 1. "No Formaldehyde Added": Provide board which is fabricated using pre-consumer recycled wood fibers and an exterior-grade urea-formaldehyde free resin binder. Product shall contain no formaldehyde additives. Acceptable products include the following or approved equal.
 - a. Collins Pine Company (distributed through Panel Source International, Tacoma WA.), product: "PureKor Particleboard Plus"
 - b. Plummer Forest Products, Post Falls ID., product "PFP particleboard".
 - c. Rodman Industries, Oconomowoc, WI., product: "Rodman Resincore I".
 - d. SierrePine Inc., Martel, CA., product "Encore SDP"
 - 2. Thicknesses:
 - a. 3/4 inch thick at cases.
 - b. 1 inch thick at shelves under 30 inches wide.
 - c. 1 1/8 inch thick at shelves 30 inches or more wide.
 - d. 1 1/8 inch thick at counters without sinks.
 - 3. Thicknesses:
 - a. Typical: 3/4 inch thick panels, except as otherwise indicated or specified.
 - b. Doors over 36 inches tall: provide 1-1/4 inch thick panels.
- B. At all toe spaces: APA MARINE A-A EXT, fir veneer marine grade plywood, with plugged cores and sanded faces, 3/4 inch thick.

2.4 CABINET HARDWARE

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:
 - 1. Accuride Corp., Santa Fe Springs, CA.
 - 2. CompX International, Inc., Dallas TX.
 - 3. Doug Mockett & Company, Inc., Manhattan Beach, CA.
 - 4. Engineered Products Company, Flint MI.
 - 5. Glynn-Johnson, Indianapolis IN.
 - 6. H.B. Ives Company, Wallingford CT.
 - 7. Häfele America Company, Archdale NC.
 - 8. Julius Blum, Inc. , Stanley NC.
 - 9. Knappe & Vogt, Grand Rapids, MI.

10. (Lamp) Sugatsune America, Inc. Carson, CA..
11. Mepla Inc., High Point NC.
12. Outwater Plastic Industries Inc., Woodridge NY.
13. Stanley Hardware, New Britain CT.
14. Waterloo Furniture Components, Ontario Canada.
- A. Door and drawer pulls:
 1. Horizontal pulls: Model Cosmas 305-4SN Satin Euro Style Bar Pull.
 2. Vertical pulls: Model Comas 305-4SN Satin Euro Style Bar Pull.
- B. Locks:
 1. General:
 - a. Provide at least three keys per keyed alike group.
 - b. Finish: lock plug finish "nickel".
 2. Locks for drawers and doors: deadbolt type.
- C. Catches: Magnetic touch latch type.
- D. Roller latches: Head frame mounted, stainless steel or cast bronze with brushed chrome finish, conforming to ANSI A 156.16, with manufacturers standard strike, equal to Glynn-Johnson model "1152B - Combination Roller Latch/Angle Stop".
- E. Pass-Through Cabinet Door Interlock Mechanism: Equal to Firmlok Mechanical Interlock.
 1. Prevents contamination by ensuring that only one pass-through door at a time can open.
 2. The moment a door is opened, the opposing latch engages a stainless-steel catch to lock out the opposing door.
 3. Dual heavy-gauge latch mechanism retract inside the easy-clean stainless-steel housing when not engaged, eliminating protruding hardware that collects contaminants and causes snags.
 4. Provide all components as required to have a functional condition.
- F. Casework hinges:
 1. General:
 - a. All hinges shall be screw-on type. No press-in or insertion type hinges will be accepted.
 - b. All hinges, after installation, shall be integral with the base plate and substrate, providing a contiguous system that insures against accidental release.
 - c. All hinges shall withstand a weight load of 150 pounds, minimum.
 2. Either hinge is acceptable, as selected by the Architect:
 - a. Casework hinges: five knuckle institutional, offset type for all swinging doors. Hinges shall be 2-1/2" long. Hinges are mounted with flathead screws, so applied to cabinets to withstand a weight load of 150 pounds minimum. Hinge finish: satin stainless steel.
 - 1) Number of hinges:
 - a) Doors 48 inches and less in height: 2 hinges.
 - b) Doors over 48 inches in height: 3 hinges.

- b. Hinge for full overlay cabinet doors: Self closing concealed hinge having maximum 125 degree angle of opening. Hinges shall be equal to Blum "Modul 125 Series", with straight arm, model N°. 95M5550.
 - 1) Number of hinges: Provide number of hinges indicated in Drawings, or if not indicated, provide number recommended by manufacturer for size and weight of door.
 - 2) Number of hinges: Provide number of hinges indicated in Drawings, or if not indicated, provide number recommended by manufacturer for size and weight of door.
- G. Pad silencers for doors: 10 mm (3/8 inch) diameter, self-adhesive resilient plastic or nylon buttons, at least 2 per door, in clear color.
- H. Drawer Slides (provide one pair per drawer except as noted otherwise):
 - 1. For desk and casework drawers (excluding file drawers): Full extension type, 100 pounds per pair minimum rated capacity, steel ball bearing rollers, lever disconnect, drawer hold in detent feature.
 - a. Acceptable slides, include the following:
 - 1) Accuride N°. 3832A
 - 2) Knappe and Vogt N°. 8400.
 - 3) Häfele N°. 3832.
 - b. Finish: clear lacquered zinc.
 - 2. For pencil drawers: 3/4 extension type, 45 pounds per pair minimum rated capacity, steel ball bearing rollers, friction disconnect.
 - a. Acceptable slides include the following:
 - 1) Accuride N°. 2006 (regular mount), N°. 2009 (bracket mount).
 - 2) Knappe and Vogt N°. 8200
 - 3) Häfele N°. 2009
 - 3. For under drawer mounting: Single extension type, 35 pounds minimum rated capacity, steel ball bearing rollers, drawer hold in detent feature.
 - a. Acceptable slides include the following:
 - 1) Accuride N°. 1029.
 - 2) Knappe and Vogt N°. 1500.
 - 3) Häfele N°. 423.55.9xx 7xx (Note: xx number will vary depending on depth of drawer).
 - b. Finish: clear lacquered zinc.
- I. Shelf supports: Shelf pins for laminated shelving, and wood shelving: plug-in type for 5mm diameter hole, Häfele model number 282.11.710 cast zinc alloy with nickel plated finish and recessed seat.
- J. Wire management grommets and covers: 2 inch diameter, as manufactured by Doug Mockett & Company, Manhattan Beach CA., model number "MM3 with 3A cover".
 - 1. Grommet Finish: Provide in metallic finish selected by the Project Engineer/VA COR and the Architect from Manufacturer's standard finishes.
 - 2. Locations: Provide where shown on Drawings, and if not shown, allow the following numbers of grommets; exact locations to be determined in field.
 - a. For counters 6 feet or less provide 2 wire grommets and covers.

- b. For counters over 6 feet, provide 1 wire grommet and cover for every 42 inches of counter, or fraction thereof.
- K. Wire management conduit and receptacle system: Medium voltage wire conduit system as manufactured by the Wiremold Company, West Hartford CT.

2.5 ACCESSORIES

- A. PVC Edging for plastic laminate casework:
 - 1. Manufactured by The Cloverdale Company (Band-it Brand), Cloverdale VA., or equal.
 - 2. Thickness: 2mm thick for door and drawer edges; 1mm for exposed edges of casework bodies.
 - 3. Edges: Square.
 - 4. Custom colors to match plastic laminate colors.
- B. Edging for adjustable shelving: Flexible PVC tee moulding, having equal to Outwater Plastics, Woodridge NJ., in color as selected by the Project Engineer/VA COR and the Architect.
- C. Edging for countertops: Flexible self-healing, PVC bumper shaped tee molding, having a 1-1/4 inch face, equal to Outwater Plastics, Woodridge NJ., model number 303-1250, in color as selected by the Project Engineer/VA COR and the Architect.
- D. Glue for lamination and fabrication of wood and plywood items: Exterior Grade, phenolic resin glue.
- E. Counter support brackets: Equal to Rakks Counter Supports by Rakks/Rangine Corp, Needham MA, with standard white color powder coat finish.
 - 1. Model EH-1818 for 24 inch counters.
 - 2. Model EH-1824 for 30 inch counters.
- F. Joint Sealer Type SL (Siliconized acrylic latex, interior construction): One-part low modulus, sealant, having a useful life expectancy of at least 10 years, conforming to ASTM C 834, with a minimum movement capability of ± 12 percent. Acceptable products include the following or approved equal.
 - 1. Gloucester Company, product "Phenoseal".
 - 2. Tremco, product "Tremflex 834".
 - 3. Pecora, product "AC-20+".
- G. Fasteners:
 - 1. Concealed joint fasteners: Threaded steel.
 - 2. Bolts, nuts, washers, lags, pins, and screws: Of size and type to suit application chrome finish in exposed-to-view locations.

2.6 FABRICATION - GENERAL

- A. Coordinate the fabrication of casework with that of the various trades responsible for installing materials and items which will be inserted into, or applied to, the casework surfaces. Obtain and verify templates, dimensions, and instructions from the respective trades before making cut-outs, holes, slots, and other cutting in the casework.
- B. Shop assemble custom casework for delivery to site. Deliver in assemblies as large as possible for entrance into the designated areas. Provide for concealed job connections of adjacent units.
- C. Fabricate, install and finish all work so that both sides of countertops, panels, doors, shelves and other casework are of balanced construction, to prevent warping.

- D. Cap exposed plywood, and particle board edges with solid hardwood, matching color of wood veneer panels. Apply veneer over hardwood edging in manner to show no visible lines between wood veneer and hardwood edging.
- E. Fit corners and joints hairline, secure with concealed fasteners.
- F. Finish all solid wood and plywood surfaces smooth, and free from all machine and tool marks that will show through the wood veneer or facing materials.
- G. Make all joints tight, and form to conceal shrinkage. Glue all miters having a dimension of 4 inches or more from heel to point.
- H. Provide shop fabricated counters, shop mitered components, closure trims with ample allowance for field cutting and fitting. Provide additional trim as required for scribing and site cutting.
- I. Finished work shall be free from visible adhesive and pencil marks.

2.7 FABRICATION - CASEWORK

- A. Fabricate casework in accordance with requirements of specified AWI Grade and the following additional requirements:
 - 1. Cabinets shall be in flush overlay construction, with drawer fronts and hinged doors overlapping openings a minimum of 1/4 inch all four sides.
 - 2. Fabricate all casework scheduled for veneer finish with exposed to view grain of wood vertical or horizontal as indicated on Drawings.
 - 3. Fabricate cabinets in integral units, each completely enclosed, without the use of common partitions.
 - 4. Fabricate plastic laminated casework with top and bottom fillers and corner panels described as optional for Custom Grade Work in the Quality Standards.
 - 5. Drawers:
 - a. Drawer sides and backs 1/2 inch thick solid hardwood of specified species.
 - b. Laminated drawer fronts: High density laminate over 3/4 inch specified core material. Drawer fronts shall be applied to separate drawer body component sub-front.
 - c. Wood veneer drawer fronts: body panel 1/2 inch thick solid hardwood of specified species, face panel same construction as specified for cabinet doors with matching veneer. Drawer fronts shall be applied to separate drawer body component sub-front.
 - d. Drawer bottoms (wood veneer casework): 1/4 inch thick hardwood veneer panel housed and glued into front, sides and back.
 - e. Drawer bottoms (plastic laminated casework): 1/4 inch thick color polyester laminate, housed and glued into front, sides and back.
 - f. Underside of drawer to receive continuous hot melt glue at joint between bottom and back/sides/front for sealing and rigidity.
 - g. Reinforce drawer bottoms as required with intermediate spreaders.
 - 6. Doors: Square edge design, 3/4 inch thick, without any profiling and shall fully overlap the cabinet frame.
 - a. Laminate doors: Fabricate doors with particle board core and front and rear faces high-pressure laminate, of selected color.
 - b. Wood veneer doors: Fabricate doors with particle board core and front and rear faces grade AA wood veneer, and solid wood edging.

- c. Maintain a maximum 1/8" reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
- 7. Base cabinets: Provide full horizontal top frame with glued and doweled joints, 3/4 inch plywood end panels and bottom. Bottom shall be glued and doweled and let into routed end panels. Provide 4 inch high toe rail, securely screwed to the end panels and to the bottom panel by concealed glue blocks.
- 8. Wall cabinets: Provide same finishes as base cabinets, with 3/4 inch thick top and bottom veneered plywood panels. Top and bottom panels shall be glued and doweled and let into routed end panels. Back of case shall be recessed and let into routed end panels and further secured with glue blocks.
- 9. Door and drawer spreaders: Provide minimum 3/4 thick full width cabinet body spreaders immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, and close off reveal. Front edge to be match face of adjacent cabinet doors/drawers.

2.8 FABRICATION OF PLASTIC LAMINATE CLAD ITEMS

- A. Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
- B. Except as otherwise specified hereunder, fabricate plastic laminate clad items in strict accordance with the details on the Drawings, the approved shop drawings, and workmanship standards set forth in the AWI Quality Standards Section 400, for specified Quality Grade.
- C. Shop fabricate all plastic laminate clad items. Adhere plastic laminate to particle board backing sheets by cold-press-method. Use of contact cements are not permitted. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Apply laminate backing sheet to reverse side of all laminated, panels, shelving and tops.
- D. Cap edges with specified banding, matching color of plastic laminate panels.
 - 1. Casework facing: Machine apply flat PVC banding, 0.018 inch (0.050 mm), using waterproof hot melt adhesive.
 - 2. Drawer and door fronts: Machine apply to all four edges, 2mm thick PVC banding, using waterproof hot melt adhesive, corner radiused profile for consistent design and safety.
 - 3. Shelving: Machine apply to all four edges, 2mm thick PVC banding, using waterproof hot melt adhesive, corner radiused profile for consistent design and safety.
- E. Fit corners and joints hairline. Make all joints and miters tight, secure with concealed fasteners.

2.9 FACTORY FINISHING

- A. General: Factory finish to be to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations.
- B. Transparent finish: AWI Premium Grade Factory Finish System 5, having a Medium rubbed effect with a sheen of 24° to 28° gloss units per ASTM D523. Finish system shall not substantially increase flame spread.
 - 1. Finish system shall include the following:
 - a. Wash coat, reduced conversion varnish.
 - b. Wash coat, vinyl.
 - c. Stain coat.
 - d. Sealer, reduced conversion varnish.

- e. Sealer, vinyl.
 - f. First topcoat.
 - g. Second topcoat.
- C. Concealed surfaces: Thoroughly coat all concealed surfaces of finish woodwork before assembling with two coats of clear wood preservative.
- D. Field Touch-up: Shall be the responsibility of the installing contractor and shall include the filling, and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and marks, and final cleaning up of the finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 - 1. Verify adequacy of blocking, backing and support framing for all finish carpentry work.
 - 2. Examine pre-fabricated woodwork before installation and verify that back priming has been completed and all packing has been removed.
 - 3. Do not install base cabinets and other floor mounted casework unless the finished floor is in place.
 - 4. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

- A. Before installing work under this section, woodwork shall be conditioned to average prevailing humidity conditions in areas of installation.
- B. Protect other Work against undue soilage and damage by the exercise of reasonable care and precautions. Clean, repair, or replace any work so damaged and soiled to the acceptance of the Project Engineer/VA COR and the Architect.

3.3 INSTALLATION - GENERAL

- A. Install work in accordance with the latest AWI quality standards in grade specified herein, under the Article entitled "QUALITY ASSURANCE".
- B. Woodwork shall be installed plumb, level, true and straight without distortions.
 - 1. Use concealed shims as required.
 - 2. Work shall be installed to a tolerance of 1/8 inch in 8 feet for plumb and levelness, including tops.
 - 3. There shall be no variations in flushness of adjoining surfaces.
- C. Tops and woodwork shall be scribed and trimmed to fit adjoining work.
 - 1. Where cuts occur, refinish surfaces and repair damaged finishes
- D. Secure woodwork to anchors or built-in blocking or blocking directly attached to substrates.
 - 1. Secure woodwork to grounds, furring, stripping and blocking as required with countersunk, concealed fasteners and blind nailing performing a complete installation.
 - 2. Use thin gauge finishing nails for exposed nailing, countersunk and filled flush with woodwork finished surface.
 - a. Match final finish materials where transparent finish is indicated.

3.4 INSTALLATION - CASEWORK AND COUNTERTOPS

- A. Install casework without distortion so that doors and drawers fit openings properly and are accurately and evenly aligned.
 - 1. Install end cabinet panels with a continuous bead of Sealant Type SL applied to bottom edge that abuts finish flooring. Immediately remove all excess sealant from surfaces of the casework and flooring.
- B. Adjust casework hardware centering the doors and drawers in the openings, and provide unencumbered operation.
- C. Complete the installation of hardware and accessory items as indicated.
- D. Maintain veneer sequence matching of casework with transparent finish, where so manufactured.
- E. Tops: Anchor tops securely to base units and to other support systems as required.
- F. Install back and side splashes with a continuous bead of Sealant Type SL applied to splash edges that abut countertop materials and adjoining splashes. Immediately remove all excess sealant from surfaces of the casework.

3.5 FIELD FINISHING

- A. Except where expressly noted otherwise on Drawings, shop finish all woodwork. Where field finishing is indicated or scheduled on Drawings, finishing Work shall be as specified under Section 099100 - PAINTING.

3.6 TOLERANCES

- A. Maximum variation from true position 1/16 inch with a maximum of 1/32 inch offset from true alignment with adjoining surfaces intended to be flush.

3.7 ADJUSTING

- A. To whatever extent work was not completed at shop or prior to installation of woodwork, perform and complete the specified finishing of woodwork.
- B. Repair damaged and defective woodwork where possible eliminating defects functionally and visually.
 - 1. Where not possible to repair damaged or defective work, replace with matching new work.
 - 2. Adjust joinery for uniform appearance.
- C. Adjust doors and drawers for smooth and balanced movement, lubricate hardware for use.

3.8 CLEANING

- A. Comply with requirements of Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for handling and disposition of all construction and demolition waste.
- B. Daily clean work areas by sweeping and disposing of scraps and sawdust.
- C. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area leave area in broom-clean condition.
- D. Remove protective material from pre-finished surfaces, immediately prior to Final Acceptance.
- E. Carefully clean exposed and semi-exposed wood surfaces, in strict accordance with fabricator's instructions. Touch-up shop-applied finishes to restore damaged or soiled areas, matching adjoining finish.
- F. Wash down plastic laminate with a solution of mild detergent in warm water, applied with soft clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

- G. Clean and polish hardware, and bright metal trim components.

3.9 PROTECTION

- A. Protect installed woodwork and maintain specified conditions, in a manner acceptable to both fabricator and installer. Ensure that work of this Section will not be damaged or soiled, and is completely free of defects at the time of final acceptance of Project by the Project Engineer/VA COR and the Architect.

END OF SECTION

SECTION 066116
SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Solid surface (solid polymer) countertops and window stools.
 - 2. Sealant, for joints between countertops, backsplashes and abutting surfaces.
- B. Make all cut outs within solid surfacing items as required to accommodate sinks, and other plumbing fixtures, from templates provided by the respective trades.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - ROUGH CARPENTRY: Wood blocking and nailers.
- B. Section 064000 - ARCHITECTURAL WOODWORK: Cabinetry, shelving and other shop fabricated casework.
- C. Division 22 - PLUMBING: Plumbing fixtures and piping.

1.3 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data. Identify available colors, shades, and gloss
 - 2. Shop drawings: Large scale design details of minimum 1-1/2 inch-to-1 foot scale, showing abutting materials, installation conditions, clearances. Show profiles, jointing and fastening methods.
 - 3. Selection samples:
 - a. Solid surfacing samples for initial color selection by Architect.
 - b. Sealant material: Manufacturer's standard strips of sealant, in all available colors, for selections by the Architect.
 - c. Provide additional samples as requested by Architect for initial selection of material colors and finishes.
 - 4. Verification samples:
 - a. 12 by 12 inch samples of solid surfacing materials.

1.4 QUALITY ASSURANCE

- A. Fabricator and Installer; with a minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
 - 1. Fabricator and Installer for solid surfacing products shall be trained and certified by solid surfacing manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Concrete, masonry, plaster, tile and marble setting and polishing and other wet work shall be completed and dry before delivery, storage and installation of fabricated solid surface items.

- B. Ship and handle all materials and fabricated items in a manner which will prevent damage thereto, and store all materials and fabricated items at a dry, elevated, ventilated, and protected interior location.
- C. Sequence deliveries to avoid delays and to minimize on-site storage.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperature above 55 degrees Fahrenheit for 5 calendar days before, during, and after installation of solid surfacing fabrications; maintain temperature until Owner's Final Acceptance.

1.7 FIELD MEASUREMENTS

- A. Field dimensions: The fabricator is responsible for details and dimensions not controlled by Project conditions and shall show on his shop drawings all required field measurements beyond his control.
 - 1. The Contractor shall acknowledge the fabricator's need for accurate field dimensions prior to custom fabrication.
 - 2. The Contractor and the fabricator shall cooperate to establish and maintain these field dimensions.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

PART 2 - PRODUCTS

2.1 SOLID SURFACING MATERIALS

- A. Basis of Design: Refer to Sheet 31-ID-104.
- B. Polymer solid surfacing material: Non-porous surfacing material homogeneously composed of natural minerals and high-performance polymer, fabricated sizes and profiles as shown on the Drawings, in colors and finishes as selected by Architect.
 - 1. Solid surfacing material shall be NSF (National Sanitation Foundation) listed under publication 51 - Plastic Materials and Components used in Food Equipment and bear the "component" mark.
 - 2. Colors and patterns shall be as selected by the Architect.
- C. Sheet thicknesses shall be as specified below or as otherwise indicated on Drawings.
 - 1. Countertops: One piece monolithic design, 1/2 inch thick.
 - 2. Solid surface wall panels: One piece monolithic design, 1/4 inch thick, using manufacturer's recommended adhesive and stainless steel mechanical fasteners as detailed.
 - a. Stainless steel type 304 shall be used for exposed fastening components, with a brushed finish.
 - 3. Countertop edges: Standard square profile with eased edges, using manufacturer's joint adhesive.
 - 4. Backsplashes: 1/2-inch thick in locations and heights as shown on the Drawings.
- D. Adhesive for build-up of solid surfacing sheets: color matched two-component seam adhesive as provided by solid surfacing manufacturer.

- E. Adhesive for installation of trim components, neoprene panel adhesive or structural silicone glazing sealant, as recommended by solid surfacing manufacturer.

2.2 ACCESSORIES

- A. Sealant, for joints between countertops and dissimilar materials: Joint Sealer Type SM as specified in Section 079200 - JOINT SEALANTS.
- B. Bolts, nuts, washers, lags, pins, and screws: Of size and type to suit application chrome finish in exposed-to-view locations.
- C. Field installed Grommets as required for cable access at three feet (3') on center minimum. Quantities and locations as required by Project Engineer/VA-COR.
- D. Fir plywood for backing: EWA C-C PLUGGED EXT.
- E. Concealed supports for edge and corner backing shall be kiln dried birch or poplar.

2.3 FABRICATION

- A. Coordinate the fabrication of solid surfacing products with that of the various trades responsible for installing materials and items which will be inserted into, or applied to, the countertop surfaces. Obtain and verify templates, dimensions, and instructions from the respective trades before making cut-outs, holes, slots, and other cutting in the countertops.
- B. Shop fabricate all solid surfacing items in strict accordance with the details on the Drawings, the approved shop drawings, and recommendations of the solid surfacing manufacturer
 - 1. Prepare countertops for undermount design sinks furnished and installed under Division 22 - PLUMBING.
- C. Fit corners and joints hairline. Make all field joints and miters tight, secure with concealed fasteners.
- D. Provide shop fabricated counters, shop mitered components, closure trims with ample allowance for field cutting and fitting. Provide additional trim as required for scribing and site cutting.
- E. Route all edges to be butted for a smooth, clean fit. Sand edges with 120 grit sandpaper to rough up surfaces for adhesive bonding. Clean with denatured alcohol.
- F. Prepare and apply adhesive in compliance with manufacturer's written instructions. Clamp all components using manufacturer's approved clamping methods at all joints and build-up laminations, maintain clamping until adhesive is set. Avoid over-tightening clamps and squeezing out adhesive.
- G. Remove excess adhesive when dry with router. Follow with belt sander using 120 grit, diagonal to joint. After adhesive is leveled and smooth with surface, proceed with final shaping and finishing.
- H. After shaping, smooth finish of cut surfaces equal to manufacturer's original finish. Sand surfaces smooth with wet 400 grit sandpaper. Remove superficial scratches and sander markings, buff with nylon buffing pads as recommended by solid surfacing manufacturer. Wipe surfaces clean and dry with cloths.
- I. Finished work shall be free from visible adhesive and pencil marks.
- J. Field touch-up: Shall be the responsibility of the installer and shall include the filling, and touch-up of exposed job made nail or screw holes, refinishing of surfaces resulting from job

fitting, repair of job inflicted scratches and marks, and final cleaning up of the finished surfaces.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. General: Install work in accordance with manufacturer's instructions.
- B. Solid surfacing shall be installed plumb, level, true and straight without distortions:
 - 1. Use concealed shims as required
 - 2. Work shall be installed to a tolerance of 1/8 inch in 8 feet for plumb and levelness, including tops.
 - 3. There shall be no variations in flushness of adjoining surfaces.
- C. Tops and trim shall be scribed and trimmed to fit adjoining work.
 - 1. Where cuts occur, refinish surfaces and repair damaged finishes
- D. Secure solid surfacing fabrications to blocking directly attached to substrates.
 - 1. Secure fabrications using concealed fasteners.
 - 2. Anchor tops securely to base units and to other support systems as required.
- E. After installation and leveling of solid surfacing fabrications has been completed; apply a continuous bead of specified sealant to all joints which abut walls or partitions. Tool the sealant to a uniformly dense surface, level with the edges of the casework. Immediately remove all excess sealant from solid surfacing surfaces.

3.2 TOLERANCES

- A. Maximum variation from true position 1/16 inch with a maximum of 1/32 inch offset from true alignment with adjoining surfaces intended to be flush.

3.3 CLEANING

- A. Daily clean work areas by sweeping and disposing of scraps.
- B. Clean excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and solid surfacing manufacturers.
- C. Wash down exposed surfaces with a solution of mild detergent in warm water, applied with soft clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

3.4 PROTECTION

- A. Protect installed fabrications in a manner acceptable to fabricator and installer, which shall ensure no damage or deterioration at the time of Final acceptance of Project by the Architect.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 – GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Rigid insulation to match existing at exterior walls.

1.2 RELATED REQUIREMENTS

- A. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- B. Section 024119 - SELECTIVE DEMOLITION: Removal of existing partitions, walls and related insulation.
- C. Section 061000 - ROUGH CARPENTRY: Wood blocking, nailers.
- D. Section 072133 - OPEN CELL SPRAYED FOAM INSULATION: Foamed-in-place insulation within framed walls, ceilings, and roof structures at indicated locations
- E. Section 072600 - VAPOR RETARDERS: Variable-permeance vapor retarder in wall assemblies
- F. Section 072700 – AIR/VAPOR BARRIERS: Self-adhesive sheet membrane air barrier system.
- G. Section 098100 - ACOUSTICAL INSULATION: Acoustical batt insulation between framing members.
- H. Section 092900 - GYPSUM BOARD: Installation of wall board over insulation in Z-channel furring system.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
 - 1. ASTM C 203 - Breaking Load and Flexural Properties of Block Type Thermal Insulation.
 - 2. ASTM C 518 - Thermal Transmission Properties by Means of the Heat Flow Meter.
 - 3. ASTM C 578 - Preformed Cellular Polystyrene Thermal Insulation.
 - 4. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
 - 5. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750°C.
 - 6. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 7. ASTM E 96 - Water Vapor Transmission of Materials.
 - 8. All applicable federal, state and municipal codes, laws and regulations for thermal insulation.
- B. Definitions:

1. The term "R-Value" referred to herein refers to the thermal resistance of the insulation alone and does not allow consideration of air spaces or other factors.

1.4 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

1.5 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

- B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 - a. Rigid board insulation materials are combustible and may constitute a fire hazard, do not expose insulation materials to open flames or other ignition sources, comply fully with manufacturer's recommendations and the requirements of local authorities having jurisdiction, for delivery, handling, storage and installation.
2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

- C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in packages containing water marks, or show evidence of mold.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cavity wall rigid extruded polystyrene insulation: Closed cell foam board, square edge, self-extinguishing, conforming to ASTM C 578, Type IV, with a compressive strength of 25 pounds per square inch when tested in accordance with ASTM D 1621.

1. Panel Size: Provide insulation boards used at masonry construction of size to suit spacing of through-wall reinforcement.
2. Minimum R-value: 5 per inch thickness.
3. Thickness as indicated on Drawings or to match thickness of adjacent rigid extruded polystyrene insulation.
4. Acceptable products include but are not limited to:
 - a. Dow Chemical Corp., product, Styrofoam Brand "Cavitymate Plus"
 - b. Owens Corning, product "Foamular CW25".

- c. Pactiv, Corp. product "GreenGuard XPS 25 PSI Board".
- d. DiversiFoam Products, product "CertiFoam 25 SE".

2.2 ACCESSORIES

- A. Staples, tape, adhesives and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each insulation type.
- B. Setting adhesive for rigid insulation: Conforming to ASTM C-557.
- C. Sill sealer: Compressible polystyrene strip, minimum ¼ inch thick by width of framing. Acceptable products include the following, or approved equal.
 - 1. Amoco Foam, Products Company, Atlanta GA. Product "Amofoam Sill Sealer".
 - 2. Dow Chemical Corp., Midland MI., product "Styrofoam Sill Seal"
 - 3. Pactiv Building Products, Lake Forest IL. product "GreenGuard Sill Sealer"

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 - 1. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 INSTALLATION

- A. Rigid insulation in exterior walls:
 - 1. Apply adhesive to substrate, in three continuous beads per board length to a full bed of 1/8 inch thick.
 - 2. Place boards in a method to maximize contact bedding. Stagger vertical joints. Butt edges and ends tight to adjacent board and to protrusions. Place impale fastener locking discs. Tape seal board joints.
 - 3. Install boards horizontally between wall reinforcement.
- B. Sill sealer: Install as recommended by manufacturer beneath sills with corrugated side facing down and ends butted.

3.3 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris, and scraps.
- B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION

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**SECTION 072116
BLANKET INSULATION**

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies stone fiber batt and blanket thermal insulation and stone fiber batt and blanket acoustical insulation.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- D. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. All applicable federal, state and municipal codes, laws and regulations for fire-resistant construction.
 - 2. ASTM C165 - [2012], Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
 - 3. ASTM C167 - [2009], Standard Test Method for Thickness and Density of Blanket or Batt Thermal Insulations.
 - 4. ASTM C356 - [2010], Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
 - 5. ASTM C423 - [2009a], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 6. ASTM C518 - [2010], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 7. ASTM C553 - [2011], Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - 8. ASTM C612 - [2010], Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 9. ASTM C665 - [2011], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 10. ASTM C795 - [2013], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - 11. ASTM C1104/C1104M - [2000(2006)], Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - 12. ASTM E84 - [2012b], Standard Test Method for Surface Burning Characteristics of Building Materials.

13. ASTM E90 - [2009], Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
14. ASTM E136 - [2011], Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
15. ASTM E413 - [2010], Classification for Rating Sound Insulation.
16. ASTM E1050 - [2012], Standard Test Method for Impedance and Absorption of Acoustical Materials Using a Tube, Two Microphones and a Digital Frequency Analysis System.
17. US Green Building Council (USGBC).
18. Underwriters' Laboratories (UL). UL 181 - [2005], Factory-Made Air Ducts and Connectors.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Scheduling:
 1. The installation of ducts, piping, conduit or other suspended equipment shall not take place until the application of sprayed fire protection is complete in an area.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and limitations of fireproofing.
 2. Manufacturer's Instructions and typical details: Indicate special application procedures or conditions.
- B. Closeout Submittals: Submit the following:
 1. Certificates: Installers certificate stating that sprayed fireproofing has been completed in full accordance with requirements to provide necessary fire resistance ratings.
 2. Record Documentation: Installer's Field Reports stating environmental conditions during the installation of fireproofing materials, include temperature and humidity conditions.
 3. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of fireproofing.
- C. Qualifications:

1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
2. Deliver materials, factory proportioned and mixed, in original, unopened packages bearing the name of the product, manufacturer's name, plant identification, lot number and Underwriter's Laboratories, Inc. label.

B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Store all materials in an elevated dry location, protected by waterproof coverings.
3. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage.

1.8 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
- C. Warranty period: [1] years commencing on Date of Substantial Performance of Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following:
 1. Roxul Inc., Milton, Ontario or approved equal.

2.2 APPLICATION

- A. Conduit openings into Airborne Infection Isolation (AII) and Ante Rooms which are trade size 2 inches and smaller.

2.3 DESCRIPTION

- A. Non-combustible, lightweight, semi-rigid stone wool batt insulation to ASTM C665 Type 1, that provides fire resistance to ASTM E136 and sound control to ASTM E423.

2.4 PERFORMANCE/DESIGN CRITERIA

- A. Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC S702, Type 1, that provides fire resistance to ASTM E136 and a sound control to ASTM E90 and ASTM E423. Acoustical and fire batt insulation for walls and floors PER ASTM C665, Type 1:
 1. Fire performance:

- a. Non-combustibility: To ASTM E136.
- b. Surface Burning Characteristics: To ASTM E84.
 - 1) Flame spread: 0.
 - 2) Smoke developed: 0.
- 2. Acoustical Performance:
 - a. Airborne sound transmission loss: To ASTM E90.
 - b. Rating sound insulation: To ASTM E413.
 - c. Sound absorption co-efficients: To ASTM E423.

Sound Absorption Co-efficiencies at Frequencies:

Thickness (inches)	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
1	0.14	0.25	0.65	0.90	1.01	1.01	0.70
1 1/2	0.18	0.44	0.94	1.04	1.02	1.03	0.85
2	0.28	0.60	1.09	1.09	1.05	1.07	0.95
3	0.52	0.96	1.18	1.07	1.05	1.05	1.05
4	0.86	1.11	1.20	1.07	1.08	1.07	1.10

2.5 MATERIALS

- A. Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC S702, Type 1, that provides fire resistance to ASTM E136 and a sound control to ASTM E90 and ASTM E423.
 - 1. Size: [16] [24] x 48 inches.
 - 2. Thickness: [1] [1.5] [2] [2.5] [3] [3.5] [4] [5] [6] inches.

2.6 ACCESSORIES

- A. Mechanical fasteners in accordance with insulation manufacturer's written recommendations.
- B. Acoustical sealant in accordance with Section [07 92 19 - Acoustical Joint Sealants].
- C. Firestopping materials in accordance with Section [07 84 00 - Firestopping].

2.7 SOURCE QUALITY CONTROL

- A. Ensure insulation components and accessories are supplied or approved in writing by single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Use only installers with [5] years minimum experience with work similar to work of this Section.

3.2 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer's written recommendations.
 - 1. Visually inspect substrate in presence of Consultant.
 - 2. Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.

3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
- B. Start of insulation installation indicates installer's acceptance of substrate installation conditions.

3.3 INSTALLATION

- A. Install insulation in accordance with manufacturer's written recommendations.
- B. Install insulation to maintain continuity of thermal protection to building elements and spaces.
- C. Do not compress insulation to fit into spaces.
- D. Coordinate installation of firestopping insulation with Section 07 84 00 - Firestopping.
- E. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- F. Keep insulation minimum 3 inches from heat emitting devices such as recessed light fixtures, and minimum 2 inches from sidewalls of chimneys and vents.
- G. Seal joints with acoustical joint sealant in accordance with Section [07 92 19 - Acoustical Joint Sealants].
- H. Do not enclose insulation until before inspection and receipt of Consultant's written approval.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with Section 014529 - Testing Laboratory Services.
- B. Manufacturer's Services:
 1. Coordinate manufacturer's services with Section 014529 - Testing Laboratory Services.
 - a. Arrange for payment for manufacturer's services.
 - b. Have manufacturer review work involved in handling, installation, protection, and cleaning of insulation and accessories, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
 2. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - a. Report any inconsistencies from manufacturer's recommendations immediately to Consultant.
 3. Schedule site visits to review work at stages listed:
 - a. After delivery and storage of drainage sheet and accessories, and when preparatory work on which Work of this Section depends is complete, but before installation begins.
 - b. Twice during progress of work at 25% and 60% complete.
 - c. Upon completion of Work, after cleaning is carried out.
 - d. Obtain reports within three days of review and submit immediately to Consultant.

3.5 CLEANING

- A. Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 – Cleaning and Waste Management].
 1. Leave work area clean at end of each day.

- B. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 – Cleaning and Waste Management].
- C. Waste Management:
 - 1. Co-ordinate recycling of waste materials with 01 74 19 - Construction Waste Management and Disposal.
 - 2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
 - 3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- A. Protect installed products and accessories from damage during construction.
- B. Repair damage to adjacent materials caused by insulation installation.

END OF SECTION

SECTION 072133
OPEN CELL SPRAYED FOAM INSULATION

PART 1 – GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Foamed-in-place insulation within framed walls, ceilings, and roof structures at indicated locations.
 - 2. Foamed-in-place insulation at junctions of dissimilar wall and roof materials to achieve a thermal and air seal.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 079200 - JOINT SEALANTS: Requirements for joint sealant and backing materials.
- E. Section 092900 - GYPSUM BOARD.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING.
- G. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Ductwork and piping insulation.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
 - 1. ANSI/AF&PANDS - National Design Specification for Wood Construction
 - 2. ASTM C 1029 - Spray Applied Rigid Cellular Polyurethane Thermal Insulation.
 - 3. ASTM C 177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - 4. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 5. ASTM C 518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.
 - 6. ASTM D 1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
 - 7. ASTM D 1621 – Test Method for Compressive Properties of Rigid Cellular Plastics.

8. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
 9. ASTM D 1622 – Test Method for Apparent Density of Rigid Cellular Plastics.
 10. ASTM D 1623 – Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
 11. ASTM D 2126 – Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 12. ASTM D 2842 – Test Method for Water Absorption of Rigid Cellular Plastics.
 13. ASTM D 2856 – Test Method for Open Cell Content of rigid Cellular Plastics by Air Pycnometer.
 14. ASTM D 5116 - Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
 15. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750°C.
 16. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 17. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 18. ASTM E 96 - Water Vapor Transmission of Materials.
 19. CAN/ULC-S705.1-01 Standard for Thermal Insulation - Medium Density Closed Cell Spray Applied Rigid Polyurethane Foam – Material Specification.
 20. CAN/ULC-S705.2-05 Standard for Thermal Insulation - Medium Density Closed Cell Spray Applied Rigid Polyurethane Foam – Application.
 21. NFPA 286 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish.
 22. UL - Building Products Directory.
 23. UL 1715 - Fire Test of Interior Finish Material.
 24. All applicable federal, state and municipal codes, laws and regulations for thermal insulation and vapor barriers.
- B. Definitions:
1. The term “OC-SPF” referenced herein refers to “Open-Cell Spray Polyurethane Foam” insulation.
 2. The "R-Value" referred to herein refers to the thermal resistance of the insulation alone and does not allow consideration of air spaces or other factors.
 3. Prescriptive Thermal Barrier: Pursuant to IBC and IRC, minimum ½ inch thick gypsum wallboard (specified under Section 09 29 00).
 4. Equivalent Thermal Barrier: Pursuant to IBC and IRC, independently tested assembly to limit temperature rise to 15 minutes. Equivalent thermal barriers may include:
 - a. Spray-applied cementitious materials.
 - b. Spray-applied cellulose materials.
 - c. Portland cement plaster.
 - d. Other approved various proprietary materials.
 5. Applied Intumescent Ignition Barrier (Alternative Assembly): Pursuant to IBC and IRC, independently tested Alternative Assembly, which has been specifically approved on

the basis of large-scale fire testing representing the actual end-use configuration as identified in ECC-ES Evaluation Report, and approved by local authorities having jurisdiction.

- a. Alternative assemblies tested under AC 377, Appendix X is not an acceptable Alternative Assembly.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

1.5 SUBMITTALS

A. Information and Review Submittals:

1. Product Data: Provide data on material characteristics, performance criteria, and limitations.
 - a. Submit letter from primary materials manufacturer indicating approval of products not manufactured by primary manufacturer.
 - b. Include statement that materials are compatible with adjacent materials proposed for use.
2. Manufacturer's certifications:
 - a. Provide ICC-ES Evaluation Report as part of the manufacturer's documentation confirming material has been evaluated and conforms to the performance requirements specified herein and IBC or IRC code requirements as applicable.
 - 1) Certification from ICC-ES Evaluation Report that insulation meets fire hazard classification requirements with prescriptive thermal barrier, or prescriptive intumescent ignition barrier, as applicable to applications indicated on Drawings.
3. Shop Drawings: Developed for specific project conditions including mock-up, submittal of manufacturer's standard details are prohibited.
4. Samples: Submit clearly labeled samples, 3 by 4 inch (75 mm by 100 mm) minimum size of each material specified.
5. Manufacturers installation instructions: indicate preparation, installation requirements and techniques, product storage and handling criteria, and limitations of the material.

B. Closeout Submittals: Submit the following under provisions of Section 019999 - PROJECT CLOSEOUT.

1. Daily work record for application of OC-SPF, including equipment pressure settings, temperature, fluid quantities applications, and locations of application.
2. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of sprayed foam insulation.
- C. Qualifications:
 - 1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and a licensed applicator by product manufacturer.
 - a. Provide proof of manufacturer's certification upon request.
- D. Certifications:
 - 1. Fire Hazard Classification: Maximum flame spread/smoke developed rating of 25/450, tested to ASTM E84.
- E. Manufacturer's Installation Review: Make arrangements to have Manufacturer's representative (employed by manufacturer) on-site during work of this Section to periodically review installation procedures. A minimum of 2 site visits are required.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
 - 2. Deliver materials in original unopened packages, containers or bundles bearing brand name, and identification of manufacturer, with labels and package seals intact and legible.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 - 2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
- C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.8 SITE CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturer for 24 hours before, during, and 48 hours after installation of sprayed foam insulation. Do not install OC-SPF when environmental conditions are not in compliance with requirements of OC-SPF manufacturer.
- B. Field Conditions:

1. Do not install OC-SPF in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.
2. Do not apply OC-SPF when wind velocity exceeds 15 miles per hour unless advance means and methods are recommended by manufacturer, and complied with.

1.9 WARRANTY

- A. General: Submit warranties under provisions of Section 019999 - PROJECT CLOSEOUT.
- B. Special Warranty:
 1. Warrant work of this section against defects or deficiencies for a period of two years from the date work is certified as substantially performed in accordance with general condition of the contract.
 2. Promptly correct, at own expense, defects or deficiencies which become apparent within the warranty period.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. General Description: Two component low-density open-cell spray polyurethane foam system having a nominal in-place density of 0.5 pounds per cubic foot. The insulation is produced in the field by combining a polymeric isocyanate and a polymeric resin.

2.2 PERFORMANCE/DESIGN CRITERIA

- A. General: All penetrations of the sprayed foam insulation, and paths of air infiltration/exfiltration shall be made airtight.
- B. VOC Regulations: Provide products which comply with applicable regulations controlling the use of volatile organic compounds.
- C. Outgassing/Reactivity or Toxicity/Hazardous Materials:
 1. Formaldehyde: Products containing urea-formaldehyde will not be permitted.
 2. Chlorofluorocarbons (CFCs/HCFCs): Products and equipment requiring or using CFCs or HCFCs during the manufacturing process will not be permitted.
- D. Performance criteria:
 1. Long Term Thermal Resistance (LTTR), when tested in accordance with ASTM C 518: Not less than R-value of 3.18 per inch.
 2. Open cell content: Greater than 90 percent when tested in accordance with ASTM D 6226 or ASTM D 2846.
 3. Density, when tested in accordance with ASTM D 1622 (nominal 3 to 4 inch lifts): Range of 0.45 (minimum) to 0.6 (maximum) pounds per cubic foot.
 4. Compressive Strength, when tested in accordance with ASTM D 1621: 0.7 pounds per square inch minimum.
 5. Tensile Strength, when tested in accordance with ASTM D 1623: Range of 3.2 (minimum) to 5.9 (maximum) pounds per square inch.
 6. Air Leakage (for 3.5 inches of material), tested per ASTM E 283 at 75 Pa: Less than 0.02 L/s/m².

7. Water vapor permeability (for 3.5 inches of material), tested per ASTM E 96: 6.33 perms.
8. Sound Transmission Class (STC): tested per ASTM E 413; STC range 49 to 51.
9. Noise Reduction Coefficient (NRC), tested ASTM C 423; NRC 0.7.
10. Flame Spread and Smoke Developed Rating tested per ASTM E 84: Class 1 having the following:
 - a. Flame Spread: less than 25.
 - b. Smoke Developed: less than 450.
11. Ignition property (spontaneous ignition temperature), tested per ASTM D 1929: 1040 degrees F. (560° C).

2.3 EQUIPMENT

- A. Equipment for spraying foam shall be manufactured specifically for the application of polyurethane foam. The equipment shall be airless, capable of maintaining a 1:1 volume ratio and have primary and hose heaters (50 feet of material hose maximum allowable to meet mix pressure requirements). Acceptable application guns shall include but are not limited to Graco Reactor E-30, Graco Fusion Air Purge configured with an AR4242 mix chamber, or as recommended by the manufacturer.
 1. Process temperature settings:
 - a. Isocyanurate: 130 to 135 degrees F.
 - b. Resin: 130 to 135 degrees F.
 - c. Hose 130 degrees F.
 2. Process pressure 1000 psig minimum while spraying.
- B. Equipment settings are to be recorded on the Daily Work Record.

2.4 ACCESSORIES

- A. Prime substrate when required by spray polyurethane manufacturer or the membrane manufacturer. The type of primer and the installation of the primer shall follow the requirements of the manufacturer for the surface conditions.
- B. Prime substrate when required by spray polyurethane manufacturer or the membrane manufacturer. The type of primer and the installation of the primer shall follow the requirements of the manufacturer for the surface conditions.
- C. Variable permeance vapor retarder:
 1. Basis of Design: 475 High Performance Building Supply, product: "DB+ Pro Clima", <https://foursevenfive.com>
 2. Characteristics:
 - a. Thickness 9 mil (0.23mm).
 - b. Variable perm rating 0.8 – 8.0 perm (average 1.43) Sd-value 4 – 0.4 (average 2.3m).
 - c. Tensile strength 550 N/50 mm / 300 N/50 mm ; 63 lb/in / 34 lb/in (longt./transverse).
 - d. Elongation 5% / 5% (longt./transverse).
 - e. Tear resistance 70 N / 70 N ; 16 lbf / 16 lbf (longt./transverse).
 - f. Thermal conductivity 1.10 hr.ft²F/BTU.in (0.13 W/mK).

- D. Membrane at Transitions in Substrate and Connections to Adjacent Elements, as acceptable to the spray polyurethane foam air barrier manufacturer:
1. Acceptable Manufacturers: Subject to compliance with the requirements specified herein and approval with specified foam air barrier (for compatibility), manufacturers offering similar products include the following:
 - a. Henry Bakor Inc., Henry Bakor, Inc., Tadoussac, QC.
 - b. Carlisle Coatings & Waterproofing Inc., Wylie, TX.
 - c. W.R. Grace & Co., Construction Products Division, Cambridge MA.
 2. Sheet membrane: Prefabricated composite sheet 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mils) of cross-laminated, high-density polyethylene film to provide a minimum 1 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.
 - a. Performance Requirements:
 - b. Water Vapor Transmission: ASTM E 96, Method B - 2.9 ng/m²sPa (0.05 perms) maximum.
 - c. Water Absorption: ASTM D 570 - Max. 0.1% by weight.
 - d. Puncture Resistance: ASTM E 154 - 178 N (40 lbs.).
 - e. Tear Resistance:
 - 1) Initiation: ASTM D 1004 - min. 58 N (7.0 lbs.) M.D.
 - 2) Propagation: ASTM D 1938 - min. 40 N (4.0 lbs.) M.D.
 - f. Lap Adhesion at -4 degrees C (25 degrees F): ASTM D 1876 - 880 N/m (5.0 lbs./in.) of width.
 - g. Low Temperature Flexibility: ASTM D 1970 - Unaffected to -43 degrees C (-45 degrees F).
 - h. Tensile Strength: ASTM D 412, Die C Modified, Min. 2.7 MPa (400 psi).
 - i. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412 - Die C - Min. 200%.
 3. Surface conditioner, liquid membrane tape, crack filler, mastics, and accessories as recommended by the sheet membrane manufacturer and comply with the following:
 - a. Description: Latex-based, water-dispersible liquid for substrate preparation.
 - 1) Flash Point: No flash to boiling point.
 - 2) Solvent Type: Water.
 - 3) VOC Content: Not to exceed 350 g/l.
 - 4) Application Temperature: -4 degrees C (25 degrees F) and above.
 - 5) Freeze/Thaw Stability: 5 cycles min.
 - 6) Freezing point (as packaged): -20 degrees C (-5 degrees F).
 - b. Termination Mastic: Rubberized asphalt-based mastic with 200 g/l max. VOC Content.
 - c. Primer: Rubber-based primer in solvent with 680 g/l max. VOC content.
- E. Counterflashing for Masonry Through-Wall Flashing: One of the following and as acceptable to the spray polyurethane foam air barrier manufacturer:
1. CCW-705 TWF by Carlisle Coatings and Waterproofing.

2. Perm-A-Barrier Flashing by Grace Construction Products.
3. Blueskin TWF by Henry.
4. Poly-Wall Crack Guard by Protective Coatings Technology, Inc.
5. ExoAir TWF by Tremco, Inc.
6. Detail Strip by W. R. Meadows, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 1. Report in writing defects in substrates which may adversely affect the performance of the foam insulation.
 2. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

- A. Protection of In-situ Conditions: During the operation of work of this Section, protect existing finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.
- B. Solvent wipe stud framing to remove oils and debris before applying sprayfoam insulation per manufacturer's instructions.
- C. Protection of In-situ Conditions: During the operation of work of this Section, protect surrounding materials and finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing surfaces which are soiled or otherwise damaged by Work of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.
- D. Surface Preparation: Surfaces to receive foam insulation shall be free of frost and loose or foreign matter which might impair adhesion of materials.
 1. Prepare surface by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion and integrity of the foam insulation system. Wipe down metal surfaces to remove release agents or other no compatible coatings, using clean sponges or rags soaked in a solvent compatible with the foam insulation. Ensure surfaces are dry before proceeding.
- E. Protect OC-SPF from rain, sleet and snow weather conditions both during and after application.

3.3 APPLICATION – SPRAY FOAM

- A. Apply foam insulation in strict accordance with manufacturer's written instructions, and the following.

1. Apply foam insulation only when surfaces and ambient temperature are within limits prescribed by the material manufacturer.
 2. Do not install OC-SPF within 3 inches of heat emitting devices such as light fixtures and chimneys.
 3. Do not install OC-SPF in areas having a maximum in-service temperature greater than 180 degrees F.
 4. Do not apply in electrical outlet or junction boxes in contact with rain, water or soil.
- B. Application with Prescriptive or Equivalent Thermal Barrier: OC-SPF must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4 and IRC Section R316.4, as applicable.
1. Maximum thickness of OC-SPF in wall cavities: 8 inches.
 2. Maximum thickness of OC-SPF in floor/ceiling cavities: 12 inches.
- C. Finish work shall be free from air pockets and imbedded foreign materials. Cut back excess foam sealant after cutting flush with surrounding surfaces unless otherwise directed and/or detailed.
- D. Apply foam insulation to within the following tolerances: minus 1/4 inch thickness or plus 1/2 inch thickness indicated on the Drawings.
1. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
- E. Finished sprayed foam insulation shall be free of voids and imbedded foreign materials.
- F. Complete connections to other components and repair any gaps, holes or other damage using material which conforms to ULC S710.1 or ULC S711.1 and installed in accordance with ULC S710.2 or ULC S711.2 as applicable.
- G. Do not allow foam insulation to cover or mark adjacent surfaces. Use masking materials if necessary.
- H. Do not permit adjacent work to damage work of this section. Damage to work of this section caused by other sections shall be made good by this section at the expense of the section which caused the damage.

3.4 INTERFACE WITH OTHER WORK

- A. Coordinate the work of this Section installation of windows, curtain wall, storefront, door frames, louvers and similar openings in framed walls.

3.5 FIELD QUALITY CONTROL

- A. Field inspection will be performed under the provisions of Section 014529 - TESTING LABORATORY SERVICES.
1. Inspect foam installation after curing, but before covering with finish materials. Infill all splits and gaps with additional application of foam.
- B. Non-Conforming Work: Remove and replace all non-conforming work.

3.6 CLEANING

- A. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of sprayed-foam and other materials installed under this Section.

- B. Remove over-spray and masking materials immediately after foam has cured to hard surface film.
- C. Clean and make good surfaces soiled or damaged by work of this section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.
- D. Waste Management:
 - 1. Recycle or dispose of off-site waste materials and trash at intervals approved by the Owner and in compliance with waste management procedures specified in Section 017419 - CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
 - 2. Dispose of liquid waste in accordance with all applicable regulations. Consult all regulations (federal, provincial, state, local) or a qualified waste disposal firm when characterizing waste for disposal. Contact manufacturer for MSDS sheets for product information, and recommendations for proposal disposal. Utilize licensed waste disposal companies as may be required, the following phone numbers for national companies are provided for the Contractor's convenience only.
 - a. Safety Kleen, Plano, TX., (telephone 800-669-5740).
 - b. Clean Harbors, Norwell, MA., (telephone 800-422-8998).
 - c. Phillip Services Corporation (PSC), Houston, TX., (telephone 800-726-1300).

3.7 PROTECTION

- A. Protect finished work under provisions of Section 015719 – TEMPORARY ENVIRONMENTAL CONTROLS.
- B. Protect spray foam insulation from ultraviolet light following installation on exterior surfaces, do not leave exposed to weather elements for a period greater than 30 calendar days.

END OF SECTION

SECTION 072600
VAPOR RETARDERS

PART 1 – GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Variable-permeance vapor retarder in wall assemblies and as additionally indicated on the Drawings.
 - 2. Foamed-in-place insulation / air barrier sealant: applied to seal gaps, cracks, cavities and joints in the building envelope, at door frames, perimeter of window frames, and other similar penetrations in exterior walls.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 024119 - SELECTIVE DEMOLITION: Removal of existing partitions, walls and related insulation.
- E. Section 072100 - THERMAL INSULATION: Thermal insulation.
- F. Section 092900 - GYPSUM BOARD: Gypsum board used at exterior walls.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 - REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM D 570 - Water Absorption of Plastics.
 - 2. ASTM D 1004 - Initial Tear Resistance of Plastic Film and Sheeting.
 - 3. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
 - 4. ASTM D 1938 - Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.
 - 5. ASTM D 1970 - Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - 6. ASTM D 2842 - Water Absorption of Rigid Cellular Plastics.
 - 7. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 - 8. ASTM D 2856 - Open Cell Content of rigid Cellular Plastics by Air Pycnometer.
 - 9. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750°C.
 - 10. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 11. ASTM E 96 - Water Vapor Transmission of Materials.
- B. General References The following reference materials are hereby made a part of this Section by reference thereto:

1. ACI 302.1R Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.
2. NFPA 701 - Fire Tests for Flame Resistant Textiles and Films
3. All applicable federal, state and municipal codes, laws and regulations for thermal insulation and vapor barriers.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work
- B. Sequencing: Coordinate work of this section with related work.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323- SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
 2. Manufacturer's Instructions: Manufacturer's installation instructions for placement, seaming and pipe boot installation.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section for each type of vapor retarder shall be from a single manufacturer, and the related accessories as recommended by the prime manufacturer of the vapor retarder.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
 2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Storage and Handling Requirements:
 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 2. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 VAPOR RETARDERS WITHIN BUILDING ASSEMBLIES

- A. Vapor retarder sheeting intended for use with unfaced, vapor-permeable mass insulation in wall and ceiling cavities.
 1. Physical and chemical properties:
 - a. Property: Water Vapor Permeance (57ng/Pa•s•m²):
 - 1) Test method: ASTM E96 Desiccant Method.
 - 2) Result: ≤ 1.0 perm.
 - b. Property: Water Vapor Permeance (572ng/Pa•s•m²):
 - 1) Test method: ASTM E96 Water Method.

- 2) Result: >10 perms.
- c. Property: Corrosivity:
 - 1) Test method: ASTM C665.
 - 2) Result: No unusual aspect of corrosion such as pitting, cracking and adhesive cure inhibition.
- d. Property: Fungi Resistance:
 - 1) Test method: ASTM C1338.
 - 2) Result: No growth.

2.2 FOAMED-IN-PLACE INSULATION

- A. Foamed-in-place insulation for air barrier sealant: UL Class I, two component polyurethane self-frothing foam insulation equal to Dow Chemical Corporation, product "Froth-Pak" having the following characteristics:
 - 1. Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a. BASF Corp., Polymers Div., Styropar Group, Parsippany NJ.
 - b. Dow Chemical Corporation (Dow Building Solutions), Midland MI.
 - c. Universal Protective Coatings, San Rafael CA.
 - 2. Product characteristics.
 - a. Propellant: HCFC or HFC, No CFC's are permitted.
 - b. Apparent Density (ASTM D1622): 1.7 pounds per cubic foot. (with 1.75 pcf HCFC)
 - c. Water Absorption (ASTM D2842): less than 2.5 percent water absorbed.
 - d. Open cell content (ASTM D2856): less than 2 percent.
 - e. Apparent aged (18 months) R value: 4.9 per inch.
 - f. Flexural Strength, parallel (ASTM C203): 17 to 23 pounds per square inch.
 - g. Flexural Strength, perpendicular (ASTM C203): 26 to 42 pounds per square inch.
 - h. Flame Spread (ASTM E84): 25 or less (Class 1 rated).
 - i. Smoke Developed (ASTM E84): 350 (Class 1 rated), tested for 2 inch depth.

2.3 ACCESSORIES

- A. General: Staples, tape, adhesives and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each type of vapor retarder.
 - 1. Double-stick tape for attachment of vapor retarder: Double coated acrylic closed-cell foam tape, as manufactured by 3M Industrial Specialties Division, St. Paul MN, , product "Scotch VHB - 4952" or approved equal, having a thickness of 0.045 inches and a width of 1 inch.
- B. Seam Tape: High Density Polyethylene Tape or HDPE Tape as recommended by vapor retarder manufacturer, with pressure sensitive adhesive.
 - 1. Minimum width: 4 inches.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ensure that subsoil is approved by Architect.

- B. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 INSTALLATION - VAPOR RETARDERS WITHIN BUILDING ASSEMBLIES

- A. Place vapor retarder on the warm-in-winter side of all thermal insulation. Attach using commercial grade double stick tape. Lap and seal all sheet joints.
- B. Extend retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.
- C. Vapor retarder is not intended to be used as an exterior vapor retarder.

3.3 INSTALLATION - FOAMED-IN-PLACE AIR BARRIER

- A. Foamed-in-place air barrier: Apply foam in froth method to a uniform monolithic density without voids, in accordance with manufacturer's instructions.
 - 1. Apply application of foam for air barrier seal includes, but is not limited to:
 - a. Door frames, window frames, and similar penetrations in exterior walls.
 - b. Gaps, cracks, cavities and joints in the building envelope, not sealed with other forms of air boots, including electrical boxes and conduit, ducts, fans, and piping.
 - c. Where additionally indicated on Drawings.

END OF SECTION

SECTION 072700
AIR/VAPOR BARRIERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Air/Vapor Barriers: Materials to stop passage of air through, and to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor-resistant.
 - 1. Self-adhesive sheet membrane.
- B. Sheet membrane vapor barriers (vapor retarders) under concrete slabs-on-grade including seam tape, and pipe boots.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.A.
- D. Section 079200 - JOINT SEALANTS: Sealant materials and installation techniques.
- E. Section 092116 - GYPSUM BOARD: Exterior sheathing under air/vapor barrier.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES.
 - 1. ASTM A 424 - Steel Sheets for Porcelain Enameling.
 - 2. ASTM B 209 - Aluminum-Alloy Sheet and Plate.
 - 3. ASTM E 84 - Standard Test Method for Surface Burning Characteristics for Building Materials.
 - 4. ASTM B 221 – Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
 - 5. ASTM E 154 - Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
 - 6. ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
 - 7. ASTM E 1745 - Plastic Vapor Retarders Used in Contact with Soil or Granular fill under Concrete Slabs
 - 8. ASTM D 570 - Water Absorption of Plastics.
 - 9. ASTM D 1004 - Initial Tear Resistance of Plastic Film and Sheeting.
 - 10. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
 - 11. ASTM D 1938 - Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.

12. ASTM D 2842 - Water Absorption of Rigid Cellular Plastics.
13. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
14. ASTM D 2856 - Open Cell Content of rigid Cellular Plastics by Air Pycnometer.
15. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750°C.

1.4 SUBMITTALS

- A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, limitations, and standard details for the air/vapor barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- E. Manufacturer's Certificate: Certify that materials meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Vapor Permeability (Perm): Measure in accordance with ASTM E 96 Procedure E.
- B. Regulatory Requirements: Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
- D. Applicator Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, away from direct sunlight, clear of ground and moisture.
- C. Store roll materials on end in original packaging.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

1.8 FIELD CONDITIONS

- A. Do not apply membrane to a damp, frosty or contaminated surface.
- B. Maintain working conditions at site as recommended by manufacturer and required by regulatory requirements.

PART 2 - PRODUCTS

2.1 AIR/VAPOR BARRIER MEMBRANES

- A. Manufacturers:
 1. Tremco Roofing & Building, Beachwood, OH, <http://www.tremcoroofing.com>
 2. American Hydrotech, Inc: www.hydrotechusa.com.
 2. Carlisle Coatings & Waterproofing, Inc: www.carlisle-ccw.com.

3. Grace Construction Products: www.na.graceconstruction.com.
4. Substitutions: See Section 016000 - PRODUCT REQUIREMENTS.
- B. Self-Adhesive Air/Vapor Barrier Sheet Membrane: 40 mil rubberized asphalt, self-adhering type, integrally bonded to a cross laminated polyethylene film.
 1. Film Thickness: 4 mil.
 2. Water Vapor Transmission: Maximum 0.05 perms, measured in accordance with ASTM E 96 Method B.
 3. Air Permeance: 0.00012 CFM/ft² at 75Pa differential pressure, measured in accordance with ASTM E 283.
 4. Puncture Resistance: 40 lbs minimum, measured in accordance with ASTM E 154.
 5. Tensile Strength (film): 400 psi, measured in accordance with ASTM D 412.
 6. Lap Adhesion: Minimum 5lb/in. of width at 25°F, measured in accordance with ASTM D 1876.
 7. Low temperature flexibility: Unaffected to -45°F, measured in accordance with ASTM D 1970.
 8. Ultimate Elongation: 200% minimum, measured in accordance with ASTM D 412.
 9. Basis of Design: Tremco ExoAir 111.
- C. Primer: Water-based primer, as recommended by manufacturer, appropriate to application, and compatible with adjacent materials.
 1. Flash Point: No flash to boiling point.
 2. VOC Content: Not to exceed 10 g/l.
 3. Application Temperature: 25°F minimum.
 4. Basis of Design: Perm-A-Barrier WB Primer manufactured by Grace Construction Products.
- D. Accessories: As recommended by manufacturer, appropriate to application, and compatible with adjacent materials.
 1. Flashing for Openings: 40 mil rubberized asphalt, self-adhering type, integrally bonded to a cross laminated polyethylene film.
 - a. Film Thickness: 8 mil.
 - b. Water Vapor Transmission: Maximum 0.05 perms, measured in accordance with ASTM E 96 Method B.
 - c. Water Absorption: 0.1% maximum by weight, measured in accordance with ASTM D 570.
 - d. Puncture Resistance: 80 lbs minimum, measured in accordance with ASTM E 154.
 - e. Tensile Strength (film): 800 psi, measured in accordance with ASTM D 412.
 - f. Lap Adhesion: Minimum 5lb/in. of width at 25°F, measured in accordance with ASTM D 1876.
 - g. Tear Resistance: 13lbs., measured in accordance with ASTM D 1004.
 - h. Low temperature flexibility: Unaffected to -45°F, measured in accordance with ASTM D 1970.
 - i. Ultimate Elongation: 200% minimum, measured in accordance with ASTM D 412.
 - j. Basis of Design: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products.
 2. Mastic: Manufacturer's standard mastic.

2.3 SEALANTS

- A. Butyl Sealant: Type as specified in Section 079200 - JOINT SEALANTS.

- B. Silicone Sealant: Type as specified in Section 079200 - JOINT SEALANTS.
- C. Sealant Backers: As specified in Section 079200 - JOINT SEALANTS.
- D. Primers, Cleaners, and Other Sealant Materials: As recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials.

2.4 ACCESSORIES

- A. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.
- B. Verify that attachment of sheathing meets air/vapor barrier membrane manufacturer's requirements.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Sand or fill irregularities as required to achieve flush surfaces.
 - 1. All cracks over 1/16 inch (1.6 mm) in width should be filled with material compatible to the substrate.
- C. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.
- D. Trim or detail all door and window openings and penetrations per manufacturer's standard details.
- E. Install brick ledge flashing prior to application of vapor/air barrier sheet membrane.
- F. Protect adjacent surfaces not designated to receive fluid applied air/vapor barrier membrane.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Install air/vapor barrier materials and assemblies in conjunction with materials described in other sections to provide continuous sealed barrier in the exterior enclosure of the building.
 - 1. Application of Transition Membrane:
 - a. After allowing the Fluid Applied Membrane to cure to tack-free, apply transition membrane with a minimum overlap of 3 inches (75 mm) onto each surface at all beams, columns and joints.
 - b. Tie in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.
 - c. Properly position and place against surface by pressing firmly into place by hand roller.
 - d. Overlap adjacent pieces 2 inches (50 mm) and roll all seams with a hand roller.
 - e. Seal top edge of flashing with termination mastic.
 - 2. Application of Flexible Membrane Wall Flashing
 - a. Properly position and place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
 - b. Overlap adjacent pieces 2 inches (50 mm) and roll all seams with a hand roller.
 - c. Trim bottom edge 1/2 inch (12.5 mm) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.

- d. At heads, sills and all flashing terminations, turn up ends a minimum of 2 inches (50 mm) and make careful folds to form an end dam, with the seams sealed.
 - e. Seal top edge of flashing with termination mastic.
 - f. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with poly-sulfide sealants, creosote, uncured coal tar products or EPDM.
- C. At junction of exterior wall and roof lap air/vapor barrier flashing membrane onto roofing vapor retarder and attach with fasteners. Seal lap with sealant. Position lap seal over firm bearing.
- D. At window and door openings install vapor/air barrier membrane window and door flashing between frame and adjacent wall vapor/air barrier membrane. Seal laps with sealant.
- E. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

3.5 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

END OF SECTION

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SECTION 078100
APPLIED FIREPROOFING

PART 1 – GENERAL

1.1 SUMMARY

- A. Patch existing fireproofing disturbed or otherwise damaged by the Work.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- D. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM E 84 - Test for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 119 - Fire Tests of Building Construction and Materials.
 - 3. ASTM E 605 - Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members.
 - 4. ASTM E 736 - Cohesive Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
 - 5. ASTM E 759 - Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members.
 - 6. ASTM E 760 - Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.
 - 7. ASTM E 761 - Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.
 - 8. ASTM E 859 - Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.
 - 9. ASTM E 937 - Corrosion of Steel by Sprayed Fire-Resistive Materials Applied to Structural Members.
 - 10. ASTM G-21 - Determining Resistance of Synthetic Polymeric Materials to Fungi.
 - 11. UL - Fire Resistance Directory.
 - 12. All applicable federal, state and municipal codes, laws and regulations for fire-resistant construction.
- B. Definitions: SFRM (Sprayed Fire-Resistant Materials) is spray-applied fireproofing as specified under this Section and defined under the International Building Code.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Pre-Installation Meetings: At least two weeks prior to commencing the work of this Section, conduct a pre-installation conference at the Project site. Comply with requirements of Section 013216.15 - PROJECT SCHEDULES. Coordinate time of meeting to occur prior to installation of work under the related sections named below.

1. Required attendees: Project Engineer/VA COR, Architect, Contractor, Fireproofing Applicator's Project Superintendent, Fireproofing manufacturer's technical representative and representatives of other related trades as directed by the Project Engineer/VA COR and the Architect or Contractor.

2. Agenda:

- a. Scheduling of fireproofing operations.
- b. Review of staging and material storage locations.
- c. Coordination of work by other trades.
- d. Installation procedures for ancillary equipment.
- e. Protection of completed Work.
- f. Establish weather and working temperature conditions to which Architect and Contractor must agree.
- g. Emergency rain protection procedure.
- h. Discuss process for manufacturer's inspection and acceptance of completed Work of this Section.

C. Sequencing:

1. The spray-applied fire resistive material shall only be applied to steel deck, which has been fabricated and erected in accordance with the criteria set forth by the Steel Deck Institute.
2. The application of spray-applied fire resistive material to the underside of roof deck shall not commence until the roof is completely installed and tight, all penthouses are complete, all mechanical units have been placed, and construction roof traffic has ceased.
 - a. Fire protection shall not be applied to steel floor decks prior to the completion of concrete work on that deck.

D. Scheduling:

1. The installation of ducts, piping, conduit or other suspended equipment shall not take place until the application of sprayed fire protection is complete in an area.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and limitations of fireproofing.

2. Test and Evaluation Reports:
 - a. Bond strength of fireproofing: ASTM E 72, tested to provide minimum bond strength twenty times weight of fireproofing materials.
 - b. Fire test reports of fireproofing application to substrate materials similar to project conditions.
 - c. Reports from reputable independent testing agencies, of product proposed for use, which indicate conformance with ASTM E 119 and ASTM E 84
 3. Manufacturer's Instructions and typical details: Indicate special application procedures or conditions.
- B. Closeout Submittals: Submit the following:
1. Certificates: Installers certificate stating that sprayed fireproofing has been completed in full accordance with requirements to provide necessary fire resistance ratings.
 2. Record Documentation: Installer's Field Reports stating environmental conditions during the installation of fireproofing materials, include temperature and humidity conditions.
 3. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.
- 1.6 QUALITY ASSURANCE
- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of fireproofing.
- C. Qualifications:
1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
- 1.7 DELIVERY, STORAGE AND HANDLING
- A. Delivery and Acceptance Requirements:
1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
 2. Deliver materials, factory proportioned and mixed, in original, unopened packages bearing the name of the product, manufacturer's name, plant identification, lot number and Underwriter's Laboratories, Inc. label.
- B. Storage and Handling Requirements:
1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 2. Store all materials in an elevated dry location, protected by waterproof coverings.
 3. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

- C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage.

1.8 SITE CONDITIONS

- A. Do not apply spray fireproofing when ambient temperature or surface temperature of substrate material is below 40 degrees Fahrenheit.
- B. Provide ventilation in areas to receive fireproofing during and 24 hours after application, to cure fireproofing material.

1.9 WARRANTY

- A. Special Warranty: Provide 2 year warranty. Warranty shall include failure of fireproofing, including: cracking, checking, dusting, flaking, spalling, separation and blistering. Failure to provide such performance will require re-installation to repair to satisfaction of Owner at no additional cost.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. General: Spray applied fireproofing, factory proportioned and mixed meeting the following requirements:
 - 1. Sprayed fireproofing materials (SFRM) shall be free of all forms of asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite. Material manufacturer shall provide certification of such upon request.
 - 2. Fireproofing materials shall not be subject to losses from finished application by sifting, flaking or dusting.
 - 3. Fireproofing shall not deform more than 10 percent under 500 pound per square foot compressive forces in accordance with ASTM E 761.
 - 4. Bare, shop-coated, and galvanized steel sheets with the fireproofing applied shall be kept at 90 degrees Fahrenheit and 70 percent relative humidity for 240 hours without evidence of corrosion of steel, tested in accordance with ASTM E 937.
 - 5. Corrosion Resistance: When tested in accordance with ASTM E937, the material shall not promote corrosion of steel.
 - 6. Noncombustibility: When tested, the material shall be noncombustible.
 - 7. Surface Burning Characteristics: When tested in accordance with ASTM E84, the material shall exhibit the following surface burning characteristics:
 - a. Flame Spread 10
 - b. Smoke Developed 0

2.2 PERFORMANCE/DESIGN CRITERIA

- A. Materials, procedures for application, dry densities, and thicknesses necessary to provide the required protection shall be tested and rated by UL in accordance with the procedures of UL 263 (ASTM E119) for the uses indicated
- B. Fire ratings interpolated or extrapolated from actual test data will not be acceptable. Provide evidence prior to application that proposed materials, installation methods and materials have been approved by all authorities having jurisdiction.
- C. Thickness and density: Thickness and dry density of fire protection material shall be according to the manufacturer's data and UL requirements to provide fire resistance ratings as indicated on the Drawings.

- D. Thickness and density at patching of existing construction: Thickness and dry density of fire protection material shall be according to the manufacturer's data and UL requirements to provide ratings matching original building fire resistant requirements.

2.3 MATERIALS

- A. Spray applied fireproofing, (Standard Density): For structural steel elements including: built-up trusses, steel deck, beams, and columns, and all other concealed applications except as otherwise indicated on the drawings, or as otherwise specified herein:

1. Acceptable products:

- a. AD/Carboline, product: "Pyrolite 15HY".
- b. W.R. Grace & Company, product: "Monokote Type MK-6".
- c. Isolatek International, product: "Cafco 300".
- d. Southwest, product: "5GP".

2. Performance Criteria:

Property	Test Method	Test value/results
Compressive Strength	ASTM E 761	3.5 lb/in ² , minimum
Bond Strength	ASTM E 736	200 lb/ft ² , minimum
Air Erosion	ASTM E 859	3.5 grams/ft ² , maximum
Deflection	ASTM E 759	No evidence of cracking or delamination
Bond Impact	ASTM E 760	No evidence of cracking or delamination
Dry Density	ASTM E 605	14 lb/ft, minimum

3. Deflection: When tested in accordance with ASTM E759, the material shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical center load resulting in a downward deflection of 1/120th of the span.
4. Bond Impact: When tested in accordance with ASTM E760, the material shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.
5. Cohesion/Adhesion (bond strength): When tested in accordance with ASTM E736, the material applied over uncoated or galvanized steel shall have an minimum bond strength of 150 psf (pounds per square foot) [667N].
6. Air Erosion: When tested in accordance with ASTM E859, the material shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft.
7. Compressive Strength: When tested in accordance with ASTM E761, the material shall not deform more than 10 percent when subjected to a crushing force of 750 psf (pounds per square foot).
8. Density: When tested in accordance with ASTM E605, the material shall meet the minimum individual and average density values as listed in the appropriate UL design,

or as required by the Authority having jurisdiction, or shall have a minimum average density of 15 pcf (pounds per cubic foot).

9. Resistance to Mold: Formulate the fireproofing material at the time of manufacturing with a mold inhibitor.
 - a. Test fireproofing material per ASTM G-21 and show resistance to mold growth for a period of 21 days for general use and 60 days for materials installed in plenums.
 - 1) Tested fireproofing material shall demonstrate resistance to mold growth when inoculated with aspergillus niger.
10. The material shall have been tested and reported by Underwriters Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119).
- B. Potable water shall be used for the application of sprayed fireproofing materials.
- C. Adhesive:
 1. Bonding adhesive for fibrous materials as recommended and supplied by the fireproofing material manufacturer. Adhesive may be an integral part of the material or applied separately to surface receiving fireproofing material.
- D. Sealer:
 1. AD/Carboline, product: "Carboguard 1390".
 2. W.R. Grace & Company: product as recommended by manufacturer.
 3. Isolatek International, product: "Bond-Seal".
 4. Southwest, product as recommended by manufacturer.
- E. Mold Inhibitor: Mold inhibitor shall be added to fireproofing materials in accordance with manufacturer's instructions.
- F. Lath Hanger: Galvanized steel 6 SWG expanded lath, 3.4 lb. per sq. yard.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 1. Inspect all surfaces and verify that they are in proper acceptance of existing substrate and site conditions.
 - a. Contact fireproofing manufacturer for procedures on handling primed / painted steel.
 - b. Ensure clips, hangers, supports, sleeves and other attachments to the substrate are placed by others prior to the application of spray-applied fire resistive materials.
 2. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

- A. Close and seal ductwork in areas where fireproofing is being applied.
- B. Provide temporary enclosures to prevent spray from contaminating air.

- C. Protection of In-situ Conditions: Protect adjacent surfaces and equipment from damage by overspray and dusting. Mask adjacent work as required. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.
- D. Surface Preparation:
 - 1. Clean substrate of dirt, dust, grease, oil, loose material, or other matter which may effect bond of fireproofing.
 - 2. Remove incompatible materials which affect bond by scraping, brushing, scrubbing, or sandblasting. Repair or replace any work so damaged and soiled.

3.3 MIXING AND APPLICATION

- A. Mixing shall conform to manufacturer's written instructions.
- B. Materials and equipment shall be as approved by the materials manufacturer. Application shall be by licensed manufacturer's applicators. Procedures shall be in strict accordance with said manufacturer's directions and specifications. Only experienced, skilled mechanics approved by the materials manufacturer shall be allowed to place the materials. A qualified manufacturers representative shall be present for initial application to guide and assist applicator's personnel.
- C. Work shall comply with applicable UL standards in addition to the requirements imposed by the applicable laws and codes, for the indicated ratings, including local pollution control regulations.
- D. Install metal lath, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by fireproofing manufacturer. Attach accessories where indicated or required for secure attachment of lath to substrate.
- E. Sprayed-on fireproofing shall be applied in the exact manner described in the certificates submitted to prove compliance with specified protection requirements. The fireproofing applicator shall be responsible for providing a controlled application of fireproofing material so that uniform quantity and thickness is maintained.
- F. After completion of fireproofing work, equipment shall be removed and all surrounding wall and floor areas cleaned of deposits of sprayed-on fireproofing materials. Where hangers and other surfaces not requiring fireproofing have been sprayed unavoidably, the sprayed material shall be removed and the surfaces made clean.

3.4 REPAIR

- A. Patch all areas of testing and any area where fireproofing has been damaged or removed during construction.

3.5 FIELD QUALITY CONTROL

- A. Independent Testing Agency field inspection will be performed under the provisions of Section 014529 - TESTING LABORATORY SERVICES.
 - 1. Perform bond test on painted steel in accordance with ASTM E-736.
 - 2. Test for bond impact strength: ASTM E-760.
- B. Ensure that applied fireproofing remains exposed to view until verification inspections and testing is made and approval of applied fireproofing is obtain. All costs for removal and

replacement of prematurely installed materials to allow inspection of fireproofing shall be borne by the Contractor.

- C. Inspection and testing shall verify that applied thickness and density meets manufacturer's tested requirement standards for required fire-resistance ratings.
 - 1. Where samples fail to meet thickness, quality, or dry density requirements, further sampling and testing will be required in the area of deficient sample. If such further testing indicates a deficient area, correction shall be made by the application of additional material or removal and replacement of faulty material.

3.6 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris. Place waste material in suitable bags or containers, and remove from site.
- B. Upon completion of the work of this Section in any given area, clean walls, floors (including bare concrete slabs) and surrounding surfaces of overspray and drippings. Remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.
- C. Waste Management:
 - 1. Recycle or dispose of off-site waste materials and trash at intervals approved by the Owner and in compliance with waste management procedures specified in Section 017419 - CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

END OF SECTION

SECTION 078400 FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install fireproof firestopping, firesafing materials, smoke seals and related accessories required for this Project for all penetrations through fire resistance rated construction, including, but not limited to, penetrations for plumbing, fire suppression, heating, ventilating and air conditioning, electrical systems, and specialized equipment.
 - 1. Fire resistance rated construction requiring firestopping includes, but is not limited to: rated partitions, smoke barriers, smoke partitions, partitions in rated corridors, passageways and stairs, shaft partitions, shaft wall (vertical and horizontal), area separation fire walls, party wall systems, and temporary fire resistant rated partitions and barriers.
 - 2. Provide removable temporary firestopping (pillows) as required to maintain fire integrity prior to Owner's final acceptance, to permit installation of electrical, telephone, data and sound system wiring. Replace temporary firestopping with permanent, after wiring systems are completed.
- B. Furnish and install firestopping/smoke seals at construction joints occurring at tops of fire resistance rated partitions, smoke partitions, and temporary partitions between top of partition and underside of deck above.
- C. Furnish and install all firestopping, firesafing, and smoke seals at perimeter of floor/roof construction and exterior wall systems, as indicated and where required by applicable codes.
- D. Furnish and install all firestopping, firesafing, and smoke seals at expansion joints in chase walls where expansion joints are not exposed to view.
- E. Furnish and install all firestopping, firesafing, and smoke seals where required by applicable codes and as additionally required by authorities having jurisdiction at no additional cost to the Owner.
- F. Furnish and install all firestopping, firesafing, and smoke seals at existing penetrations that are exposed by the work of this project.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- D. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.

- E. Section 078100 - APPLIED FIREPROOFING: Spray applied fireproofing.
- F. Section 092900 - GYPSUM BOARD: Gypsum wallboard fireproofing.
- G. Division 21 - FIRE SUPPRESSION: Fire protection system penetrations through fire resistance rated construction.
- H. Division 22 - PLUMBING: Plumbing system penetrations through fire resistance rated construction.
- I. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Heating, ventilating and air conditioning system penetrations through fire resistance rated construction.
- J. Division 26 - ELECTRICAL: Electrical penetrations through fire resistance rated construction.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Owner's Project Manager and the Architect.
 - 1. ASTM E-84 - Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E-119 - Method for Fire Tests of Building Construction and Materials.
 - 3. ASTM E-814 - Test Method of Fire Tests of Through-Penetration Firestops.
 - 4. NFPA 70 - National Electrical Code.
 - 5. UL - Fire Resistance Directory.
 - 6. UL 1479 - Fire Tests of Through Penetration Firestops.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide materials and work to conform to Building Code Requirements in fire resistant wall assemblies.
- B. Manufacturer's certified product test requirements:
 - 1. All firestop/smokeseal material shall be tested by a recognized, independent testing agency and shall conform to both Flame (F-rating) and Temperature (T-rating) requirements of ASTM E-814.
 - 2. Conform to UL Fire Hazard Classification Requirements.
 - 3. Tested and classified non-combustible per ASTM E-84.
- C. Firestops in place shall be of sufficient thickness, width, and density to provide a fire resistance rating at least equal to the wall, or partition construction into which it is installed.
- D. Non-combustible dams shall be constructed:
 - 1. As necessary to achieve fire rating as tested and rated.

2. In conformance with installation requirements for type of wall, and partition construction.
 3. As recommended by firestop/smokeseal manufacturer.
- E. Combustible damming materials, if used, must be removed after proper curing.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, and physical properties.
 - a. Indicate requirements for manufacturer's descriptive data for products and related materials with FM, UL or Warnock-Hersey illustrations showing systems and approval of materials in systems.
 2. Certificates: Manufacturer's written certification stating that firestopping materials, meet or exceed the requirements specified under this Section and that all fire-resistive requirements for the indicated combustibility, Flame (F-rating) and Temperature (T-rating) Ratings have been met.
 3. Manufacturer's installation instructions.
 4. Test reports: Submit fire test reports from recognized, independent testing agent(s) indicating the following:
 - a. Fire test report of firestop material applied to substrate and penetration materials similar to project conditions. Tests to indicate both Flame (F-rating) and Temperature (T-rating) Ratings.
 - b. Test reports of products to be used shall indicate conformance to ASTM E-814.
 - c. Include test report for each type and quantity of penetrant through each type of wall or floor construction.
 5. On-site sample installation to be included in Work: Minimum (15) fifteen days prior to application in any area, provide samples of firestop and smoke seal materials and installation in accordance with the following requirements.
 - a. Apply one sample of appropriate firestop and smoke seal material for each different penetration and fire rating required for the work.
 - b. Sample areas will comply with thickness, fire resistance ratings, and finished appearance of the project and applicable fire code.
 - c. Acceptance samples will constitute standard of acceptance for method of application, thickness, and finished appearance for firestop and smoke seal application. The sample(s) shall remain visible during completion of the work and shall remain as part of the completed work.
 6. Shop drawings indicating requirements for penetrations in wall/deck intersections, change of planes, control joints, expansion joints and blank openings.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

- B. Sole Source: Obtain firestop and smoke seal products from a single manufacturer, except as otherwise approved by the Owner's Project Manager and the Architect.
- C. Environmental Requirements for Volatile Chemicals: Use firestopping caulks that comply with the following limits for VOC content:
 - 1. Firestopping caulks: VOC not more than 250 g/L.
- D. Special Inspections by Owners on-call Firestopping Installer: Allow for 3 percent of each type of firestopping system to be removed and inspected for conformance with approved submittals.
 - 1. All firestopping shall be inspected and approved by Owners Project Manager prior to installation of suspended ceilings or concealed by other materials.
- E. Qualifications:
 - 1. Installer: a specialized subcontractor having not less than 3 years documented experience demonstrating previously successful work of the type specified herein.
 - a. The manufacturer of the firestop material shall submit written certification that the firm to be used for the firestop products has been trained in the application of the products by the manufacturer.

1.7 MOCK-UPS

- A. Provide firestop samples and locate as directed. Accepted samples may remain as part of the work.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store firestopping materials in original, sealed, packages showing manufacturer's identification and date of packaging.
- B. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire resistance ratings and surface burning characteristics.
- B. Obtain certificate of compliance from authority having jurisdiction indicating approval of combustibility.

2.2 MATERIALS AND APPLICATIONS

- A. Conduit openings into Airborne Infection Isolation (AII) and Ante Rooms which are larger than trade size of 2 inches:
 - 1. Intumescent flexible block, consisting of the following:
 - a. Basis of Design Product: Hilti Firestop Block, (CFS-BL) or approved equal.
 - b. Application temperature: 40° F to 104° F (5° C to 40° C).
 - c. Temperature resistance: 5° F to 140° F (-15° C to 60° C).

- d. Intumescent activation: Approx. 392° F (200° C).
 - e. Expansion ratio (unrestricted): Up to 1:3.
 - f. Surface burning characteristics (ASTM E 84-10b): Flame Spread Index of 10, Smoke Development Index of 15.
 - g. Sound transmission classification (ASTM E 90): STC Rating of 52.
 - h. Tested in accordance with UL 1479, ASTM E 814, ASTM E 84.
 - i. Color: Red.
- B. Firestop mortar: asbestos free, cementitious mortar, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM/UL1479:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product "Novasit K-10".
 - b. Specified Technologies, Inc., product "Spec Seal Mortar".
 - c. Tremco Inc., product "Tremstop M".
- C. Silicone Firestop sealant: Single component, non-combustible silicone elastomer firestop sealant, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product product "Biotherm 100" (Gun Grade) or "Biotherm 200" (Self Leveling).
 - b. Specified Technologies, Inc., product "Spec Seal Pensil 300 Sealant (gun grade)" or "Spec Seal Pensil 300SL" (Self Leveling).
 - c. 3M Company, product "Fire Barrier Silicone Sealants".
 - d. Tremco Inc., product product "Tremsil" (Gun Grade) or "Tremsil S/L" (Self Leveling).
 - 2. Sealants will not dissolve in water.
- D. Intumescent firestop sealant and caulks: Acrylic based, water resistant sealant, which will not re-emulsify after drying:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product "Biostop 500".
 - b. Specified Technologies, Inc., product "Spec Seal Triple-S Sealant".
 - c. 3M Company, product "Fire Barrier Caulk CP25WB+".
 - d. Tremco Inc., product "Tremstop 1A".
- E. Firestop putty: sticks or pads:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product "Moldable Putty".
 - b. Specified Technologies, Inc., product "Spec Seal Putty Bars and Pads".
 - c. 3M Company, product "Fire Barrier Moldable Putty".
 - d. Tremco Inc., product "Flowable Putty".

- F. Firestop collars: Pre-manufactured fire protective pipe sleeve, UL classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479:
 - 1. Provide separated (two piece) firestop collar for application when plastic pipe system is already in place. Provide non-separated firestop collar for application prior to installation of plastic pipe system.
 - 2. Acceptable products, or approved equal:
 - a. 3M Company, Inc., product "Fireshield Firestop Sleeve".
 - b. Specified Technologies, Inc., product "Spec Seal Collars".
 - c. 3M Company, product "Fire Barrier PPD's".
 - d. Tremco Inc., product "Fyrecan sleeve".
- G. Firestop pillows: UL Classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product "Fireshield Firestop Pillows".
 - b. Specified Technologies, Inc., product "Spec Seal Pillows".
 - c. Tremco Inc., product "Tremstop P.S".
- H. Wrap strips:
 - 1. Acceptable products, or approved equal:
 - a. Bio Fireshield, product "FS-195".
 - b. Specified Technologies, Inc., product "Spec Seal Wrap Strip".
 - c. 3M Company, product "Fire Barrier FS195 Wrap Strip".
 - d. Tremco Inc., product "Tremco W.S".
- I. Mineral wool fiber / ceramic wool non-combustible insulation (fire safing):
Conforming to ASTM C665, Type 1, ASTM C612, and ASTM C553 with a minimum density of 4 pounds per cubic foot:
 - 1. Flame Spread Classification: Material shall be classified non-combustible per ASTM E-814.
 - 2. Recycled content of slag:: Use maximum available percentage of material (slag). Mineral wool insulation products incorporated into the work shall contain not less than 75 percent of recycled material (slag) by weight.
 - 3. Acceptable products include:
 - a. Fibrex Insulations Inc. Sarnia Ontario, Canada, product: "Fibrex FBX" Industrial board.
 - b. Rock Wool Manufacturing Company, Leeds, AL, product: "Delta Safing Mineral Wool".
 - c. Roxul, Inc., product "Roxul Safe".
 - d. Thermafiber, Inc. product "Safing 4.0 pcf".
 - 4. Accessories: Provide galvanized steel safing clips as required for installation of insulation.

- J. Elastomeric Firestopping: Non halogenated latex based elastomeric coating applied by airless spray:
 - 1. Acceptable products, or approved equal:
 - a. Specified Technologies, Inc., product "Spec Seal Elastomeric Firestop Spray".
 - b. Bio Fireshield (A Division of Rectroshield), product "Flamesafe FS900+".
 - c. Hilti, Inc., product "CP 601S."

2.3 ACCESSORIES

- A. Forming and damming materials: Mineral fiberboard or other type as recommended by firestopping manufacturer.
- B. Primer, sealant and solvents: As recommended by manufacturer.
- C. Woven wire mesh: Galvanized 20 gage woven wire mesh "chicken wire" or "poultry fencing", 1 inch spacing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect areas and conditions where firestops are to be installed and notify the Owner's Project Manager and the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
 - 1. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

- A. Surface to receive firestops shall be free of dirt, dust, grease, oil, form release agents, or other matter that would impair the bond of the firestop material to the substrate or penetrating item(s).
- B. Voids and cracks in substrate shall be filled and unnecessary projection removed prior to installation of firestops.
- C. All penetrating items shall be permanently installed prior to firestop installation.
- D. Substrate shall be frost, free and, when applicable, dry.

3.3 INSTALLATION

- A. General:
 - 1. Installation of firestops shall be performed by applicators/installers qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
 - 2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations. Meet building code requirements.
 - 3. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all pipe, conduit, cable, and other items which penetrate fire rated construction have been permanently installed prior to installation of firestops.

Schedule and sequence the work to assure that partitions and other construction which would conceal penetrations are not erected prior to the installation of firestops.

- a. Ensure that all firestopping is inspected prior to installation of suspended ceilings or concealed by other finished materials.

B. Dam construction:

1. Install dams when required to properly contain firestopping materials within openings and as required to achieve required fire resistance rating. Combustible damming material must be removed after appropriate curing. Incombustible damming material may be left as a permanent component of the firestop system.
2. Placement of dams shall not interfere with function or adversely affect the appearance of adjacent construction.

C. Installation of single component silicone firestop:

1. Apply with manual or powered caulking gun.
2. Apply minimum 1/2 inch thickness for 2 hour rating. Apply 1/2 inch to both sides of wall penetrations.
3. Use incombustible insulation as required to achieve fire resistance rating.
4. Surface of gun grade silicone firestop may be tooled using clean, potable water.
5. Clean excess material off of adjacent surfaces and tools within 10 minutes using either water or Xylol where the use of such would not be hazardous.

D. Installation of cementitious firestop mortar:

1. Add dry powder to water and mix with mechanical mixer or hand mixing tools as recommended by firestop mortar manufacturer. Allow a average mixing time is 3 minutes and provide a average wet density of 70 pounds per cubic foot, plus or minus 5 PCF.
2. Do not apply if ambient or substrate temperature is less than 35 degrees Fahrenheit during 24 hours after application.
3. Wet all surfaces prior to application of firestop mortar.
4. Mortar may be hand applied or pumped into the opening.
5. Exposed surfaces shall be finished using conventional plastering tools prior to curing.
6. When installation around layered cables, it is recommended to increase the fluidity of the firestop mortar to provide a better fill around the cables. Vibrate or move the cables slightly to prevent voids from forming between the cables.
7. Allow 48 hours for initial cure prior to form removal. For full cure allow 27 days.
8. Wet material may be cleaned with water. Dry material may require scraping or chipping.

E. Installation of firestop collars (plastic pipe only):

1. Firestop collars may be surface mounted to a slab or wall or imbedded in Firestop Mortar to a maximum depth of 2 inches.

2. For wall penetrations with ABS pipe firestop collars must be installed on both sides of the penetration to provide a 2 hour F and T Rating. All other applications required installation on one side only to provide a 2 hour F and T Rating.
- F. Firesafing insulation: Install firestopping safing insulation on safing clips spaced as needed between each stud, leaving no voids. Secure safing clips to slab using fasteners recommended by insulation manufacturer. Install sealant over mineral wool in accordance with test requirements.
- G. Conclusion of work day: Wherever work is performed in areas which abut or are adjacent to Owner occupied areas, at the conclusion of the work day ensure that all penetrations and perimeter construction joints are firestopped and that there are no openings, penetrations or construction joints left unprotected.
- H. Firestopping for cabling shall use through wall or through floor adjustable fire rated pathway device similar to Specified Technologies, Inc. "EZ-PATH".

3.4 LABELING

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems.
1. Include the following information on labels

**WARNING: THROUGH-PENETRATION FIRESTOP SYSTEM-DO NOT DISTURB.
NOTIFY FACILITY MANAGER OF ANY DAMAGE.**

- Contractor's name, address, and phone number.
- Through-penetration firestop systems designation of applicable testing and inspecting agency.
- Date of installation.
- Through-penetration firestop systems manufacturer's name.
- Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspector: Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
1. Inspector will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.6 SCHEDULE

- A. General: Typical penetrations are indicated below with list of standard firestopping/smokeseal approaches. Actual firestopping materials and combination of materials will vary with size of penetration and with individual firestopping

manufacturer's approved UL Design System Requirements. Use only UL Design System materials for each penetration *that best matches type of wall construction; I.E. steel stud/gypsum board or masonry/concrete.*

1. Where penetrations occur for which no listed UL or WH Design System test exists, obtain from the firestop system manufacturer an engineered system acceptable to the authorities having jurisdiction for firestopping such penetrations. Engineered system from manufacturer shall include a detail drawing showing the engineered system and shall contain no disclaimers.
- B. Single metal pipe (non-insulated) and conduit penetrations through walls:
1. (masonry and concrete walls only) Firestop mortar and putty.
 2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
 3. Intumescent firestop sealant with wrap strips.
- C. Multiple metal pipe and conduit penetrations through walls:
1. Firestop mortar and putty.
 2. (through masonry walls only) Firestop pillows with woven wire mesh.
 3. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- D. Insulated metal pipe penetrations (single and multiple) through walls:
1. Firestop mortar with wrap strips.
 2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
 3. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing) and Wrap strips.
 4. (multiple penetrations through masonry walls only) Firestop pillows with woven wire mesh.
- E. Duct penetrations through walls:
1. Rectangular and square ducts: Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing), and steel flanges provided under Division 15.
 2. Round ducts: Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- F. Combustible plastic pipe and conduit penetrations through walls:
1. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
 2. Intumescent firestop sealant with firestop collars.
- G. Cable penetrations through walls:
1. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
 2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).

3. (single penetrations only) Firestop putty.
 4. (electrical boxes) Firestop pads.
 5. Firestop putty over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- H. Cable tray penetrations:
1. (floors only) Firestop mortar.
 2. Firestop pillows with woven wire mesh containment, and Firestop putty, sticks or pads for filling voids.
 3. Firestop pillows with woven wire mesh containment, and Firestop mortar at perimeter and firestop putty, sticks or pads for filling voids.
- I. Blank openings:
1. Firestop mortar.
 2. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- J. Fire rated joints:
1. Silicone Firestop sealant over backer rod or bond breaker.
- K. Floor to curtain wall assemblies:
1. Silicone Firestop sealant/mastic over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- L. Construction joints at head of wall/floor assemblies:
1. Silicone Firestop sealant/mastic over mineral fiber / ceramic wool non-combustible insulation (fire safing).
 2. Elastomeric spray over mineral fiber / ceramic wool non-combustible insulation (fire safing).
- M. Smoke barrier sealant for dampers, fire door frames:
1. Silicone Firestop sealant.
- N. Temporary sealing of openings and penetrations:
1. Firestop putty, sticks or pads.
 2. Firestop pillows.

END OF SECTION

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SECTION 079200
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. General: The work of this Section consists of sealants and backing materials where shown on the Drawings, as specified herein, and as required for a complete and proper installation.
 - 1. This Section specifies general requirements, definition of joint sealer types, and application requirements for sealant work specified within other individual specification sections.
- B. Prepare sealant substrate surfaces, including removal of existing sealant and backing, and thorough cleaning of joints.
- C. Furnish and install sealant and backing materials.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- D. Section 024100 - DEMOLITION: Removal of existing finishes, partitions and walls as indicated in the Drawings
- E. Section 061000 - ROUGH CARPENTRY.
- F. Section 078400 - FIRESTOPPING: Firestopping sealants and related backing materials.
- G. Section 088000 - GLAZING: Sealant used in conjunction with setting glass.
- H. Section 092900 - GYPSUM BOARD: Application of concealed acoustical sealant used in conjunction with gypsum board work at abutting surfaces (perimeter of partitions and walls).
- I. Section 099100 - PAINTING: Caulks used in preparation of applied finish coatings.

1.3 REFERENCES

- A. The standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Project Engineer/VA COR and the Architect.
- B. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM C 717 - Standard Terminology of Building Seals and Sealants.
 - 2. ASTM C 790 – Guide for Use of Latex Sealants
 - 3. ASTM C 804 - Use of Solvent-Release Type Sealants.
 - 4. ASTM C 834 - Latex Sealing Compounds.
 - 5. ASTM C 919 - Use of Sealants in Acoustical Applications.
 - 6. ASTM C 920 - Elastomeric Joint Sealants.
 - 7. ASTM C 962 - Use of Elastomeric Joint Sealants.

8. ASTM C 1193 - Guide for Use of Joint Sealants.
 9. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
 10. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
 11. FS TT-S-00227E - Sealing Compound: Elastomeric Type, Multi-Component.
 12. FS TT-S-00230C - Sealing Compound: Elastomeric Type, Single-Component.
 13. FS TT-S-001543A - Sealing Compound, Silicone Rubber Base.
- C. The following reference materials are hereby made a part of this Section by reference thereto:
1. SWRI – Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, chemical and physical properties and installation instructions for each item furnished hereunder.
 2. Selection Samples: Sample card indicating Manufacturer's full range of colors available for selection by the Project Engineer/VA COR and the Architect.
 3. Verification Samples: 12 inch long samples of sealant for verification of color, installed where directed by the Project Engineer/VA COR and the Architect.
 4. Certificates: Manufacturer's certification that the Products supplied meet or exceed specified requirements.
 5. Test and Evaluation Reports:
 - a. Compatibility and adhesion test reports: Test reports from sealant manufacturer indicating that sealant proposed for use have been tested for compatibility and adhesion with actual samples of substrates to be used on this project. Include sealant manufacturer's interpretation of test results, and recommendations for primers and substrate preparation specific to this Project.
- B. Closeout Submittals: Submit the following:
1. Bonds and Warranty Documentation: Manufacturer's standard Warranties and Guarantees.

1.5 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Provide sealants from a single manufacturer for all work of this Section to the greatest extent possible. Each individual type of sealant installed in the Work shall be from a single manufacturer.
- C. Qualifications:
1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.
- D. Sustainability Standards:
1. Environmental Requirements for Volatile Chemicals: Use only interior sealants and caulks that comply with the specified limits for VOC content.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Each container and package must bear an unbroken seal, test number and label of the manufacturer upon delivery to the site. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question, by the Project Engineer/VA COR and the Architect and his requiring its removal from the site. New material conforming to said requirements, shall be promptly furnished at no additional cost to the Contract.

1.7 SITE CONDITIONS

- A. Do not install single component solvent curing sealant in enclosed building spaces.
- B. Environmental Requirements: Maintain temperature and humidity recommended by the sealant manufacturer during and 24 hours after installation. Do not proceed with installation of joint sealers under the following conditions:
 - 1. When ambient and substrate temperature conditions are below 40 degrees F.
 - 2. When joint substrates are wet due to rain, frost, condensation, or other causes.
- C. Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from substrates.

1.8 WARRANTY

- A. Provide 5 year warranty. Warranty shall include coverage of installed sealant and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

- A. Sealant Materials, General Requirements:
 - 1. Only use sealant and primers that comply with the following limits for VOC content:
 - a. Architectural Sealants: 250 g/L.
 - b. Roofing Sealants: 450 g/L.
 - c. Roadway Sealants: 250 g/L.
 - d. Sealant primer: 250 g/L.
 - 2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.
- B. Joint Sealer Type AA (Acrylic acoustical): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable.
 - 1. Tremco, product "Tremco Acoustical Sealant".
 - 2. USG, product "USG Acoustical Sealant".
 - 3. Pecora, product "AC-20 FTR".
- C. Joint Sealer Type AP (Acrylic painters caulk): One component acrylic latex caulking compound, conforming to FS 19-TP-21M and ASTM C 834 Type P, Grade NF, paintable within 24 hours after application, with a minimum movement capability of ± 12.5 percent, equal to one of the following:
 - 1. BASF (Sonneborn), product, "Sonolac".
 - 2. Tremco, product, "Tremflex 834".
 - 3. Bostik, product, "Chem-Calk 600".
 - 4. Pecora, product "AC-20+".

- D. Joint Sealer Type HL2 (Horizontal-self-Leveling, 2-component): Pouring grade self-leveling multi-component urethane sealant, conforming to FS TT-S-000227E, Type I, Class A, and ASTM C 920, with a minimum movement capability of ± 25 percent, equal to the following:
 - 1. BASF (Sonneborn), product, "SL2".
 - 2. Sika, product, "Sikaflex 2CSL".
 - 3. Tremco, product, "THC-900 / THC-901".
- E. Joint Sealer Type SC (Silicone, general construction): One-part medium modulus, natural cure, synthetic sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, NS, Class 25, use NT, G, A, M, O with a minimum movement capability of ± 50 percent, equal to the following:
 - 1. Dow Corning, product, "791".
 - 2. GE Silicones, product, "Silpruf".
 - 3. Pecora, product, "895".
 - 4. Sika, product, "Sika Sil-C 995".
 - 5. Tremco, product, "Spectrem 2".
- F. Joint Sealer Type SE (Silicone, Exterior construction): One-part low modulus, moisture curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, NS, Class 25, FS TT-S-001543A, Type, Class A with a minimum movement capability of +100 percent and -50 percent, equal to the following:
 - 1. Dow Corning, product, "790".
 - 2. GE Silicones, product, "SCS9000 SilPruf NB".
 - 3. Sika, product "Sika Sil-C 990".
 - 4. Tremco, product "Spectrem 1".
- G. Joint Sealer Type SM (Silicone, Mildew-resistant): USDA approved one component acetoxysilicone rubber, mildew resistant, acceptable to local health officials, conforming to U.S. Food and Drug Administration regulation 21 CFR 177.2600, FS TT-S-001543A, Type Non-Sag, Class A, and FS TT-S-00230C, Type II, Class A and ASTM C 920, Type S, Class 25, Grade NS, use NT, G and A with a minimum movement capability of ± 25 percent, and a Shore A hardness of 20, equal to the following:
 - 1. BASF (Sonneborn), product "Sonolastic - OmniPlus".
 - 2. Dow Corning, product "786".
 - 3. GE Silicones, product "Sanitary 1700".
 - 4. Tremco, product "Tremsil 200".
 - 5. Pecora, product "898".
- H. Joint Sealer Type SP (Silicone, Paintable all purpose): One-component, medium modulus, pre-pigmented, neutral cure elastomeric silicone sealant, or silyl-terminated polyether (hybrid) sealant, conforming to ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, and O. Paintable after manufacturer's recommended cure time.
 - 1. BASF (Sonneborn), product "Sonolastic 150".
 - 2. Dow Corning, product "756 SMS Building Sealant".
 - 3. GE Silicones, product "Silicone II Paintable Sealant".

2.2 ACCESSORIES

- A. Compressible joint bead back-up: Compressible closed cell polyethylene, extruded polyolefin or polyurethane foam rod complying with ASTM C 1330, Type C, 1/3 greater in

diameter than width of joint. Shape and size of compressible back-up shall be as recommended by manufacturer for the specific condition used. Provide one of the following, or equal.

1. Construction Foam Products (Division of Nomaco, Inc.), Zebulon, NC, product "HBR Closed Cell".
 2. Industrial Thermo Polymers Ltd., Brampton, Ontario CN, product "ITP Standard Backer Rod".
 3. BASF Construction Chemicals (Sonneborn), Shakopee MN, product "Sonolastic Closed Cell Backer Rod".
 4. W.R. Meadows Inc., Hampshire, IL, product "Sealtight Kool-Rod".
- B. Primers: Furnish and install joint primers of the types, and to the extent, recommended by the respective sealant manufacturers for the specific joint materials and joint function.
- C. Bond-breaker tape, and temporary masking tape: Of types as recommended by the manufacturer of the specific sealant and caulking material used at each application, and completely free from contaminants which would adversely affect the sealant and caulking materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Inspect existing joints to be renovated.
1. Verify joint sealants, backing, and other materials containing PCBs and other hazardous materials have been removed.
 2. Verify joint substrates and adjoining materials are structurally sound.
 3. Verify joints to be renovated can be satisfactorily repaired with specified methods and materials.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General:
1. Weather conditions must be dry and of the temperature, as recommended by sealant manufacturer, during application operations.
 2. Surface receiving work of this section must be absolutely dry and dust free. All joints receiving sealant/caulking materials and primers shall be subject to the approval of the sealant manufacturer for proper use of specified materials.
- B. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
1. Clean ferrous metals of all rust and coatings by wire brush, grinding or sandblasting. Remove oil, grease and protective coatings with cleaners recommended by sealant manufacturer.
 2. Where sealant is indicated to replace existing, thoroughly remove existing sealant and backing, scrape and clean surfaces. Renovate sealant joints in accordance with manufacturer's instructions and reviewed shop drawings. Remove all existing sealant residue from joint surfaces using chemical cleaners and solvents which are acceptable to sealant manufacturer.

- C. Prime joint substrates, as recommended in writing by joint-sealant manufacturer, as based on preconstruction joint-sealant-substrate tests or as based upon prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Verify that joint backing and release tapes are compatible with sealant.
- E. Perform preparation in accordance with ASTM C 804 and C 790 for solvent and latex base solvents, respectively.

3.3 PREPARATION FOR REPLACEMENT OF EXISTING SEALANT

- A. Remove existing joint sealants and backing as shown on drawings and identified during pre-installation conference and inspection (Article 1.4.B, Section 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS). Do not remove silicone joints to be recapped and joints to be covered with silicone seals.
- B. Cut existing sealant close to joint edges.
- C. Clean joint with power or hand wire brush, grinding, saw cutting, or solvent cleaning to depth at which replacement backing and sealant are to be installed.
- D. Blow out dust, loose particles, and debris with moisture and oil-free compressed air. Remove any pieces of caulk and backer rod lodged in joint.
- E. Repair deteriorated or damaged substrates as recommended by sealant manufacturer to provide suitable substrate for new sealant. Allow patching materials to fully cure.

3.4 INSTALLATION

- A. General: Conform to SWRI requirements, and sealant manufacturer's written requirements for installation.
- B. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.
 - 1. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
 - 2. Do not stretch back-up material into joints.
- C. Install bond breaker in joints where shown in the Drawings and wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.
- D. Apply masking tape or other precautions to prevent migration or spillage of materials onto adjoining surfaces.
- E. Apply urethane sealant and latex caulking materials into joints in accordance with manufacturer's instructions, using mechanical or power caulking gun equipped with nozzle of appropriate size, with sufficient pressure to completely fill the joints.
 - 1. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
 - 2. Maintain the outer edge of the sealant and caulking materials, where side faces of joints are in the same plane, back 1/8-inch from the faces.
 - 3. Apply sealant in continuous beads without open joints, voids or air pockets so as to provide a watertight and airtight seal for the entire joint length.
 - 4. After placement of the sealant and caulking materials, concave-tool the surfaces to uniform density, using a water-wet tool. Do not use detergents or soapy water for the tooling operations.

5. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.
- F. Apply pouring self-leveling urethane sealant (Sealant designation **HL**) into horizontal joints in accordance with manufacturer's instructions, to a level approximately 1/16 inch below adjacent surfaces.
 1. Apply sealant without open joints, voids or air pockets so as to provide a watertight and airtight seal for the entire joint length.
 2. After placement of the sealant and caulking materials, concave-tool the surfaces to uniform density, using a water-wet tool. Do not use detergents or soapy water for the tooling operations.
 3. Remove the temporary masking tape immediately after tooling, and before the sealant has taken initial set.

3.5 RECAPPING EXISTING EXTERIOR SILICONE SEALANT

- A. Clean existing silicone sealant that is sufficiently adhered and not mechanically damaged to prepare for recapping.
- B. Use two-cloth solvent wipe in accordance with ASTM C1193.
 1. Pour cleaning solvent onto clean cloth. Wipe vigorously to remove contaminants.
 2. Immediately wipe cleaned area with separate cloth before solvent has evaporated.
- C. Mask joint with tape.
- D. Apply thin bead of silicone sealant over existing cured sealant.
- E. Dry tool sealant with metal spatula. Provide smooth, uniform, sealant finish. Tool in one continuous stroke.
- F. Remove masking tape.

3.6 CLEANING

- A. Clean all surfaces of adjacent surfaces which have been marked or soiled by the work of this Section, removing all excess sealant and caulking materials with solvents which will not damage the surfaces in any way.

3.7 PROTECTION

- A. During the operation of sealant work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.8 SCHEDULE

- A. General: Seal joints indicated and all interior and exterior joints, seams, and intersections between dissimilar materials.
- B. Sealant Colors:
 1. Colors for Sealant Type "HL2": Match colors furnished by the Architect, or match other building materials as directed. Should such custom colors not be available from the approved manufacturer, except at additional charge, provide all such colors at no change in Contract Sum.
 2. Colors for Sealant Types "SC", "SE", "SP", and "SM": As selected by the Architect from manufacturer's standard colors.
 3. Color for Sealant Types "AA" and "AP": White.
 4. In concealed installation, and in partially or fully exposed installation where so approved by the Project Engineer/VA COR and the Architect, standard gray or black sealant may be used.

C. Sealant at Airborne Infection Isolation (All) and Ante Rooms:

1. Joint Sealer Type AP, (Acrylic painters caulk): One-component acrylic latex caulking compound, conforming to FS 19-TP-21M and ASTM C 834 Type P, Grade NF, paintable within 24 hours after application, with a minimum movement capability of ± 12.5 percent, equal to one of the following:
 - a. BASF (Sonneborn), product, "Sonolac".
 - b. Bostik, product, "Chem-Calk 600".
 - c. Pecora, product "AC-20+".
 - d. Tremco, product, "Tremflex 834".
 - 1) Seal all outlet box and panelboard openings into such wall cavities. Similarly seal each outlet box and panelboard perimeter to the gypsum wall board opening. Outlet boxes shall include, but are not limited to power receptacles, light switches, fire alarm, and data outlets.

2. Gypsum Board:

Joint Condition	Sealant Type
a. Gypsum board to metal or wood trim:	AP or SP
b. Gypsum board to abutting surfaces at exposed tops and bottoms partitions and walls:	AA
c. Gypsum board to masonry:	SC
d. Gypsum board to interior door and window frames, penetrating conduits and piping, light-fixtures, electrical cover plates, building specialty items, ductwork, grilles, supply diffusers, faucets, piping, escutcheon plates and similar items:	AP or SP
e. Gypsum board to plumbing fixtures:	SM

3. Architectural millwork and casework:

Joint Condition	Sealant Type
a. Casework to abutting materials, kitchens, toilet rooms and similar "wet spaces":	SM
b. Casework to abutting surfaces (except in "wet" spaces):	AP or SP
c. Countertops to abutting wall surfaces and to abutting casework:	SM
d. Countertops to plumbing fixtures and fittings:	SM

4. Interior metal:

Joint Condition	Sealant Type
a. Metal to metal:	SC

5. Interior floor drains:

Joint Condition	Sealant Type
a. Floor drains to concrete slab:	SE

6. Acoustical ceilings:

Joint Condition	Sealant Type
a. Acoustical ceiling edge angle to irregular wall surface	AP or SP

7. Tile:

<u>Joint Condition</u>	<u>Sealant Type</u>
a. Tile to tile vertical, and horizontal non-traffic joints:	SM
b. Tile to tile, horizontal pedestrian traffic joints:	HL2

8. Interior Wood:

<u>Joint Condition</u>	<u>Sealant Type</u>
a. Wood to wood (natural or stained finishes)	SC or SP
b. Wood to wood (painted opaque finishes)	AP or SC or SP
c. Wood to metal	SC or SP

END OF SECTION

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SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish the following products to be installed under the designated Sections:
 - 1. Flush UL-Labeled and non-labeled steel doors, complete with internal reinforcing, hardware cut-outs; and provided with glazing openings, where so indicated; installed by Section 062000 - FINISH CARPENTRY.
 - 2. Hollow metal frames for doors, UL-Labeled and non-labeled, complete with internal reinforcing; installed under Section 06 10 00 - ROUGH CARPENTRY.
 - 3. Glazing beads, loosely attached to hollow metal frames and doors, where so indicated, for removal and permanent installation during glazing operations; installed by: Section 08 80 00 - GLAZING.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 061000 - ROUGH CARPENTRY: Wood blocking, installation of hollow metal door frames.
- D. Section 062000 - FINISH CARPENTRY: Installation of doors and hardware.
- E. Section 079200 - JOINT SEALANTS: Requirements sealants and backing materials.
- F. Division 8 - See project drawings for Doors, Frames & Hardware Schedule.
- G. Section 081400 - INTERIOR WOOD DOORS: Furnishing wood doors to be installed in hollow metal frames.
- H. Section 088000 - GLAZING: Furnishing and installing glass located in doors and frames.
- I. Section 092900 - GYPSUM BOARD: Coordination of hollow metal frames occurring in gypsum drywall assemblies.
- J. Section 099100 - PAINTING: Applied finish coatings.
- K. Building-in of frame anchors to wall and partition construction: By trade responsible for wall and partition erection.
- L. Drawing 31-AS-602 for additional project specific door and hardware requirements and the Door and Hardware Schedule (Door, Frame & Hardware Groups).

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
 - 3. ANSI/SDI A250.8 – R2008 (formerly SDI 100) - Recommended Specifications for Standard Steel Doors and Frames.

4. ANSI/SDI A250.11 – Recommended Erection Instructions for Steel Frames.
5. SDI 111 Series (111A-111F): Recommended Details, Steel Doors and Frames.
6. SDI 117-93: Manufacturing Tolerances for Standard Steel Doors and Frames.
7. NFPA publication 80 - Fire Doors and Windows.
8. NFPA publication 105 – Standard for the Installation of Smoke Door Assemblies.
9. UL publication 10B - Fire Tests of Door Assemblies.
10. UL publication 10C – Positive Pressure Fire Tests of Door Assemblies.
11. UL 1784 – Air Leakage Tests of Door Assemblies.
12. All applicable federal, state and municipal codes, laws and regulations for exits.
13. ABAAS Architectural Barrier Act Accessibility Standard; PLUS V.A. Standard PG-18-13.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing anchorages furnished by this Section; make arrangements for delivery, receipt and installation of inserts and anchorages to prevent delay of the Work.
2. Coordinate the work of this Section with the respective trades responsible for furnishing hardware and installing doors and frames.
3. Ensure that the work performed hereunder is coordinated with issued templates authorized by the hardware supplier.
4. Do not fabricate doors or frames before receiving a copy of the approved hardware schedule, submitted by the hardware supplier, reviewed by the Contractor and accepted by the Project Engineer/VA COR and the Architect. Verify that issued templates are coordinated with the approved schedule; immediately notify the Project Engineer/VA COR and the Architect, in writing, of any conflicts.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

1. Product Data: Manufacturer's product data sheets, specifications, for doors, frames and shop applied finishes.
2. Shop Drawings:
 - a. Door and Frame Schedule: A complete schedule coordinated with the door and frame schedule contained in the Contract Drawings.
 - b. Large scale details of each type door and frame construction, indicating all gages, reinforcing, and anchorage.
 - 1) Indicated cutouts for glazing.
3. Certificates: Manufacturer's written certification stating that doors, frames, and all related items to be furnished hereunder, meet or exceed the requirements specified under this Section; that specified galvanized and shop priming has been performed; and that all U.L. fire-resistive requirements for the indicated Labels have been met.

B. Closeout Submittals: Submit the following:

1. Bonds and Warranty Documentation: Manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain doors and frames specified in this Section from a single manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Prior to shipping, identify each frame and door with a removable metal or plastic label which corresponds with door schedule identifying opening number and location.
 - 2. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
 - 3. Deliver doors and frames boxed or crated to provide protection during transit and job storage.
 - 4. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided the refinished items are equal in respects to new work and acceptable to the Project Engineer/VA COR and the Architect; otherwise remove and replace damaged items.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials following manufacturer's recommended procedures.
 - 2. Store doors and frames at the building site upright and under cover. Place the units on wood dunnage and cover in a manner that will prevent rust and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Amweld Building Products, Inc., (A Division of Amweld International, LLC), Coppell, TX.
 - 2. Ceco Door Products (A Division of Assa Abloy Group Company), Milan, TN.
 - 3. Curries Company (A Division of Assa Abloy Group Company), Mason City, IA.
 - 4. Republic Doors and Frames, McKenzie, TN.
 - 5. Steelcraft (A Division of Ingersoll-Rand Company), Cincinnati, OH.

2.2 DESCRIPTION

- A. Regulatory Requirements:
 - 1. Fire rated door construction shall conform to UL publications 10B and 10C.
 - 2. Install fire rated door assemblies in compliance with NFPA 80.
 - 3. Corridor door assemblies shall be tested and listed per UL 1784.

2.3 DOORS

- A. General: Refer to the Drawings for design of doors, sizes, glazing cut-outs in doors, and details.
- B. Construction: Full flush commercial type, 1-3/4 inches thick, unless noted otherwise, meeting or exceeding the materials, gages, construction, and testing requirements of the referenced ANSI and SDI publications.
- C. Interior Doors:

1. Interior Doors 1-3/4 inch thick (44.4 mm): ANSI 250.8, Level 2, Model 1 (Full Flush), ANSI A250.4 Physical Performance Level B, (Heavy Duty) having 18-gage, minimum 0.042 inch (1.0 mm) steel faces, with a minimum STC rating of 32.
2. Interior temperature-rise-rated door: ANSI 250.8, Level 3, Model 1 (Full Flush), ANSI A250.4 Physical Performance Level B, (Extra-Heavy Duty) having 16-gage steel faces, Temperature-rise-rated type door, UL Class A.
 - a. Fire-rating: UL rated Class A having a tested fire resistance rating of 3 hours. Modify specified construction to meet all construction requirements required for fire-resistive rating.
 - b. Temperature rise rating: Door shall be capable of withstanding a 250 degree Fahrenheit temperature rise for a minimum period of 30 minutes.
 - c. Core: Solid slab fire rated gypsum core, permanently bonded to the inside face of each face sheet.
3. Hardware reinforcing:
 - a. Hinges: 7 gage, minimum 0.167 inch (4.2 mm) thick.
 - b. Closers: Box/channel-shape reinforcing, 12 gage, minimum 0.093 inch (2.3 mm) thick.
 - c. Locks: Box/channel-shape reinforcing,
 - 1) Mortise locks: 14 gage, minimum 0.067 inch (1.6 mm) thick.
 - d. Kick plates: 18 gage, minimum 0.042 inch (1.0 mm) thick.
 - e. All other hardware: 14 gage, minimum 0.067 inch (1.6 mm) thick.
 - f. Locations for reinforcing shall be determined from information and templates provided under Section 08 71 00 - DOOR HARDWARE.

2.4 HOLLOW METAL FRAMES

- A. General: Refer to the Drawings for various types of frames, sizes, and profiles, UL fire-resistive Label frames, and other characteristics of frames and related items.
 1. Frame type (all frames), non-rated frames and fire-resistance rated frames: Shop welded frames with mitered joints arc-welded, reinforced and ground smooth.
- B. Materials for frames, reinforcement, anchors, anchor clips and related items: commercial grade cold-rolled steel conforming to ASTM A109 or commercial grade hot-rolled and pickled steel conforming to ASTM A415.
 1. Frame gage:
 - a. Interior frames for Level 2 and 3 doors: 16-gage, 0.053 inch thick (1.3 mm), except as otherwise required for specific U.L. Label.
 2. Reinforcing channels within frames, except where structural steel channels are indicated, and except where U.L. Label requirements prohibit same: 12 gage.
 3. Hinge reinforcement: 7 gage, minimum 0.167 inch (4.2 mm) thick.
 4. Lock and strike reinforcement: 12 gage, minimum 0.093 inch (2.3 mm) thick.
 5. Door closer reinforcement: 12 gage, minimum 0.093 inch (2.3 mm) thick.
 6. Floor clips: 16 gage, minimum 0.053 inch (1.3 mm) thick.
 7. Splice plates or channels: same gage as door frame.
 8. Removable Glazing stops: Rectangular channel sections, not less than 20-gage, 0.032 inch thick (0.8 mm) steel; pre-drilled and loosely attached within the glazing cut-outs with countersunk tamper-resistant stainless steel screws; sized to properly

accommodate the designated thicknesses of glass and glazing materials; and external edges set flush with, or slightly behind, door face. Modify glazing stops for UL Label doors to conform with UL fire rating requirements.

- a. The fastening of the glazing stops shall be performed to create a seamless appearance by using countersunk screws with caps that match the color and surface appearance of the surrounding glazing stop material.
- b. The screws shall not be visible once the glazing is installed.

9. Mortar guards: 26 gage, minimum 0.016 inch (0.4 mm) thick.

C. Frame construction:

1. Fire-rated frame assemblies: Modify specified construction to meet all construction requirements required for fire-resistive rating.
 - a. Affix appropriate UL, FM or Warnock Hersey labels to each rated frame assembly, indicating applicable rating.
2. Shop-fabricate frames as whole single units per door opening, except when frame size is too large to ship as a single unit. Oversized frames may be shipped in large sections as practicable for field assembly with concealed splice plates or channels.
 - a. Frame corner construction: Shop welded frames with mitered joints arc-welded, reinforced and ground smooth.
3. Reinforcements, stiffeners, and base angle clips: Welded to interior surfaces of frames to provide a stable base and so as to not interfere with installation of hardware.
4. Appearance of finished frames: Strong, rigid, completely free from warp and buckle, with miters well-formed and in true alignment, and with surfaces smooth and free from defects of any kind.
5. Silencer holes: Prepare frames for silencers at non-gasketed doors, coordinate with Section 08 71 00 – DOOR HARDWARE and Hardware Schedule. Provide three single silencers for single doors, and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
6. Glazing beads: Carefully place to properly accommodate the various thicknesses of glass and glazing materials, and loosely-attach to frames with flathead galvanized steel screws through pre-drilled holes having countersunk depressions.

D. Anchorage:

1. Anchor clips for frames in metal stud partitions: Steel clips, 18-gage (minimum 0.042 inch [1.0 mm] thick), 1-1/2 inch upturned and downturned legs, or equivalent type standard with the manufacturer, contained within the frames, for screw attachment to metal studs under Section 092216 - NON-STRUCTURAL METAL FRAMING.
2. Anchors for frames in masonry walls: Adjustable, T-shaped, positively engaging the retainers on both flanges of each jamb member, when placed. The stem of the anchors shall be 2 inches wide by 12 gage, minimum 0.093 inch (2.3 mm) thick, corrugated or perforated for mortar bond, and extend 10 inches into the masonry, unless otherwise indicated.
3. Anchors for fire-resistive rated frames: Conform to all UL requirements for the specific fire-resistive ratings.
4. Provide the following number of anchors, clips, or bolts, per jamb:
 - a. For frames 7'-6" in height or less: 3 anchors per jamb.
 - b. For frames 7'-6" in height or less and having doors exceeding 3'-0" feet width, and for cross corridor frames: 4 anchors per jamb.

- c. For frames greater than 7'-6", up to 10'-0" in height: 4 anchors per jamb.
- d. For frames greater than 7'-6", up to 10'-0" in height, and having doors exceeding 3'-0" feet width, and for cross corridor frames: 5 anchors per jamb.
- e. For frames over 10'-0' in height: 5 anchors per jamb.

2.5 FABRICATION

- A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.
- B. Fabrication Tolerances, Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

2.6 FINISHES

- A. Preparation: Pressure-sand all surfaces of all doors, frames, accessory items, anchors, and related items, to remove blemishes and foreign matter and provide paint grip. Spot-fill imperfections with metallic filler, and sand smooth. Thoroughly clean the surfaces by applying hot or cold phosphate treatment standard with the manufacturer.
- B. Following cleaning apply one dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer to all surfaces, including those which will be concealed after erection. Bake, or oven dry, the primer at time and temperature recommended by the manufacturer for developing maximum hardness and resistance to abrasion.

2.7 ACCESSORIES

- A. Removable Stops: Rolled steel channel shape.
- B. Astragals for Double Doors: Steel T shaped.
- C. Primer: ANSI A250.10 rust inhibitive type.

PART 3 - EXECUTION

3.1 ERECTION AND INSTALLATION

- A. Installation of frames and doors, including all accessories and related items furnished hereunder, will be performed under Section 061000 - ROUGH CARPENTRY, and Section 062000 - FINISH CARPENTRY.
 - 1. Section 06 10 00 - ROUGH CARPENTRY shall place frames in correct position within specified tolerances, and provide temporary bracing at locations where frames are indicated to be built-into masonry. Section 04 20 00 - UNIT MASONRY shall build and grout frames into masonry work.
- B. Final installation of loosely-attached glazing stops will be performed under Section 088000 - GLAZING.

END OF SECTION

SECTION 081400
INTERIOR WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies interior flush doors with pre-finish, pre-fit option.
- B. Section includes fire rated doors, sound retardant doors, and smoke doors.

1.2 RELATED WORK

- A. Metal door frames: Section 081113 - HOLLOW METAL DOORS AND FRAMES.
- B. Door hardware including hardware location (height): Section 087100 - DOOR HARDWARE.
- C. Installation of doors and hardware: Section 081113 - HOLLOW METAL DOORS AND FRAMES, Section 081400 - WOOD DOORS, or Section 087100 - DOOR HARDWARE.
- D. Drawing 31-AS-602 for additional project specific door and hardware requirements and the Door and Hardware Schedule (Door, Frame & Hardware Groups).

1.3 SUBMITTALS

- A. Submit in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
 - 1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
 - 2. Veneer sample 200 mm (8 inch) by 275 mm (11 inch) by 6 mm (1/4 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample stained to match Architect's control sample for approval.
- C. Shop Drawings:
 - 1. Show every door in project and schedule location in building.
 - 2. Indicate type, grade, finish and size; include detail of glazing, louvers, sound gasketing, and pertinent details.
 - 3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.
- D. Manufacturer's Literature and Data:
 - 1. Sound rated doors, including test report indicating STC rating per ASTM E90 from test laboratory.
 - 2. Labeled fire rated doors showing conformance with NFPA 80.
- E. Laboratory Test Reports:
 - 1. Screw holding capacity test report in accordance with WDMA T.M.10.
 - 2. Split resistance test report in accordance with WDMA T.M.5.
 - 3. Cycle/Slam test report in accordance with WDMA T.M.7.
 - 4. Hinge-Loading test report in accordance with WDMA T.M.8.

1.4 WARRANTY

- A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:
 - 1. For interior doors, manufacturer's warranty for lifetime of original installation.
 - 2. Specified STC RATING for sound retardant rated door assembly in place.

1.5 DELIVERY AND STORAGE

- A. Factory seal doors and accessories in minimum of 6 mill polyethylene bags or cardboard packages which shall remain unbroken during delivery and storage.
- B. Store in accordance with WDMA I.S.1-A, J-1 Job Site Information.
- C. Label package for door opening where used.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. Window and Door Manufacturers Association (WDMA):
 - I.S.1-A-04Architectural Wood Flush Doors
 - I.S.4-07AWater-Repellent Preservative Non-Pressure Treatment for
Millwork
 - T.M.5-90Split Resistance Test Method
 - T.M.6-08Adhesive (Glue Bond) Durability Test Method
 - T.M.7-08Cycle-Slam Test Method
 - T.M.8-08Hinge Loading Test Method
 - T.M.10-08Screwholding Test Method
- C. National Fire Protection Association (NFPA):
 - 80-07Protection of Buildings from Exterior Fire
 - 252-08Fire Tests of Door Assemblies
- D. ASTM International (ASTM):
 - E90-04Laboratory Measurements of Airborne Sound Transmission Loss

PART 2 – PRODUCTS

2.1 FLUSH DOORS

- A. General:
 - 1. Meet requirements of WDMA I.S.1-A, Extra Heavy Duty.
 - 2. Adhesive: Type II.
 - 3. Thickness: 45 mm (1-3/4 inches) unless otherwise shown or specified.
- B. Face Veneer:
 - 1. In accordance with WDMA I.S.1-A.
 - 2. Face veneer, where transparent finish is scheduled: WDMA Industry Premium Grade veneer minimum 1/50 inch (0.6 mm) thick, plain sliced select white maple, plain sliced with book matched grain, stained to match Architect's control sample.
 - a. Door edges shall be same species as door face veneer except maple may be used for stile face veneer on birch doors.
 - b. On doors required to have transparent finish on one side and paint finish on other side; use veneers as required for transparent finish on both sides.
- C. Wood for stops, louvers, muntins and moldings of flush doors required to have transparent finish:
 - 1. Solid Wood of same species as face veneer, except maple may be used on birch doors.

- a. On non-labeled doors provide flush stops and moldings around glazed lights with mitered hairline joints.
- 2. Glazing:
 - a. On non-labeled doors use applied wood stops nailed tight on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on centers.
 - b. Use stainless steel or dull chrome plated brass screws for exterior doors.
- D. Stiles and Rails:
 - 1. Option for wood stiles and rails:
 - a. Composite material having screw withdrawal force greater than minimum performance level value when tested in accordance with WDMA T.M.10.
 - 2. Provide adequate blocking for bottom of doors having mechanically operated door bottom seal meeting or exceeding the performance duty level per T.M.10 for horizontal door edge screw holding.
- E. Fire rated wood doors:
 - 1. Fire Performance Rating:
 - a. "B" label, 1-1/2 hours.
 - b. "C" label, 3/4 hour.
 - 2. Labels:
 - a. Doors shall conform to the requirements of ASTM E2074, or NFPA 252, and, carry an identifying label from a qualified testing and inspection agency for class of door or opening shown designating fire performance rating.
 - b. Metal labels with raised or incised markings.
 - 3. Performance Criteria for Stiles of doors utilizing standard mortise leaf hinges:
 - a. Hinge Loading: WDMA T.M.8. Average of 10 test samples for Extra Heavy Duty doors.
 - b. Direct screw withdrawal: WDMA T.M.10 for Extra Heavy Duty doors. Average of 10 test samples using a steel, fully threaded #12 wood screw.
 - c. Cycle Slam: 1,000,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with WDMA T.M.7.
 - 4. Additional Hardware Reinforcement:
 - a. Provide fire rated doors with hardware reinforcement blocking.
 - b. Size of lock blocks as required to secure hardware specified.
 - c. Top, bottom and intermediate rail blocks shall measure not less than 125 mm (five inches) minimum by full core width.
 - d. Reinforcement blocking in compliance with manufacturer's labeling requirements.
 - e. Mineral material similar to core is not acceptable.
 - 5. Other Core Components: Manufacturer's standard as allowed by the labeling requirements.
 - 6. Provide steel frame approved for use in labeled doors for vision panels.
 - 7. Provide steel astragal on pair of doors.
- F. Smoke Barrier Doors:
 - 1. For glazed openings use steel frames approved for use in labeled doors.
 - 2. Provide a steel astragal on one leaf of pairs of doors, including double egress doors.
- G. Sound Rated Doors:
 - 1. Fabricated as specified for flush wood doors with additional construction requirements to meet specified sound transmission class (STC).

2. STC Rating of the door assembly in place when tested in accordance with ASTM E90 by an independent nationally recognized acoustical testing laboratory not less than 36.
3. Accessories:
 - a. Frame Gaskets: Continuous closed cell sponge neoprene with stop adjusters.
 - b. Automatic Door Bottom Seal:
 - 1) Steel spring operated, closed cell sponge neoprene metal mounted removable in extruded aluminum housing with a medium matte 0.1 mm (4.0 mil) thick clear Anodized finish.
 - 2) Concealed or Surface Mounted.

2.2 PREFINISH, PREFIT OPTION

- A. Flush doors may be factory machined to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
- B. Factory fitting to conform to specification for shop and field fitting, including factory application of sealer to edge and routings.
- C. Flush doors to receive transparent finish (in addition to being prefit) shall be factory finished as follows:
 1. WDMA I.S.1-A Section F-3 specification for System TR-4, Conversion Varnish or System TR-5, Catalyzed Vinyl.

2.3 IDENTIFICATION MARK:

- A. On top edge of door.
- B. Either a stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, code date of manufacture and quality.
- C. Accompanied by either of the following additional requirements:
 1. An identification mark or a separate certification including name of inspection organization.
 2. Identification of standards for door, including glue type.
 3. Identification of veneer and quality certification.
 4. Identification of preservative treatment for stile and rail doors.

2.4 SEALING:

- A. Give top and bottom edge of doors two coats of catalyzed polyurethane or water resistant sealer before sealing in shipping containers.

PART 3 – EXECUTION

3.1 DOOR PREPARATION

- A. Field, shop or factory preparation: Do not violate the qualified testing and inspection agency label requirements for fire rated doors.
- B. Clearances between Doors and Frames and Floors:
 1. Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
 2. Maximum clearance at bottom of sound rated doors, light-proofed doors, doors to operating rooms, and doors designated to be fitted with mechanical seal: 10 mm (3/8 inch).
- C. Provide cutouts for special details required and specified.
- D. Rout doors for hardware using templates and location heights specified in Section 087100 - DOOR HARDWARE.

- E. Fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (two inches) of door thickness undercut where shown.
- F. Immediately after fitting and cutting of doors for hardware, seal cut edges of doors with two coats of water resistant sealer.
- G. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.
- H. Apply a steel astragal on the opposite side of active door on pairs of fire rated doors.
- I. Apply a steel astragal to meeting style of active leaf of pair of doors or double egress smoke doors.

3.2 INSTALLATION OF DOORS APPLICATION OF HARDWARE

- A. Install doors and hardware as specified in Section, INSTALLATION OF DOORS AND HARDWARE.

3.3 DOOR PROTECTION

- A. As door installation is completed, place polyethylene bag or cardboard shipping container over door and tape in place.
- B. Provide protective covering over knobs and handles in addition to covering door.
- C. Maintain covering in good condition until removal is approved by Resident Engineer.

END OF SECTION

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SECTION 083100
ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Fire resistive rated and non-rated access panels and frames, as specified under this Section, furnished by Sections requiring the same and installed under the following Sections:
 - 1. Section 092900 - GYPSUM BOARD: Installation of access panels into drywall assemblies.
 - 2. Section 093000 - TILING: Installation of access panels into tiled walls.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 092900 - GYPSUM BOARD: Installation of access panels into drywall assemblies.
- D. Section 093000 - TILING: Installation of access panels into tiled walls.
- E. Division 21 - FIRE SUPPRESSION: Furnishing access panels required for fire protection systems.
- F. Division 22 - PLUMBING: Furnishing access panels required for plumbing systems.
- G. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Furnishing access panels required for heating/cooling systems.
- H. Division 26 - ELECTRICAL: Furnishing access panels required for electrical systems.

1.3 SUBMITTALS

- A. Information and Review Submittals:
 - 1. Product Data: Manufacturer's product data sheets, specifications and installation instructions.
 - 2. Schedule: Submit Schedule of all access panels to be furnished hereunder, indicating locations for each size and type of access door.
 - a. The Contractor is responsible to ensure that all of the types/styles of panels and frames specified herein can be furnished by the manufacturer submitted.
 - b. Prior to submitting schedule, coordinate with the work of Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATING AND AIR CONDITIONING and Division 26 - ELECTRICAL and meet with the Project Engineer/VA COR and the Architect to determine exact quantities and locations required for the installation of access panels.
 - 3. Shop drawings: Large scale details of access doors, indicating all sizes, gages and thickness; provide complete installation details, coordinated to the specific receiving conditions.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver access doors to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA COR and the Architect.

- B. Store access door units inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 ACCESS PANELS - FOR FIRE RESISTANCE RATED CONSTRUCTION

- A. For fire-resistance rated wall and ceiling surfaces: Standard flush panel door meeting the following requirements:
 - 1. Panel and frame rating: UL "B" label for 90 minutes.
 - 2. Frame type:
 - a. For tile walls: 16 gage Type 304 stainless steel flanged frame, with flange exposed to view 1 inch or less, equal to:
 - 1) Acudor FW-5050 series.
 - 2) Karp KRP-150FR series.
 - 3) Nystrom IT series.
 - 4) Williams WB-FRSS Regular series.
 - b. For gypsum board walls and ceilings: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
 - 1) Acudor FW-5050DW
 - 2) Karp KRP-350FR series.
 - 3) Nystrom IW series.
 - 4) Williams WB-FR series.
 - 3. Door: Insulated Flush panel door as follows:
 - a. Typical wall types : Flush door, Sandwich construction with 2 inch thick mineral wool fiber insulation between two layers of 20 gage galvanized bonderized steel.
 - b. For tile walls only: Flush door, Sandwich construction with 2 inch thick mineral wool fiber insulation between two layers of 20 gage Type 304 stainless steel.
 - 4. Hinge: Flush continuous piano hinge with stainless steel pin.
 - 5. Closer: Spring closer.
 - 6. Latch: Flush cam latch, operated by Allen or Torx head screwdriver.

2.2 ACCESS PANELS - FOR NON - RATED CONSTRUCTION

- A. For non-rated wall and ceiling surfaces: Flush panel door type meeting the following requirements:
 - 1. Frame type:
 - a. For gypsum board walls and ceilings: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
 - 1) Acudor DW-5040 series.
 - 2) Karp KDW series.
 - 3) Nystrom NW series.
 - 4) Williams WB-PL series.

- b. For tiled walls: 16 gage Type 304 stainless steel flanged frame, with flange exposed to view 1 inch or less, equal to:
 - 1) Acudor UF-5000 series.
 - 2) Karp DSC-214SM series.
 - 3) Nystrom NT series.
 - 4) Williams WB-GP series.
 - 2. Door: Flush panel door as follows:
 - a. Typical all wall types: 14 gage galvanized bonderized steel.
 - b. For tiled walls: 14 gage type 304 stainless steel.
 - 3. Hinge:
 - a. Typical: Concealed spring hinge enabling door to open 175 degrees and permit removal of door from frame.
 - b. Panels greater than 24 by 36 inches: Flush continuous piano hinge with stainless steel pin.
 - 4. Latch: Flush cam latch, operated by Allen or Torx head screwdriver.
- B. For non-rated gypsum board, walls and ceilings (Public areas): Recessed door type meeting the following requirements
 - 1. Manufacturer's types:
 - a. Acudor DW-5015 series.
 - b. Karp:
 - 1) Walls: Karp RDW series.
 - 2) Ceilings: Karp KATR series.
 - c. Nystrom RW series.
 - d. Williams WB-DW series.
 - 2. Frame type: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
 - 3. Door: Recessed 16 gage galvanized bonderized steel door. with 22 gage galvanized steel drywall bead.
 - 4. Hinge: Concealed pivot rod hinge.
 - 5. Latch: Flush cam latch, (operated by Allen or Torx head screwdriver) with steel grommet welded to door.

2.3 ACCESSORIES

- A. Emergency latch release: For all ceiling panels and wall panels accessible from the back which are greater than 18 by 18 inches in size, provide an interior latch release mechanism to permit panel to be opened from back (interior side) of panel.

2.4 FACTORY FINISHING

- A. Panel assemblies fabricated from stainless steel: N°. 4 satin finish.
- B. Panel assemblies fabricated from galvanized bonderized steel: Baked on rust inhibitive gray primer finish.

- C. Panel assemblies fabricated from cold rolled steel: Phosphate dipped with baked on rust inhibitive gray primer finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Verify that prepared openings are ready to receive the work of this Section and opening dimensions are as indicated on the shop drawings. Verify that all blocking is set in place and secure.
- B. Beginning of installation means acceptance of project conditions.

3.2 INSTALLATION

- A. Install access panels in accordance with manufacturer's instructions and direction from authorities having jurisdiction. Install miscellaneous specialties absolutely level and in true line, with units securely anchored to the surrounding construction.
- B. Test each door and latching device, and make adjustments required to ensure a bind-free operation and proper latching.

END OF SECTION

SECTION 083473
INTERIOR SLIDING WOOD SOUND CONTROL DOOR ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior Aluminum-Framed, Top-Hung Sliding Wood Sound Control Door Assemblies and Related Hardware.
- B. Related Sections:
 - 1. Section 081400 "Interior Wood Doors". Wood doors of this section shall match aesthetic aspects of wood doors specified in Section 081400.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 80 - Fire Doors and Windows.
 - 4. NFPA 101 - Life Safety Code.
 - 5. NFPA 105 - Installation of Smoke Door Assemblies.
 - 6. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.
 - 7. State Building Codes, Local Amendments.
- D. Standards: Comply with the following industry standards:
 - 1. ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 2. ASTM E1332-16 Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
 - 3. UL1784 Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.3 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Refer to Division 01 Section "Project Requirements".

1.4 SUBMITTALS

- A. Comply with Section 013323 "Shop Drawings, Product Data, and Submittals".
- B. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, door hardware and accessories, and finishes.
- C. Shop Drawings: Show details of fabrication and installation, including the following:
 - 1. Assembly elevations and sections indicating dimensions, tolerances, materials, components, hardware, finishes, options, and accessories.

2. Door hardware locations, mounting heights, quantities, and installation requirements.
 3. Frame anchorages and wall reinforcement requirements.
- D. Manufacturer's Certification: Submit manufacturer's certification that assemblies comply with specified requirements and are suitable for intended application, including acoustical report as applicable.
- E. Samples for Verification: For each type of exposed finish indicated, provide samples below as requested by Architect.
1. Frame finish sample.
 2. Door veneer sample.
- F. Maintenance Data: For top-hung, sliding door assemblies include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing top hung, sliding door assemblies similar to those required for this Project and with a record of successful in-service performance.
- B. Product Options: Architectural drawings indicate size, profiles, and dimensional requirements of aluminum framing system and sliding door.
- C. Source Limitations: Obtain each of the top-hung, sliding door components from one source with the complete integrated assembly from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Notify manufacturer immediately of any shipping damage.
- C. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 3. Store materials in clean, dry area indoors.
 4. Protect materials and finish during storage, handling, and installation to prevent damage.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Manufacturer's written warranty agreeing to repair or replace components of the top-hung, sliding door assemblies that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
1. Structural failures.
 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 3. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 4. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
 5. Failure of operating components to function normally.

- C. General Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Acoustic Rating: Minimum STC 34 rated sound control assemblies tested at an independent acoustic laboratory in accordance to ASTM E90 Sealed-In-Place standard.
- B. Aluminum Frames: Aluminum cased opening perimeter frames manufactured with integral C-channel door cavity and acoustic seals.
- C. Closing Mechanism: Soft self-closing mechanism integrated with top track.
- D. Door Guide: Concealed type door guide.
- E. Accessibility Standards: Comply with applicable provisions in Accessibility Guidelines for Buildings and Facilities ICC (ANSI) A117.1 and requirements of authorities having jurisdiction.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements, provide the named product, or the comparable product by one of the alternate specified manufacturers. Comparable products are subject to review and approval through the submittal process specified.
- B. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and Specifications have been based on products specified in the following articles.
 - 1. ASSA ABLOY.
- C. Acceptable alternate manufacturers may be any national recognized major brand only when it has been demonstrated that all of the design and performance characteristics set forth below have been met.

2.3 INTERIOR TOP-HUNG, SLIDING SOUND CONTROL DOORASSEMBLIES

- A. Basis-of-Design Product:
 - 1. ASSA ABLOY RITE SLIDE Sliding Door System (RS).
- B. Frame and Door Assembly Components:
 - 1. Single Piece Box Top Track: Extruded aluminum track system with mounting brackets.
 - 2. Fascia: Extruded aluminum with matching integral end caps.
 - 3. Integral Soft-Closer: Soft and self-closing damper mechanism.
 - 4. Concealed Door Bottom Floor Guide.
 - 5. Acoustical Integrated Door Bottom.
 - 6. Seal Sets: Integral to frame.
 - 7. Operating Hardware.
- C. Specified Wall Thickness:
 - 1. As indicated on Architectural Drawings.
- D. Frame Profiles: Extruded aluminum cased frame and trim with integral vertical jamb receiver channel.
 - 1. 1-1/2" Faces.
- E. Fascia Profile:
 - 1. Custom Fascia Profile:

a. Chamfer.

F. Frame Finish:

1. Standard: Clear Anodized.

G. Framing Anchors and Fastenings: Manufacturer's standard concealed anchors and fastenings.

H. Flush Wood Door Construction:

1. Standard: WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: A Premium.
2. Minimum 1-3/4" Thickness.
3. Core Construction: Structural Composite Lumber (SCL). Engineered hardwood composite wood products tested in accordance with WDMA I.S.1A, Testing Cellulosic Composite Materials for Use in Fenestration Products containing no added Urea Formaldehyde.
4. Face Veneer: Per Section 081400 "Interior Wood Doors".
5. Finish: Comply with referenced standard for factory finishing.

I. Door Preparation. Doors leaves to be factory machined for hardware including pilot and function holes.

J. Door Hardware Components:

1. General: Heavy-duty, operating door hardware units in sizes, quantities, and types recommended by manufacturer for sliding door assemblies indicated.
2. Refer to section 080671 "Door Hardware Schedule" for specific hardware sets.
3. Cylinders and Keying: Refer to Division 08 Section "Door Hardware".

2.4 FABRICATION

- A. General: Fabricate top-hung, sliding door assemblies in sizes, profiles, and configurations indicated on Architectural Schedules and Drawings.
- B. Factory prepare door assemblies for field installation of door hardware and accessories to greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify dimensions of wall openings.
- B. Examine wall openings and conditions, with Installer present, for plumb, level and square, and compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Sliding door operation will be adversely affected by out-of-tolerance framing.
- C. Examine surfaces to receive door bottom guide. Floor shall have no height variance throughout the complete sliding operation.
- D. Notify Architect of conditions that would adversely affect installation or subsequent use of sliding doors. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 DOOR, FRAME AND HARDWARE ASSEMBLY INSTALLATION

- A. General: Comply with manufacturer's written installation instructions and approved shop drawings.
- B. Install frame components and sliding doors plumb, level, square, and in proper alignment.
- C. Anchor sliding door assemblies securely in place to supports according to manufacturer's written

installation instructions.

3.3 ADJUSTING AND CLEANING

- A. Adjust sliding doors and hardware for smooth operation in accordance with manufacturer's written instructions without binding and with tight fit at contact points and seals. Sliding doors to close against walls without gaps.
- B. Repair minor damages to finish in accordance with manufacturer's written instructions and as approved by Architect.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure sliding door assemblies are without damage or deterioration at the time of Substantial Completion.

3.5 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. See Project Drawings for Door, Frame and Hardware Schedule.

END OF SECTION

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SECTION 085113
ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes aluminum windows for exterior locations.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section
- B. Section 017419 - Construction Waste Management and Disposal: Procedural and administrative requirements for construction and demolition recycling.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified.
- D. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- E. Product test reports and Sample warranties.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.5 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.
 - c. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ALUMINUM WINDOWS

- A. Type: Fixed, Non-Operable.
- B. Basis-of-Design Product:
 - 1. Kawneer Company, Inc.

2. Trifab Versaglaze 601UT Framing System
 - a. 2x6 inches nominal dimension
 - b. Thermal
 - c. Front Plane
 - d. Back closure trim, aluminum extrusion, dual-thermally broken, full window perimeter. Plastic is not acceptable.
 - C. Frames and Sashes: Thermally broken aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 - D. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.
 1. Kind: Fully tempered where indicated on Drawings.
 - E. Insulating-Glass Units: ASTM E 2190.
 1. Glass: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: As selected
 - b. Kind: Fully tempered where indicated on Drawings.
 2. Filling: Fill space between glass lites with argon
 3. Low-E Coating: Pyrolytic on second surface.
 - F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
 - G. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- ## 2.2 ACCESSORIES
- A. Dividers (False Muntins): Provide extruded-aluminum divider grilles in designs indicated for each sash lite.
 1. Type: Permanently located between insulating-glass lites.
 2. Pattern: As indicated on Drawings.
 3. Profile: As selected by Architect from manufacturer's full range.
 - B. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
 - C. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
 - D. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
 - E. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.
- ## 2.3 FABRICATION
- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
 - B. Glaze aluminum windows in the factory.
 - C. Provide weep holes and internal passages to conduct infiltrating water to exterior.

- D. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- E. Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.4 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

- F. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Door hardware and related items necessary for complete installation and operation of doors.

1.2 RELATED WORK

- A. Caulking: Section 079200 - JOINT SEALANTS.
- B. Application of Hardware: Section 081400 - WOOD DOORS and Section 081113 - HOLLOW METAL DOORS AND FRAMES.
- C. Painting: Section 099100 - PAINTING.
- D. Drawing 31-AS-602 for additional project specific door and hardware requirements and the Door and Hardware Schedule (Door, Frame & Hardware Groups).

1.3 GENERAL

- A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.
- B. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- C. Deadlocks specified for psychiatric area doors are not required to have "UL" label.
- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, if possible, except as otherwise specified:
1. Mortise locksets.
 2. Hinges for hollow metal and wood doors.
 3. Surface applied overhead door closers.
 4. Exit devices.
 5. Floor closers.

1.4 SUBMITTALS

- A. Submit in accordance with Section 013323 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

1.5 DELIVERY AND MARKING

- A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.6 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters "HW" followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:

Adams-Rite	Adams Rite Mfg. Co.	Glendale, CA
Glynn Johnson	Glynn Johnson Co.	Chicago, IL
LCN	LCN Closers	Princeton, IL
Firemark	Rixon-Firemark Co.	Chicago, IL
Hager	Hager Hinge Company	Saint Louis, MO
Stanley	The Stanley Works	New Britain, CT

Trimco	Triangle Brass Mfg. Co.	Los Angeles, CA
Unican	Simplex Security Systems	Collinsville, CT
Von Duprin	Von Duprin Hardware Co.	Indianapolis, IN
Zero	Zero Weather Stripping Co.	New York, NY

- C. Keying: All cylinders shall be keyed into existing Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be 7 pin type. Keying information shall be furnished at a later date by the Resident Engineer.

1. Keying shall be Best Brand "TE" keyway system using 7 pin cores..
2. Supply information regarding key control of cylinder locks to manufacturers of equipment having cylinder type locks. Notify Resident Engineer immediately when and to whom keys or keying information is supplied. Return all such keys to the Resident Engineer.

1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):
F883-04..... Padlocks
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
A156.1-00..... Butts and Hinges
A156.2-03..... Bored and Pre-assembled Locks and Latches
A156.3-01..... Exit Devices
A156.4-00..... Door Controls (Closers)
A156.5-01..... Auxiliary Locks and Associated Products
A156.6-05..... Architectural Door Trim
A156.8-05..... Door Controls-Overhead Stops and Holders
A156.13-05..... Mortise Locks and Latches Series 1000
A156.15-06..... Release Devices-Closer Holder, Electromagnetic and
Electromechanical
A156.16-02..... American National Standard for Auxiliary Hardware
A156.18-00..... Materials and Finishes
A156.21-06..... Thresholds
A156.22-05..... Door Gasketing and Edge Seal Systems
A156.23-04..... Electromagnetic Locks
A156.24-03..... Delayed Egress Locking Systems

A156.26-00.....Continuous Hinges
A156.31American National Standard for Electric Strikes and Frame
Mounted Actuators

A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):

80-06Fire Doors and Fire Windows

101-05Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

Building Materials Directory (2007)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:

1. Exterior Doors: Type A2112 for doors 900 mm (3 feet) wide or less and Type A2111 for doors over 900 mm (3 feet) wide. Hinges for exterior doors shall have non-removable pins.
2. Interior Doors: Type 8112 for doors 900 mm (3 feet) wide or less and Type A8111 for doors over 900 mm (3 feet) wide.
3. Automatic doors hung on butts, provide Type A2111 for exterior doors and aluminum doors, and Type A8111 for other doors.
4. Any door installed in structural steel frames: Type A2412, A8412, A2411 or A8411 as applicable, except where otherwise specified. Such hinges shall be of same quality and weight as other hinges listed above for applicable door sizes.
5. Labeled Wood Fire Doors: Type 8411 or Type 8412; these hinges shall be thru bolted to door with hex nuts and bolts.

B. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

2.2 CONTINUOUS HINGES

A. ANSI/BHMA A156.26, //Grade 1-150// //Grade 1-300// //Grade 1-600//.

1. Listed under Category N in BHMA's "Certified Product Directory."

B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete:

1. Fire Pins: Steel pins to hold labeled fire doors in place if required by tested listing.

C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a pin that extends entire length of hinge.

1. Base Metal for Exterior Hinges: Stainless steel.
2. Base Metal for Interior Hinges: Stainless steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel.
4. Manufacturers:
 - a. Hager Companies.

- b. Markar Architectural Products, Inc.; a Subsidiary of Adams Rite Manufacturing Co.
 - c. McKinney Products Company; an ASSA ABLOY Group company.
 - d. Stanley Commercial Hardware; Division. of the Stanley Works and Zero International.
- D. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves; joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
- 1. Manufacturers:
 - a. Bommer Industries, Inc.
 - b. Hager Companies.
 - c. McKinney Products Company; an ASSA ABLOY Group company.
 - d. Pemko Manufacturing Co.
 - e. Select Products Limited.
 - f. Zero International.

2.3 DOOR CLOSING DEVICES

Closing devices shall be products of one manufacturer.

2.4 OVERHEAD CLOSERS

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
 - 1. The closer shall have 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
 - 2. Where specified, closer shall have hold-open feature.
 - 3. Size Requirements: Size closers in accordance with manufacturer's recommendations or provide multi-size closers, sizes 1 through 6.
 - 4. Material of closer shall be forged or cast iron or cast aluminum.
 - 5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
 - 6. Closers shall have full size cover.
 - 7. Closers shall have adjustable hydraulic back-check and separate valves for closing and latching speed.

2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS

- A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor closers and floor pivots, except where metal thresholds occur. Provide cement cast for all floor closers. Floor closers specified for fire doors shall comply with Underwriters Laboratories, Inc., requirements for concealed type floor closers for classes of fire doors indicated on drawings. Hold-open mechanism, where required, shall engage when door is opened 105 degrees, except when door swing is limited by building construction or equipment, the hold-open feature shall engage when door is opened approximately 90 degrees. Floor closers shall have adjustable hydraulic back-check. Single acting floor closers shall also have built in dead stop. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.
- B. Where floor closer appears in hardware set provide the following as applicable.
 - 1. Double Acting Floor Closers: Type C06012.

2. Single Acting Floor Closer: Type C06021 (center pivoted). (Intermediate pivot is not required).
3. Single Acting Floor Closers: Type C06041 (offset pivoted).
4. Single Acting Floor Closer for Labeled Fire Doors: Type C06051 (offset pivoted).
5. Single Acting Floor Closer For Lead Lined Doors: Type C06061 (center pivoted). (Intermediate pivot is not required).
6. Single Acting Floor Closers For Lead Lined Doors: Type C06071 (offset pivoted).

2.6 COMBINATION CLOSER – HOLDER

- A. Conform to ANSI A156.15; combination closer-holder with built-in electronic release.
- B. Combination closer-holder shall have the following features:
 1. Control door closing and latching sequence by hydraulic action.
 2. Wiring for 24V DC current. Current draw shall not exceed 0.16 amperes.
 3. Double level arm closing action, and adjustable hydraulic back-check.
 4. Spring power for closing force shall conform to ANSI A156.4 and have 50% spring power adjustment.
 5. Closer Size Requirements:
 - a. Doors, 900 mm (3 feet) and less in width: Size III closer.
 - b. Doors over 900 mm (3 feet) and less than 1050 mm (3 feet 6 inches) in width: Size IV closer.
 - c. Doors 1050 mm (3 feet 6 inches) and over in width: Size V closer.
 6. Hold open mechanism shall hold door open between 85 degrees and 180 degrees depending on wall and frame conditions. Mount device to provide maximum door opening permitted by building construction or equipment.
 7. Electronic release shall release door when signaled by smoke detector. Smoke detectors shall not be incorporated as an integral part of door holders. Smoke detectors are specified in the ELECTRICAL Section.
 8. All closers to have full covers.
 9. All closers shall have a 1 ½" piston and an adjustable back check position valve.

2.7 DOOR STOPS

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.
- C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.
- D. Substitute floor stops Type L02141 or L02161 as appropriate, when wall bumpers would not provide an effective door stop.
- E. Where drywall partitions occur, use floor stops, Type L02141 or L02161.
- F. Provide stop Type L02011 or L02181, as applicable for exterior doors.
- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.

- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified.

2.8 OVERHEAD DOOR HOLDERS

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment.

2.9 FLOOR DOOR HOLDERS

- A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

2.10 LOCKS AND LATCHES

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than seven pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
 - 1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles similar to Falcon S-lever Design. Lever handle shall be fabricated from wrought stainless steel. No substitute lever design or material shall be accepted. All locks and latchsets shall be furnished with curved lip strike and wrought box. Lock function F02 shall be furnished with key plates similar to Russwin's No. A70. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks.
 - 2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. Knobs for series 4000 lock and latch sets shall have 57 mm (2-1/4 inch) diameters. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
 - 3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.
 - 4. Locks on designated doors in Psychiatric (Mental Health) areas shall be paddle type with arrow projection covers and be UL Listed. Provide these locks with paddle in the down position on both sides of the door. Locks shall be fabricated of wrought stainless steel.

2.11 PUSH-BUTTON COMBINATION LOCKS

- A. ANSI/BHMA A156.5, Grade 1. Mechanical or electrically operated as indicated.

- B. Construction: Heavy duty cylindrical lock housing conforming to ANSI/BHMA A156.2, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines.
- C. Special Features: Key override to permit a master keyed security system and a key activated passage feature to allow access without using the entry code.
- D. Manufacturers:
 - 1. Alarm Lock.
 - 2. Code Locks, LLC
 - 3. Locknetics; an Ingersoll Rand company.
 - 4. Kaba Ilco.

2.12 ELECTROMAGNETIC LOCKS

- A. ANSI/BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. Listed under Category E in BHMA's "Certified Product Directory."
 - 1. Type: Full exterior or full interior, as required by application indicated.
 - 2. Strength Ranking: 1500 lbf (6672 N).
 - 3. Inductive Kickback Peak Voltage: Not more than 53 V.
 - 4. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.
- B. Delayed-Egress Locks: BHMA A156.24. Listed under Category G in BHMA's "Certified Product Directory".
 - 1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds, as required by NFPA 101.
 - 2. Security Grade: Activated from secure side of door by initiating device.
 - 3. Movement Grade: Activated by door movement as initiating device.
- C. Manufacturers:
 - 1. Door Controls International.
 - 2. Doorguard Systems, Inc.
 - 3. Dortronics Systems, Inc.
 - 4. DynaLock Corp.
 - 5. Locknetics; an Ingersoll-Rand Company.
 - 6. Rutherford Controls Int'l. Corp.
 - 7. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - 8. Security Door Controls.

2.13 CARD READERS

- A. Provide and install card readers where indicated. Integrate card readers with other specified systems and systems that are in place. Refer to Section 281311 - PHYSICAL ACCESS CONTROL SYSTEMS, for card reader requirements.

2.14 ELECTRIC STRIKES

- A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes with fire-rated devices.

C. Manufacturers:

1. Adams Rite Manufacturing Co.
2. Folger Adam Security Inc.; an ASSA ABLOY Group company.
3. HES, Inc.; an ASSA ABLOY Group company.
4. Locknetics; an Ingersoll-Rand Company.
5. Precision Hardware, Inc.
6. Von Duprin; an Ingersoll-Rand Company.

2.15 KEYS

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	Quantity
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	1 key

B. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

2.16 KEY CABINET

- A. ANSI Standard A156.5. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and two parasentric keys. All locks shall be nickel plated with solid brass pin tumbler cylinder keyed as directed. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent.
- B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."
- C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.
- D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the Resident Engineer.

2.17 ARMOR PLATES, COMBINATION KICK-MOP PLATES AND DOOR EDGING

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates as specified below:
 - 1. Kick-mop plates and armor plates plastic or metal, Type J100 series, color as required. When wood grain plastic plates are specified in Section 090600 - SCHEDULE FOR FINISHES, grain plates shall run in same direction as grain of face veneer of wood doors.
 - 2. Provide kick-mop plates for both sides of each new door, except where noted as not required. Kick-mop plates shall be 200 mm (8 inches) high. On push side of doors where jamb stop extends to floor, make combination kick-mop plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other combination kick-mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
 - 3. Kick-mop plates are not required on following door sides:
 - a) Armor plate side of doors;
 - b) Exterior side of exterior doors;
 - c) Closet side of closet doors;
 - d) Storage side of doors to or from storage spaces; and
 - e) Both sides of aluminum entrance doors.
 - 4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt cross bar.
 - 5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick-mop plate in place of armor plate. Size of stretcher plate and kick-mop plate shall be 200 mm (8 inches) high.

2.18 EXIT DEVICES

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have lever handles similar to locksets, unless otherwise specified.
- B. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

2.19 FLUSH BOLTS (LEVER EXTENSION)

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors. Modify flush bolts to fit stiles of aluminum doors on double-acting doors.
- B. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- C. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

2.20 FLUSH BOLTS (AUTOMATIC)

- A. Conform to ANSI A156.16. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).

2.21 DOOR PULLS

- A. Conform to ANSI A156.6. Pull plate 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Cut plates of door pulls for cylinders, or turn pieces where required.

2.22 PUSH PLATES

- A. Conform to ANSI A156.6. Plastic, Type J302, 200 mm (8 inches) wide by 350 mm (14 inches) high. Provide plastic Type J300 plates 100 mm (4 inches wide by 350 mm (14 inches) high) where push plates are specified for doors with stiles less than 200 mm (8 inches) wide. Color shall be as specified for kick-mop plates in Section 090600 - SCHEDULE FOR FINISHES. Cut plates for cylinders, and turn pieces where required. When wood grain plastic plates are specified in SCHEDULE FOR FINISHES Section, grain in plates shall run in same direction as grain of face veneer of wood doors.

2.23 COMBINATION PUSH AND PULL PLATES

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high, top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

2.24 COORDINATORS

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated.

2.25 THRESHOLDS

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.
- B. For thresholds at elevators entrances see other sections of specifications.

2.26 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF DOORS

Conform to ANSI A156.22.

2.27 WEATHERSTRIPS (FOR EXTERIOR DOORS)

Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m³/s/m).

2.28 MISCELLANEOUS HARDWARE

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.

- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, // except as otherwise specified //. Provide cylinders to operate locking devices where specified for following partitions and doors:
 - 1. Folding doors and partitions.
 - 2. Wicket door (in roll-up door assemblies).
 - 3. Slide-up doors.
 - 4. Swing-up doors.
 - 5. Fire-rated access doors-Engineer's key set.
 - 6. Doors from corridor to electromagnetic shielded room.
 - 7. Day gate on vault door.
- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011, of white or light gray color, on each steel door frame, except lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

2.29 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES

- A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.
- B. Key padlocks as follows:
 - 1. Constant Temperature Rooms in Research Departments: Research Laboratory Set.
 - 2. Cold Room in Morgue Department: Autopsy Set.
 - 3. Refrigerators in Canteen Department: Canteen Storage Set.
 - 4. All Refrigerator Rooms in Main Kitchen Department: Kitchen Storage Set.
 - 5. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.
 - 6. Chain Link Fence Gates for Oxygen Storage Buildings: Maintenance supply set.
 - 7. Roof Access and Scuttles: Engineer's set.
 - 8. Hinged Wicket in Post Office Partitions: Post Office set.
- C. Omit padlocks on communicating refrigerator doors.

2.30 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS

- A. Where lock is shown, equip each cabinet door (metal) with lock Type E06213, conforming to ANSI A156.1. Key locks in Key Sets approved by Contracting Officer. See mechanical drawings and specifications for location of cabinets.
- B. Cabinet manufacturer shall supply the hinges, bolts and pulls. Ship locks to cabinet manufacturer for installation.

2.31 HINGED WIRE GUARDS (FOR WINDOWS, DOORS AND TRANSOMS) AND WIRE PARTITION DOORS

- A. Butt hinges, type A8133 (special swaging) 100 mm by 90 mm (4 inches by 3-1/2 inches), Finish US2C.
 - 1. 3 hinges for guards over 1060 mm (3-1/2 feet) high.

2. 2 hinges for guards less than 1060 mm (3-1/2 feet) high.
- B. Conform to ANSI A156.11. Lock Type E06081 for guards and Type E06061 for partitions.
 1. Keying: Except as noted otherwise, key locks like entrance door or space wherein guards and partitions are located except as otherwise specified.
 2. Key locks for partitions enclosing mechanical and electrical equipment in Engineer's Set. (See detailed drawings for number of locks and butt hinges required for each guard).

2.32 FINISHES

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 099100 - PAINTING.
- B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.
- C. Miscellaneous Finishes:
 1. Hinges --exterior doors: 626 or 630.
 2. Hinges --interior doors: 652.
 3. Pivots: Match door trim.
 4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color .
 5. Thresholds: Mill finish aluminum.
 6. Cover plates for floor hinges and pivots: 630.
 7. Other primed steel hardware: 652.
- D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces.
- E. Color of Plastic Items: See Section 090600 - SCHEDULE FOR FINISHES. Where colors other than chocolate brown or black are specified, color of core material may be different than color of face.
- F. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.

2.33 BASE METALS

- A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION

3.1 HARDWARE HEIGHTS

- A. For existing buildings locate hardware on doors at heights to match existing hardware. The Contractor shall visit the site, verify location of existing hardware and submit locations to Resident Engineer for approval.

1. For new buildings locate hardware on doors at heights specified below unless otherwise noted:

3.2 INSTALLATION

- A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted regular arm. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.
- B. Substitute parallel arm or top jamb mounting for regular arm mounting where the following conditions occur:
 1. Where door swing, in full open position, would be limited to less than 90 degrees due to partition construction and closer location.
 2. Where door to room opens outward into corridor, // except security bedroom, bathroom and anteroom doors which shall have closer installed parallel arm on exterior side of doors. //
 3. Where exterior doors open outward.
 4. On doors equipped with roller latch.

C. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

- D. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim.
- E. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by Resident Engineer. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.
- F. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

- G. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

- H. After locks have been installed; show in presence of Resident Engineer that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Resident Engineer for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

3.3 HARDWARE SETS

- A. Refer to project Drawing 31-AS-602 for Doors, Frames & Hardware Schedules.
- B. Refer APPENDIX A – ACCESS CONTROL at the end of this section for all access control components that will be furnished by the General Contractor through the access control system vendor.

3.4 ATTACHMENTS

- A. APPENDIX A, 087100.A: ACCESS CONTROL

END OF SECTION

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087100.A
ACCESS CONTROL

APPENDIX A TO SECTION 087100, DOOR HARDWARE

COVER SHEET

Contactless Readers for PIV Solutions

MEETS NIST ASSURANCE-LEVEL REQUIREMENTS FOR THESE AREAS:

"Unrestricted" Areas

"Controlled" Areas

"Limited" Areas

"Exclusion" Areas



CONTACTLESS READERS FOR "CONTROLLED" AREAS ENABLE HIGH SECURITY, INTEROPERABILITY AND COMPLIANCE

- **Part of an integrated solution from a single, trusted provider** – Enable FIPS 201 compliance per NIST SP 800-116 guidelines and the TWIC Reader Specification.
- **Contactless reader solutions for "Controlled" security areas** – Meets NIST's "Controlled" security area assurance-level requirements with a single-factor authentication.
- **Support multiple card types** – Works with PIV, PIV-I, CAC, CIV (a.k.a., PIV-C), TWIC, FRAC, iCLASS® and HID Prox® cards for easy, phased transitions from legacy technology to new PKI-enabled smart cards. .

HID Global's pivCLASS Government Solutions portfolio enables facilities to upgrade their existing physical access control system (PACS) to achieve FIPS 201 compliance.

The PIV-enabled contactless readers and their proximity – enabled versions deliver the "Controlled" assurance level defined in the National Institute of Standards and Technology (NIST) SP 800-116

guidelines when used with the pivCLASS Authentication Module (PAM) to perform a single-factor authentication check.

CHUID + VIS Authentication – The system tests the signature on the PIV Card Holder Unique Identifier (CHUID) data object. The CHUID signature check ensures the card is authentic (came from a valid issuer) and has integrity (has not been altered).

Because the CHUID is a "free read" and will be transmitted unencrypted to any reader, it could be possible for perpetrators to capture a PIV card's CHUID and create a counterfeit card. However, the required visual check (VIS) of the card secures against this threat by making it possible to identify cards that have been counterfeited or altered.*

CAK Authentication – The full duplex version of these contactless PIV-enabled readers work with the PAM to perform a PKI challenge-response test in addition to a signature check to validate the card authentication key (CAK). The challenge-response test ensures the public key in the card authentication certificate is bound to the private key on the card. This CAK authentication secures against cards that have been counterfeited, altered, copied or cloned. The half duplex version of these readers supports the OSD protocol to half duplex authentication modules.

HID Readers for PIV Solutions are guaranteed to meet the stringent specifications for operation, reliability and interoperability with other Genuine HID™ products.



ADDITIONAL PRODUCT FEATURES:

- Part of an integrated solution from a single, trusted provider – Enable FIPS 201 compliance per NIST SP 800-116 guidelines and the TWIC Reader Specification.
- Contactless reader solutions for "Controlled" security areas – Meets NIST's "Controlled" security area assurance-level requirements with a single-factor authentication.
- Support multiple card types – Works with PIV, PIV-I, CAC, CIV (a.k.a., PIV-C), TWIC, FRAC, iCLASS® and HID Prox® cards for easy, phased transitions from legacy technology to new PKI-enabled smart cards.

* Per SP 800-116, to achieve "Controlled" assurance, the CHUID read must be combined with a visual check (VIS) of the identification card.

Model Number	Reader Series	HID Signo™	
General Information			
			
	Base Model & Form Factors	20 / 20K - mullion 40 / 40K - wallswitch	R10 / RP10 - mullion R40 / RP40 / RK40 / RPK40 - wallswitch
Credential Technology	13.56 MHz Credential Compatibility	PKI-Based FIPS-201 Credentials including PIV, PIV-I, CIV, CAC, TWIC and FRAC Secure Identity Object (SIO) on iCLASS Seos, iCLASS SE, MIFARE DESFire EV1 and MIFARE Classic standard iCLASS Access Control Application ISO14443A (MIFARE) CSN	
	125 kHz Credential Compatibility	HID Proximity, EM4102 Proximity, AWID	
Device Characteristics	Mounting	Mullion, single or double-gang switch box	
	Connector Type	Pigtail Cable – 18 inch (0.5 m) Terminal Block – flush mount	Pigtail Cable – 18 inch (0.5 m) Terminal Block - protruding mount
	Color	Black Bezel / Silver Trim (Black Trim available as an accessory)	Black Bezel Only
	Material Housing	Polycarbonate – UL94 V0 rated	
	Operating Voltage Range	12 VDC	5 - 16 VDC
	Current Draw (max)	250 mA	200 mA
	Device Input & Output	Input: Tri-color LED, Buzzer, Hold Output: Tamper Relay	Input: Tri-color LED, Buzzer, Hold Output: Open Collector – TTL
	Operating Temperature Range	-35° C to +66° C (-31° F to +150° F) 0% to 95% non-condensing	
	Storage Temperature Range	-40° C to +85° C (-40° F to +185° F)	-55° C to +85° C (-67° F to +185° F)
	Environmental Rating	UL294 Outdoor and Indoor rated	
	Ingress Protection	IP65	IP55; IP65 if installed with optional gasket (IP65GSKT)
	Controller Communication	Half duplex supports OSDP protocol and HID pivCLASS protocol. Wiegand, Clock & Data integrated into base hardware.	Full duplex supports HID pivCLASS protocol, Half duplex supports OSDP and HID pivCLASS protocol . Wiegand, Clock & Data integrated into base hardware.
	Cable Distance 1	RS485 for communication (500 ft [152m], 22AWG), (300 ft [91m], 24AWG); two wires for power (500 ft [152m], 22AWG)	
Device Features	Device Management	HID Reader Manager, OSDP configuration	HID reader configuration cards
	Intelligent Power Mode	Yes	
	Velocity Attack Detection	Yes	
	Metal Environment Optimization	Yes – surface detection feature automatically calibrates read range	No
	FIPS-201 Outputs	Wiegand and OSDP: CHUID & UUID outputs per reader configuration. CAK, SM Auth, High Assurance Authentication and PKI supported when connected to a pivCLASS Authentication Module (PAM) or controller using HID pivCLASS Embedded Authentication.	
Certifications and Terms	Certifications	FIPS-201 & FICAM Certified 2 , UL294, FCC, CB, CE, - see www.hidglobal.com/certifications	
	Warranty	Limited Lifetime	



hidglobal.com

North America: +1 512 776 9000 | Toll Free: 1 800 237 7769
Europe, Middle East, Africa: +44 1440 714 850
Asia Pacific: +852 3160 9800 | Latin America: +52 (55) 9171-1108
For more global phone numbers click here

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2021-05-28-piv-fips-controlled-readers-ds-en PLT-00413
part of ASSA ABLOY

ACCESS CONTROL - 087100.A
Appendix A to Section 087100, DOOR HARDWARE
September 30, 2022

DS160 Series High Performance Request-to-exit Detectors

www.boschsecurity.com



BOSCH

Invented for life



- ▶ Door monitor with sounder alert
- ▶ Sequential Logic Input (SLI)
- ▶ Internal vertical pointability
- ▶ Wrap-around coverage pattern with precise pattern control
- ▶ Up to 64 second adjustable latch time

The DS160 Series consists of the DS160 Detector (light gray) and the DS161 Detector (black) specifically designed for Request-to-exit (REX) applications. With features such as timers, door monitor with sounder alert, and pointable coverage, the DS160 and DS161 have the flexibility to meet the most stringent REX requirements. The exclusive Sequential Logic Input (SLI) provides added security that is not offered in any other REX device.

Functions

Sequential Logic Input (SLI)

The SLI terminal allows connection of a second device to require sequential detection. This eliminates the possibility that an object that is slid through the door or underneath the door will activate the detector. This input can also be used to lock the sensor if motion is present outside the premises.

Door Monitor

The sensor can monitor a door contact to allow special control of the internal relay. For example, if the door is opened within the relay time period, the sensor can be programmed to halt the timer. If the door is not opened within a specific time period, the relay can be programmed to deactivate.

Sounder Alert

An integrated sounder can be programmed to activate if the door is left open too long. The sounder volume is fully adjustable to 85 dB.

Keycard Input

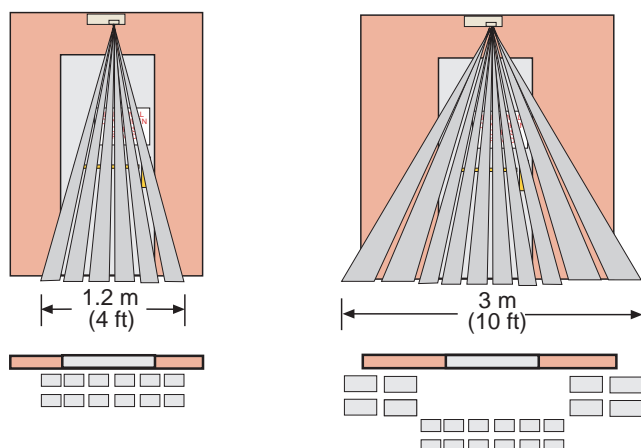
The keycard input allows the sensor relay to be controlled from an external source, such as an access control system or card reader.

Certifications and approvals

Europe Complies with EN50131-1 Grade 2

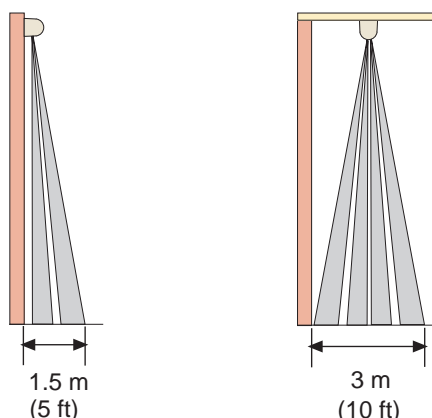
Region	Regulatory compliance/quality marks	
Australia	RCM	[DS160]
Europe	CE	EMC, LVD, RoHS [DS160, DS161]
USA	UL	ALVY: Access Control Systems Units (UL294) [DS160, DS161]

Installation/configuration notes



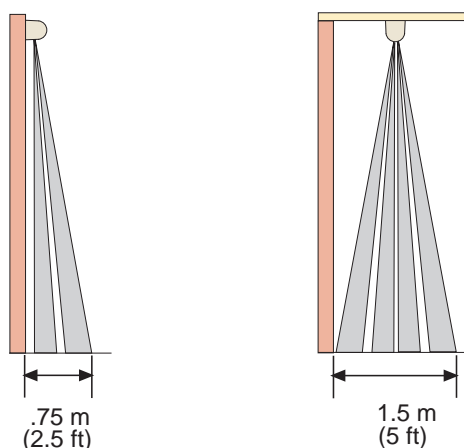
Front View

Mounted on wall above door and mounted on ceiling .75 m (2.5 ft) in front of the door.



Side View

The higher that you mount the unit, the larger the coverage area. Do not mount the DS160/DS161 more than 4.6 m (15 ft) above the floor. Side view of coverage pattern with the unit mounted at 4.6 m (15 ft) above the floor with the lens pointed straight down.



Side View

The higher that you mount the unit, the larger the coverage area. Do not mount the DS160/DS161 more than 4.6 m (15 ft) above the floor. Side view of coverage pattern with the unit mounted at 4.6 m (15 ft) above the floor with the lens pointed straight down.

Coverage Information

The coverage (detection area) varies depending on the mounting height above the floor, angle of the lens, and whether the unit is mounted on a wall above the door or on the ceiling. The coverage is 2.4 m x 3 m (8 ft x 10 ft). The coverage patterns for the detector at a height of 2.3 m (7.5 ft) are shown. The coverage pattern increases or decreases with height and detector alignment.



Notice

When you mount the unit on the wall and the lens points straight down, some detection zones point toward the wall and do not detect movement.

The diagrams depict views of the coverage pattern with the detector mounted at 2.3 m (7.5 ft) above the floor with the lens pointed straight down. Zones that are pointed toward the wall are not shown.

Technical specifications

Environmental

Operating Temperature:	-29°C to +49°C (-20°F to +120°F) For UL Certificated installations, 0°C to +49°C (+32°F to +120°F)
Radio Frequency Interference (RFI) Immunity:	No alarm or setup on critical frequencies in the range from 26 MHz to 1000 MHz at 50 V/m

Complies with Environmental Class II (EN50130-5)

Mechanical

Dimensions:	4.5 cm x 17.1 cm x 4.4 cm (1.80 in. x 6.75 in. x 1.75 in.)
Material:	High impact ABS plastic enclosure

Modes

Power Loss Default:	Programmable fail-safe or fail-secure modes.
Timer:	Programmable reset accumulative or non-reset counting mode.

Electrical

Current Draw:	8 mA nominal standby current, 39 mA at 12 VDC in alarm
Voltage:	12 VAC or VDC to 30 VAC or VDC

Alarm Output:	Two Form C relay contacts each rated 1 A at 30 VAC or VDC for resistive loads
Indicators:	1 activation LED
Relay Latch Time:	Adjustable from 0.5 sec to 64 sec.

Ordering information

DS160 Request-to-exit sensor, sounder

For use in request-to-exit (REX) applications. Provides PIR 2.4 m x 3 m (8 ft x 10 ft) coverage, timers, door monitor with sounder alert, and pointable coverage.
Order number **DS160**

EWE-DECTCTR-IW 12mths wrty ext detector general

12 months warranty extension
Order number **EWE-DECTCTR-IW**

DS161 Request-to-exit sensor, black, sounder

Black enclosure. For use in Request-to-EXit (REX) applications. Provides PIR, 2.4 m x 3 m (8 ft x 10 ft) coverage, timers, door monitor with sounder alert, and pointable coverage.
Order number **DS161**

EWE-DECTCTR-IW 12mths wrty ext detector general

12 months warranty extension
Order number **EWE-DECTCTR-IW**

Accessories

TP160 Trim plate for DS150 and DS160

A light gray trim plate used when mounting the detector over a standard single-gang box.
Order number **TP160**

TP161 Trim plate for DS151 and DS161, black

A black trim plate used when mounting the sensor over a standard single-gang box.
Order number **TP161**

Represented by:

Europe, Middle East, Africa:
Bosch Security Systems B.V.
P.O. Box 80002
5600 JB Eindhoven, The Netherlands
Phone: + 31 40 2577 284
emea.securitysystems@bosch.com
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Robert-Bosch-Ring 5
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11 Bishan Street 21
Singapore 573943
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Fax: +65 6571 2699
apr.securitysystems@bosch.com
www.boschsecurity.asia



The 1006 Series is also available in a **Complete One Box Solution**

1006 Series

The strongest, most versatile electric strike available

Shown with KM Option

The 1006 series is the strongest and most versatile electric strike available. The dual interlocking plunger design and heavy duty stainless steel construction, enables it to exceed every standard developed for electric strikes. With multiple faceplate options, the 1006 will fully accommodate every lock designed to work within an ANSI 4-7/8" strike plate. Tested to exceed 3,000 lbs. of static strength, 350 ft-lbs. of dynamic strength and factory tested to exceed 1,000,000 cycles of operation, the 1006 is in a class of its own.



Specifications

- UL 10C fire-rated, 3 hour single door (fail secure only)
- UL 10C fire-rated, 1-1/2 hour double door (fail secure only)
- CAN4-S104(ULC-S104) fire door conformant
- ANSI A250.13-2003 windstorm listed
- UL 1034, burglary-resistant listed and suitable for outdoor use
- UL 294 (6th Edition) listed
- ANSI/BHMA A156.31, Grade 1
- NFPA-252 fire door conformant
- ASTM-E152 fire door conformant
- MEA New York City accepted
- Florida Building Code approved FL#4776
- RoHS compliant
- Environmental Product Declaration
- Patents: 6,021,038 & 6,595,564

Frame Application

- Metal
- Wood

Electrical (continuous duty)

- .45 Amps at 12 VDC
- .25 Amps at 24 VDC

1006 Models

1006	Universal electric strike	Faceplate options ordered separately, see pages 12-16
1006CS	Complete electric strike	Includes the SMART Pac II and J, KD, KM, HM, and AD faceplates
1006CLB	Complete electric strike	Includes the J, K, KD, and KM faceplates
1006CDB	Complete electric strike	Includes the HM and AD faceplates
RF1016	Integrated Prox	Includes the strike body, Prox reader and door position switch
IC1026	Integrated iCLASS®	Includes the strike body, iCLASS reader and door position switch

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Appendix A to Section 087100, DOOR HARDWARE
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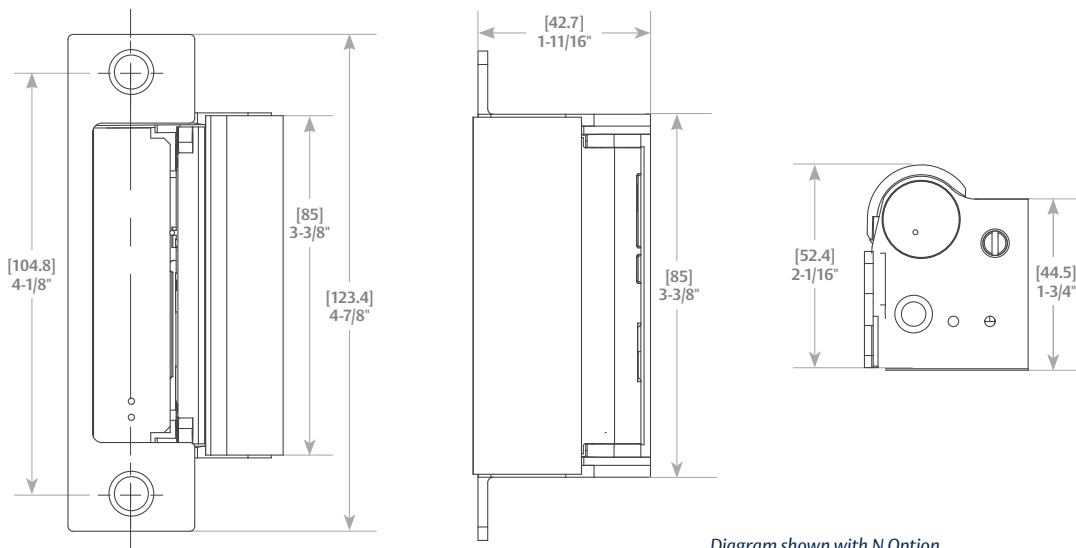


Diagram shown with N Option

Standard Features

- Stainless steel construction
- Tamper-resistant
- Static strength 3,070 lbs. (fail secure)
- Dynamic strength 350 ft-lbs. (fail secure)
- Endurance 1,000,000 cycles
- Fail secure
- Dual-voltage 12 VDC or 24 VDC continuous duty
- Non-handed
- Internally mounted solenoid
- Accommodates up to 1" deadbolt
- Plug-in connector
- Full keeper shims for horizontal adjustment
- Trim enhancer
- Five-year limited warranty

Optional Features

- LBM** » Latchbolt monitor
- LBSM** » Latchbolt strike monitor
- Fail safe
- Interchangeable faceplates

Monitor Switches may not work with all faceplate options (see pages 12-16)

Accessories

- 1000-102** » Rain guard
- 1006-103** » Full keeper shims
- 1000-104** » Lip extension trim adapter
- 1006-105** » Trim enhancer BLK (goof plate)
- 1006-109** » Trim adapter
- 1000-110** » Replacement strike plate
- 1000-130** » KD filler plate

- 150** » Strike latch guard
- 154-MTK** » Metal template kit
- 2004M** » ElectroLynx® adapter
- 2005M3** » SMART Pac® III
- 2006M** » Plug-in buzzer

Finishes

- 630** » Satin stainless steel
- 605** » Bright brass
- 606** » Satin brass
- 612** » Satin bronze
- 613** » Bronze toned
- 629** » Bright stainless steel

BLK » Black

**Complete Pacs are only available in the 630 finish*



CYLINDRICAL
LOCKSETS



MORTISE
LOCKS WITH
DEADBOLTS



MORTISE LOCKS
WITHOUT
DEADBOLTS



SPECIALTY
LOCKSETS



ANSI A250.13-2003
WINDSTORM
RESISTANT



FIELD SELECTABLE
(12 OR 24VDC)



FIRE RATED



GRADE 1



OUTDOOR
RATED



UL 1034
BURGLARY
LISTED



ACCESS CONTROL - 087100.A

Appendix A to Section 087100, DOOR HARDWARE
September 30, 2022

1006 Series

HES raises the bar again with a **Complete** line of **One Box Solutions**

If you're unsure of what lockset you'll encounter in the field or just want to simplify what you carry, choose an HES Complete electric strike system.

You'll be sure to have a Grade 1 solution to release any cylindrical or mortise lockset that works with an ANSI 4-7/8" strike plate.

Everything is included in the box.

How to Order

The following is an example describing how to order the new 1006 Complete One Box Solutions.

Part Number Examples

1006CLB-630-LBM

Is the part number for a 1006 Series electric strike with select option faceplates included in the box, and a stainless steel finish.

1006	C	LB	F	630	LBM
Strike Series	Complete	Lock Type	Fail Safe/Secure	Finishes	Optional Features
Choose the electric strike series number	Specify a "C" to include select faceplates and hardware in the box	"LB" for Latchbolt "S" for SMART Pac® III "DB" for Deadbolt	Specify an "F" for Fail Safe and leave blank for Fail Secure (standard)	All Complete Pacs are only available in the 630 finish	This item refers to options such as latchbolt monitor or latchbolt strike monitor

ACCESS CONTROL - 087100.A

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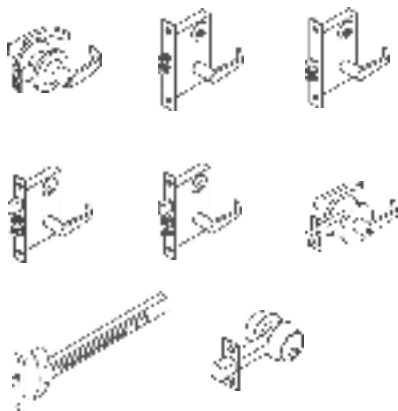
1006CS Smart Strike™

The **Complete One Box Solution** for all cylindrical and mortise locksets, with or without a 1" deadbolt

The **1006CS Smart Strike** includes a 1006 electric strike body and SMART Pac® III plus faceplates and brackets that can provide the same function as any of the following options:

J Option	AM Option	N Option
K Option	H Option	ND Option
KD Option	HD Option	NM Option
KM Option	HM Option	T Option
A Option	HT Option	TD Option
AD Option	HTD Option	

Compatible Locksets:



*Complete Pacs are only available in the 630 finish

1006CLB Complete for Latchbolt Locks

The **Complete One Box Solution** for all cylindrical and mortise locksets

The **1006CLB** includes the 1006 electric strike body plus faceplates and brackets that provide the same function as any of the following options:

J Option	KD Option
K Option	KM Option

Compatible Locksets:



1006CDB Complete for Deadbolt Locks

The **Complete One Box Solution** for all locksets with a 1" deadbolt

The **1006CDB** includes the 1006 electricstrike body plus faceplates and brackets that provide the same function as any of the following options:

A Option	HM Option	NM Option
AD Option	HT Option	T Option
AM Option	HTD Option	TD Option
H Option	N Option	
HD Option	ND Option	

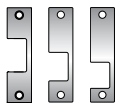
Compatible Locksets:



1006 Series Faceplate Options



Operation: After releasing the latchbolt, the keeper returns to the locked position



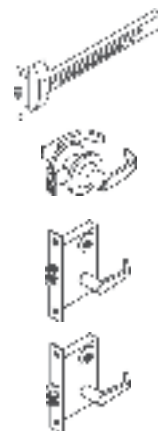
4-7/8" x 1-1/4"

LB Option

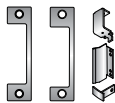
The Latchbolt Solution: Includes all hardware to accommodate every cylindrical and mortise lock up to a 3/4" latchbolt.

Replaces function of the J, K, KM and KD Options

» ANSI/BHMA Numbers: E09321, E09322, E09323



Operation: This deadbolt solution offers three modes of functionality; night latch, lockout, and normally extended deadbolt. (Functional operation modes described below.)



4-7/8" x 1-1/4"

DB Option

The Deadbolt Solution: Includes all hardware to retain, release and recapture all mortise locks, and tubular deadbolts up to a 1" latchbolt

Mode 1: Night latch function. The deadbolt is retracted during traffic hours. The latchbolt is released by the keeper and keeper returns to the locked position.

Mode 2: Lockout function. The electric strike will not release if the deadbolt is extended.

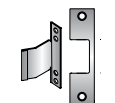
Mode 3: Normally extended deadbolt. Latchbolt and deadbolt are released by a single keeper. The keeper is held open to recapture the latchbolt and deadbolt when the door is closed.

Replaces function of the N, ND, NM, A, AM, AD, T, TD, H, HD, HM, HT, and HTD options

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



Operation: After releasing the latchbolt or deadbolt the keeper returns to the locked position



4-7/8" x 1-1/4"

E Option


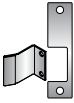









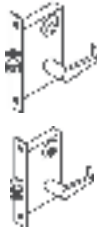
For use with: Corbin Russwin Security Bolt, Weiserbolt and normally extended 1" tubular deadbolts

» ANSI/BHMA Numbers: E09391, E09392, E09393



"For use with" information is offered as a recommendation only. Reference should be made to the lockset manufacturer for proper installation instructions necessary to meet compatibility requirements.

1006 Series Faceplate Options

  <p>4-7/8" × 1-1/4"</p>	<p>Operation: The hookbolt is released by a single keeper. The keeper is held open to recapture the latchbolt and hookbolt when the door is closed.</p> <p>R Option</p> <p>For use with: Adams Rite style hookbolt up to 1" throw</p> <p>» ANSI/BHMA Numbers: E09391, E09392, E09393, E09332, E09333</p>	
  <p>4-7/8" × 1-1/4"</p>	<p>Operation: After releasing the latchbolt, the keeper returns to the locked position</p> <p>Z Option</p> <p>For use with: Unit and Mono locks</p> <p>» ANSI/BHMA Numbers: E09321, E09322, E09323</p>	
  <p>9" × 1-3/8"</p>	<p>Operation: After releasing the latchbolt, the keeper returns to the locked position</p> <p>J-2 Option</p> <p>For use with: All cylindrical locks up to a 3/4" latchbolt</p> <p>» ANSI/BHMA Numbers: E09321, E09322, E09323</p>	
  <p>9" × 1-3/8"</p>	<p>Operation: After releasing the latchbolt, the keeper returns to the locked position</p> <p>KM-2 Option</p> <p>For use with: Mortise locksets up to a 3/4" latchbolt</p> <p>» ANSI/BHMA Numbers: E09321, E09322, E09323</p>	

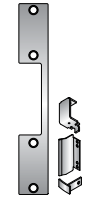
"For use with" information is offered as a recommendation only. Reference should be made to the lockset manufacturer for proper installation instructions necessary to meet compatibility requirements.

Continued on next page »

1006 Series Faceplate Options



Operation: This deadbolt solution offers three modes of functionality; night latch, lockout, and normally extended deadbolt. (Functional operation modes described below.)



9" x 1-3/8"

DB-2 Option

The Deadbolt Solution: Includes all hardware to retain, release and recapture all mortise locks, and tubular deadbolts up to a 1" latchbolt

Mode 1: Night latch function. The deadbolt is retracted during traffic hours. The latchbolt is released by the keeper and keeper returns to the locked position.

Mode 2: Lockout function. The electric strike will not release if the deadbolt is extended.

Mode 3: Normally extended deadbolt. Latchbolt and deadbolt are released by a single keeper. The keeper is held open to recapture the latchbolt and deadbolt when the door is closed.

Replaces the N-2, A-2, T-2, and H-2 options

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



Operation: After releasing the latchbolt, the keeper returns to the locked position



4-7/8" x 1-1/4"

J Option

For use with: Cylindrical locksets up to 3/4" throw and all locksets with center-lined bolts

Compatible locksets: All brands of cylindrical latchbolts

» ANSI/BHMA Numbers: E09321, E09322, E09323



Operation: After releasing the latchbolt, the keeper returns to the locked position



4-7/8" x 1-1/4"

KD Option

For use with: Mortise locksets up to 3/4" throw latchbolt

Compatible locksets: Dorma 9500, Jackson, Sargent (7700 & 8100), Schlage, Yale (8700)

» ANSI/BHMA Numbers: E09321, E09322, E09323



4-7/8" x 1-1/4"

KM Option

For use with: Mortise locksets up to 3/4" throw latchbolt

Compatible locksets: Accurate, Arrow, Baldwin, Best, Corbin Russwin, Falcon, Marks, PDQ, Sargent (7800, 8200 & 9200), Yale (8800)

» ANSI/BHMA Numbers: E09321, E09322, E09323



"For use with" information is offered as a recommendation only. Reference should be made to the lockset manufacturer for proper installation instructions necessary to meet compatibility requirements.

1006 Series Faceplate Options



Operation: Latchbolt and deadbolt are released by a single keeper. The keeper is held open to recapture the latchbolt and deadbolt when the door is closed.



4-7/8" × 1-1/4"

AD Option

For use with: Mortise locksets with a normally extended 1" deadbolt

Compatible locksets: Sargent (7700 & 8100), Schlage, Yale (8700)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



4-7/8" × 1-1/4"

AM Option

For use with: Mortise locksets with a normally extended 1" deadbolt

Compatible locksets: Accurate, Arrow, Baldwin, Best, Corbin Russwin, Falcon (45H, 47H, 34H & 37H), Marks, Omnia, PDQ, Sargent (7800, 8200 & 9200), Yale (8800)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



Operation: Lockout function. The electric strike will not release if the deadbolt is extended. The deadbolt is retracted during traffic hours. The latchbolt is retracted by the keeper. The keeper returns to the locked position.



4-7/8" × 1-1/4"

HM Option

For use with: Mortise locksets with a 1" deadbolt. Strike will not release when deadbolt is extended

Compatible locksets: Accurate, Arrow, Baldwin, Best, Corbin Russwin, Falcon (45H, 47H, 34H & 37H), Marks, Omnia, PDQ, Sargent (7800, 8200 & 9200), Yale (8800)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



4-7/8" × 1-1/4"

HTD Option

For use with: Mortise locksets with a 1" deadbolt and no deadlatch or a center positioned deadlatch. Strike will not release when deadbolt is extended

Compatible locksets: Sargent (7700 & 8100), Schlage, Yale (8700)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



"For use with" information is offered as a recommendation only. Reference should be made to the lockset manufacturer for proper installation instructions necessary to meet compatibility requirements.

Continued on next page »

1006 Series Faceplate Options



Operation: Night latch function. The deadbolt is retracted during traffic hours. The latchbolt is released by the keeper and keeper returns to the locked position.



4-7/8" x 1-1/4"

ND Option

For use with: Mortise locksets with a deadbolt used for night latch function only

Compatible locksets: Sargent (7700 & 8100), Schlage, Yale (8700)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



4-7/8" x 1-1/4"

NM Option

For use with: Mortise locksets with a deadbolt used for night latch function only

Compatible locksets: Accurate, Arrow, Baldwin, Best, Corbin Russwin, Falcon (45H, 47H, 34H & 37H), Marks, Omnia, PDQ, Sargent (7800, 8200 & 9200), Yale (8800)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



Operation: Latchbolt and deadbolt are released by a single keeper. The keeper is held open to recapture the latchbolt and deadbolt, and the deadlatch is engaged when the door is closed.



4-7/8" x 1-1/4"

T Option

For use with: Mortise locksets with a normally extended 1" deadbolt and center-lined deadlatch

Compatible locksets: Accurate, Arrow, Baldwin, Marks, Omnia, PDQ, Schlage

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333



4-7/8" x 1-1/4"

TD Option

For use with: Mortise locksets with a normally extended 1" deadbolt and center-lined deadlatch

Compatible locksets: Sargent (7700 & 8100), Schlage, Yale (8700)

» ANSI/BHMA Numbers: E09391, E09392, E09393, E09331, E09332, E09333

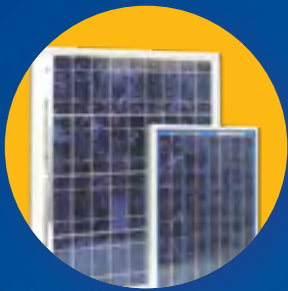


The following legacy faceplate options remain available for order. Suggestions are provided below for more versatile options.

A Option replaced by **AM Option**
H Option replaced by **HM Option**
HD Option replaced by **HTD Option**
HT Option replaced by **HTD Option**
K Option replaced by **KM Option**
N Option replaced by **NM Option**

K-2 Option combined into **KM-2 Option**
A-2 Option replaced by **DB-2 Option**
H-2 Option replaced by **DB-2 Option**
N-2 Option replaced by **DB-2 Option**
T-2 Option replaced by **DB-2 Option**

"For use with" information is offered as a recommendation only. Reference should be made to the lockset manufacturer for proper installation instructions necessary to meet compatibility requirements.



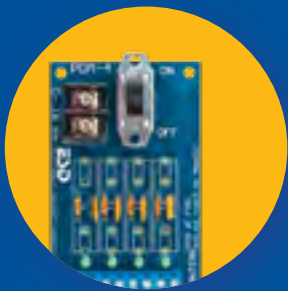
Solar Power Supplies



Power Transfers



PoE Injectors & Extractors



Power Distribution Boards



Inductive Coupling Power Transfer



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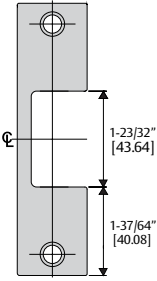
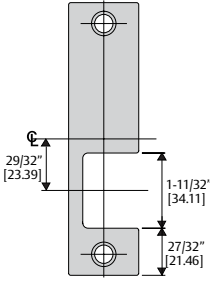
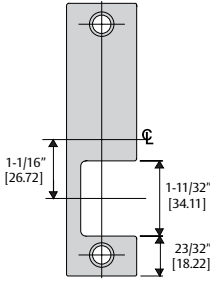
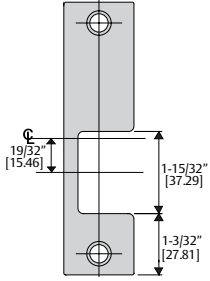
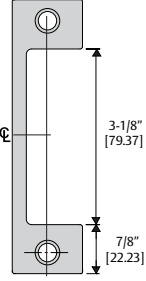
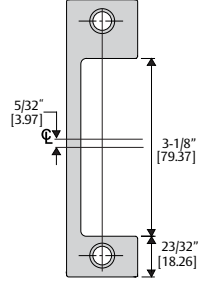
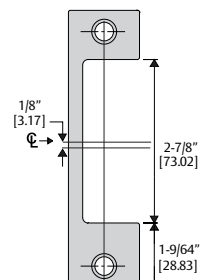
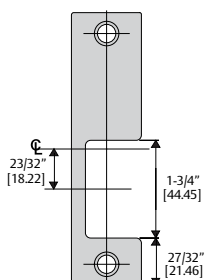
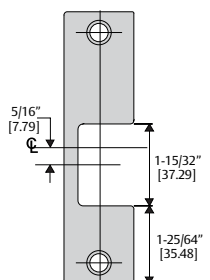
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1006 Series Faceplate Dimensions

J, E Faceplate Option	K Faceplate Option	KD Faceplate Option
		
KM Faceplate Option	A, H, HT, N, T Faceplate Option	AD, HD, ND, TD Faceplate Option
		
AM, HM, NM Faceplate Option	R Faceplate Option	Z Faceplate Option
		

ACCESS CONTROL - 087100.A

Appendix A to Section 087100, DOOR HARDWARE
September 30, 2022

1006 Series Faceplate Dimensions

HES

FOLGER ADAM

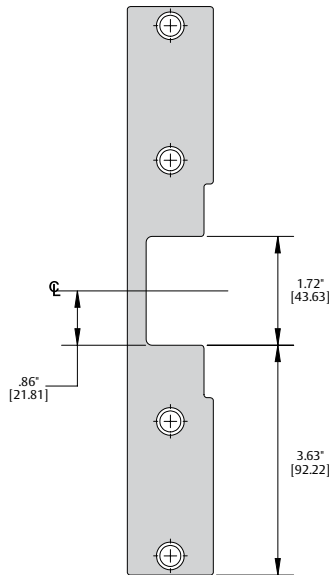
INTEGRATED
PRODUCTS

CABINET LOCKS

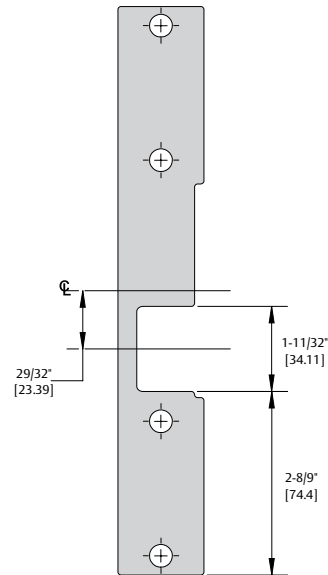
ACCESSORIES

GENERAL
INFORMATION

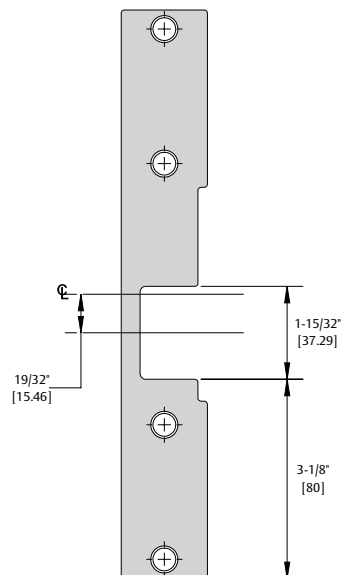
J-2
Faceplate Option



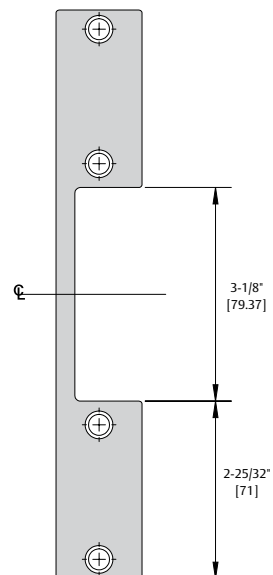
K-2
Faceplate Option



KM-2
Faceplate Option



N-2, T-2, A-2, H-2
Faceplate Option





ALLEGION™

LCN®

Electrohydraulic automatic operators



Overview

LCN's electrohydraulic automatic operators integrate the 4000 Series mechanical closer to provide a smooth and easy manual opening experience for preliminary manual use applications. When activated, the door works as a fully functional low energy automatic operator to increase accessibility.

The low energy electric Auto Equalizer 4600 Series utilizes LCN's 4040XP mechanical closer to increase product life when the door is primarily used manually. When activated, a motor/clutch system drives the manual closer to automatically open the door.

The low energy pneumatic Auto Equalizer 4800/2600 Series provides quiet, smooth and reliable door operation and allows for use in hazardous locations where electronically operated devices are not permitted.

Features and benefits

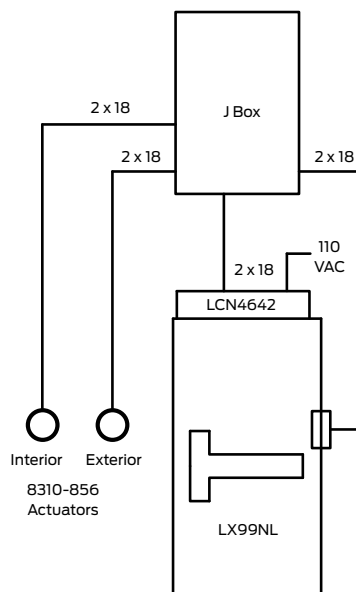
- UL Listed for self-closing doors without hold open under "Swinging door closers"
- Tested and certified under ANSI Standard A156.19
- ANSI Standard A117.1
- Electric Auto Equalizer has a no-destruct feature that allows clutch to slip when abused to reduce damage to the operator
- Digital control suite in electric Auto Equalizer has on-board diagnostics to ensure easy, trouble-free installation
- Pneumatic Auto Equalizer has easily adjustable air pressure and timing cycle to meet the needs of a specific installation
- Pneumatic Auto Equalizer is available in four different mounting configurations

Features	4600 Series	4800/2600 Series
Handed	No	No; Yes (2610)
Mounting options	Push (4640) Pull (4630)	Push (4820) Pull (4810) Parallel arm (4840) Concealed (2610)
On board power supply	Yes	No
Digital control box	Yes	No
Header length	33 1/2"	20"
Maintains memory after power loss	Yes	Yes
Adjustable manual open face	Yes	Yes
Blow open capability	No	Yes
Meets UL requirements	UL/cUL 325 and 228	–

All electrohydraulic operators are available in seven standard or 150+ custom powder coated finishes.

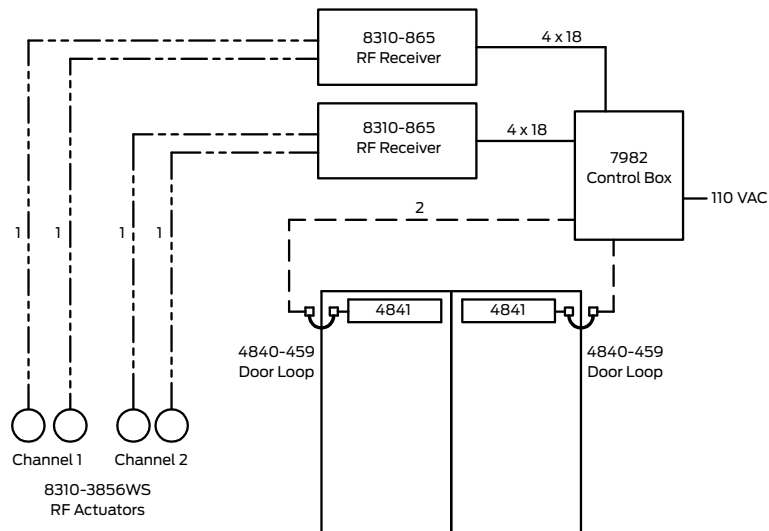
Sample common applications

Exterior retail entrance



Operation: When panic device is mechanically dogged both interior and exterior actuators will be enabled through LX switch. When device is undogged actuators will not function.

Church/library entrance



Operation: Doors normally closed, not latched. Two 8310-3856WS actuators to independently signal each door to swing.

¹ Dashed/dotted lines indicate RF signal, not a wiring connection.

² Dashed lines indicate pneumatic 925 tubing.

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ALLEGION™



M490/492

Electromagnetic locks



Overview

M400 Series electromagnetic locks from Schlage are designed with the customer in mind to be robust, easy-to-install, and secure. The unique bayonet mounting feature makes installation easier, allowing the installer to have their hands free during the mounting process.

All M400 Series electromagnetic locks are symmetrical with field-selectable handing, allowing optimum placement of the magnet no matter the application. They are designed to provide automatic voltage sensing for 12 and 24 volts along with polarity protection to make wiring less complex. M490 models are tested and certified to meet or exceed UL 1034 and BHMA 1500 lb hold force requirements.

The M490 electromagnetic locks come in four configurations to meet your specific security needs. Single and double door models are offered in standard configurations. Plus versions of these models with "P" designations add intelligent sensing and reporting features needed to integrate with access control systems along with additional available options. Kits are also available for top jamb, double door, and glass door applications.

Features and benefits

- 1500 lb. hold force rating for maximum security applications
- "Plus" models offer magnetic bond sensor (MBS), adjustable relock time delay (RTD) and door position switch (DPS)
- Automatic voltage selection (AVS)
- Symmetrical design with field-selectable handing for optimum placement
- Bayonet mount simplifies installation by eliminating the need to hold lock overhead while securing
- Armature mount pivot feature compensates for slight opening imperfections
- Optional mounting kits available for top jamb mount, double door and HERCULITE® brand glass doors
- Aluminum housing in 628 satin finish
- ANSI/BHMA 156.23 Grade 1, UL 1034, UL 10C, UL 294, cUL, CFMS certifications
- Limited lifetime warranty on magnetic coil assembly

Additional features

All models

- Automatic Voltage Selection (AVS) senses the voltage applied to the lock and responds accordingly

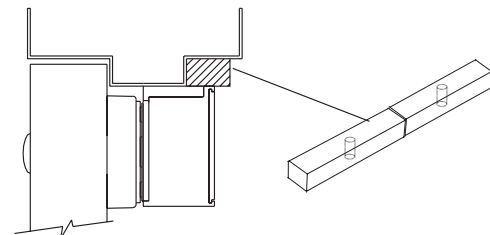
M490P/M492P

- Magnetic Bond Sensor (MBS) monitors the strength of the bond between the lock and armature so you know the door is secure
- Door Position Switch (DPS) monitors whether the door is open or closed
- Relock Time Delay (RTD) provides a relock delay that is adjustable from 0.5 to 30 seconds
- Optional accessories (P models only)
 - ATS/LED Combines anti-tamper switch (ATS) with magnetic bond sensor in one kit.
 - ATS provides an indication that the cover of the magnet is securely fastened to the lock and that the on board circuitry is secure
 - Magnetic bond sensor indicator (LED) provides visual indication of magnetic bond at the lock

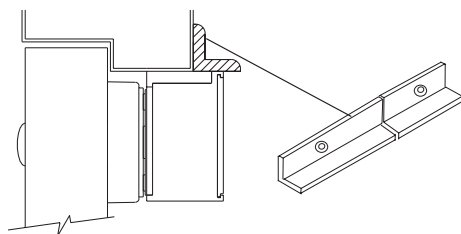
Optional accessories (for all)

- Glass door bracket kit designed for use with Herculite® brand glass door.
- Top jamb (inswinging doors) kit
- Double door connector kit (converts two single magnetic locks to a double)

Filler Plate



Angle Bracket



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M490/M492 electromagnetic lock specifications

Specification	M490/M490P	M492/M492P
Holding force	Meets or exceeds BHMA standard of 1500 lbs	Meets or exceeds BHMA standard of 1500 lbs
Door type	Single	Double
Input voltage (auto selected)	12/24 VDC	12/24 VDC
Current draw	.65A @ 12 VDC .35A @ 24 VDC	1.3A @ 12 VDC .7A @ 24 VDC
Height	3"	3"
Length	12 1/2"	25 1/16"
Depth	1 3/4"	1 3/4"
Weight (approximate)	14 lbs	28 lbs
Certifications	UL 10C, UL 1034, UL 294, ANSI/BHMA A156.23, cUL, CSFM	UL 10C, UL 1034, UL 294, ANSI/BHMA A156.23, cUL, CSFM
Temperature	0° to 49°C (32° to 120° F)	0° to 49°C (32° to 120° F)
Wire gauge	14-22 AWG	14-22 AWG

Filler plates and angle brackets specifications

Length	12 1/2"
--------	---------

Filler plates

Width x Height	Plate no.
1 1/4" x 1/8"	4901F
1 1/4" x 1/4"	4902F
1 1/4" x 3/8"	4903F
1 1/4" x 1/2"	4904F
1 1/4" x 5/8"	4905F
3/4" x 1/2"	4906F
3/4" x 5/8"	4907F
3/4" x 3/4"	4908F

Angle brackets

Width x Height	Bracket no.
1" x 1"	4901A
1 1/2" x 1"	4902A
1 1/2" x 1 1/2"	4903A
1 1/2" x 2"	4904A
1 1/2" x 2 1/2"	4905A

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ALLEGION™



650 Series

Keyswitches



Overview

Schlage 650 Series keyswitches utilize an innovative magnetic spring design which allows installers to configure both clockwise and counterclockwise key turn direction as well as momentary or maintained action in seconds. Single gang and narrow stiles are available with numerous options which include heavy-duty plate, weather resistant cover (single gang size only), 2 LED lights – green/red, anti-tamper switch and Schlage Everest cylinder. In addition to the standard (630) satin stainless steel finish, there are five additional architectural finishes to choose from.

Features and benefits

- Easy to install and maintain
- Single gang and narrow stile offer ultimate flexibility
- Multiple options
- Patented magnetic spring design allows installers to configure momentary to maintained action in seconds
- Available options include red/green LED lights, anti-tamper switch and Schlage Everest cylinder
- Available water-resistant cover
- Single pole, double throw or double pole, double throw in both maintained and momentary action with a variety of combinations
- Standard 630 satin stainless steel plate with 5 additional finish options on heavy-duty zinc plate
- Standard or narrow stile cover options

Specifications

Innovative magnetic spring technology allows installers to configure models in seconds

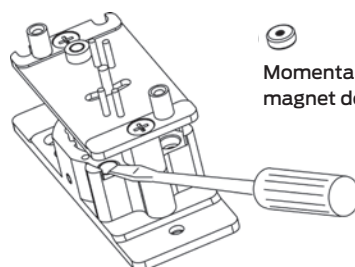
Standard keyswitch

- 5 amp @ 30 VDC
- SPDT contacts

ATS switch closes when cover is on 0.025A@28VDC

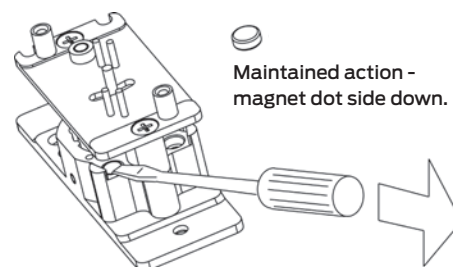
LED indicator lights operate at 12/24 VDC 0.500A @ 30VDC

Momentary action



Momentary action -
magnet dot side up.

Maintained action



Maintained action -
magnet dot side down.

Ordering information

- 653-04** - SPDT maintained single direction
- 653-05** - SPDT momentary single direction
- 653-14** - DPDT maintained single direction
- 653-15** - DPDT momentary single direction
- 653-1414** - (2) DPDT maintained bi-direction
- 653-1415** - DPDT maintained x DPDT momentary
- 653-1515** - (2) DPDT momentary bi-direction
- 653-041** - SPDT maintained x key remove one position
- 653-0404** - (2) SPDT maintained bi-direction
- 653-0405** - SPDT maintained x SPDT momentary
- 653-141** - DPDT maintained x key remove one position
- 653-0505** - (2) SPDT momentary bi-direction

Options

- L2** - Two LEDs (red/green), dual voltage
- NS** - Narrow stile - stainless steel plate (1 3/4" x 4 1/2")
- ATS** - Anti-tamper switch
- WP** - Weather-resistant cover fits 1 1/8" cylinder only (not available with NS and L2 options)
- CYL** - 1 1/4" Schlage Everest® mortise cylinder and 1/8" spacer ring (keyed different)
- CYL-KA** - 1 1/4" Schlage Everest mortise cylinder and 1/8" spacer ring (keyed alike)

Finishes

- 630** - Satin finish on .035 stainless steel (standard)
- SF-626** - Satin chrome on heavy-duty zinc
- SF-605** - Bright brass on heavy-duty zinc
- SF-612** - Satin bronze on heavy-duty zinc
- SF-613** - Oil satin bronze on heavy-duty zinc
- SF-625** - Bright chrome on heavy-duty zinc

Note: 650 Series keyswitches operate with either a 1 1/8", 1 1/4", 1 3/8", or 1 1/2" cylinder having a straight type cam.

- 1 1/8" mortise cylinder fits direct in key switch - no blocking ring required.
- 1 1/4" cylinders require a 1/8" blocking/spacer ring, Schlage part number 36-079-012 or equivalent (included with the CYL and CYL-KA options).
- 1 3/8" mortise cylinder housing for SFIC cores - requires 3/8" blocking ring Schlage part number 36-079-025 or equivalent.
- 1 1/2" mortise cylinder housing for FSIC cores - requires 3/8" blocking ring Schlage part number 36-079-037 or equivalent.

All cylinders, except 1 1/4" as CYL or CYL-KA options, must be ordered separately.

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KRYPTONITE ■ LCN ■ SCHLAGE ■ STEELCRAFT ■ VON DUPRIN

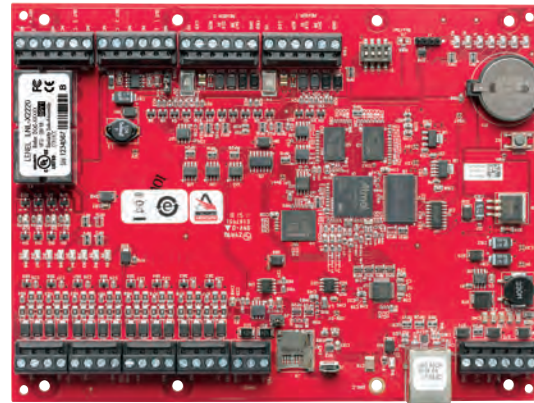
ACCESS CONTROL - 087100.A

Appendix A to Section 087100, DOOR HARDWARE
September 30, 2022

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LNL-X2220

Intelligent Dual Reader Controller



Overview

The LNL-X2220 Intelligent Dual Reader Controller (IDRC) provides a single board solution for interfacing one or two doors to an OnGuard® system. In addition, other I/O and reader interface modules can be added on the controller's downstream port to expand its capabilities. The LNL-X2220 controller revolutionizes access control system architecture by allowing Ethernet connection directly from an entry location to the OnGuard server, while still providing the security, functionality, and modularity of Lenel's proven hardware platform. The LNL-X2220 controller is scalable for any access control application, from the most basic to the most sophisticated. In the event of communication loss, the LNL-X2220 controller allows nearly all local functionality to continue unimpaired until the server connection is restored.

Utilizing its native Ethernet communications and an advanced 32-bit processor, the LNL-X2220 controller can communicate upstream to the host computer through its Ethernet port. The controller can store up to 250,000 cardholders in non-volatile flash memory, and supports selective download for larger cardholder databases. The downstream RS-485 two-wire port can be used to connect up to 32 devices (maximum 64 doors).

Two on-board reader ports support Data1/Data0, Clock/Data, Supervised and Unsupervised F2F, Biometric readers and the bi-directional RS-485 Open Supervised Device Protocol (OSDP) communications. Each LNL-X2220 controller supports up to sixteen different card formats. The LNL-X2220 controller includes eight inputs that support normally open, normally closed, supervised, and unsupervised circuits. In addition, four output relays support fail-safe or fail-secure operation.

Features & Functionality

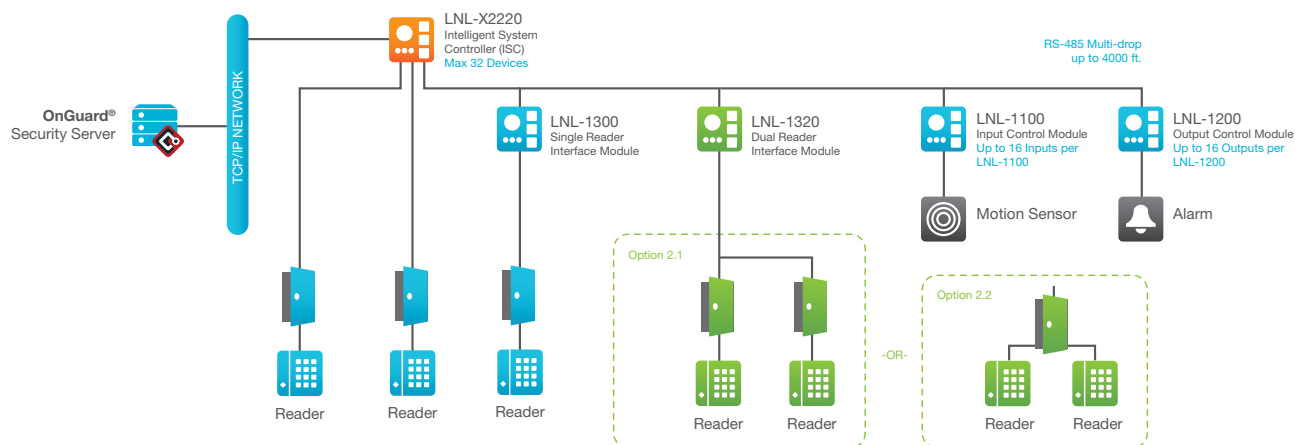
Controller Functionality

- DNS device naming through DHCP extended commands
- 6 MB of available on-board, non-volatile flash memory
- Battery-backed, non-volatile storage of 50,000 events
- Configurable option for Data at Rest encryption
- Firmware stored in flash memory, background download of firmware updates supported
- Supports up to sixteen badge formats
- Biometric template storage support for OSDP™ Biometric and legacy Bioscrypt® readers
- Optional Secondary NIC, USB port (2.0) with optional adapter
- Enhanced anti-passback capabilities
- Up to 32,000 access level permissions
- Elevator control support for up to 128 floors
- Individual extended held open and strike times
- Two dedicated inputs for tamper and power failure status
- Advanced Encryption Standard (AES) 256-bit algorithm for communications to Lenel Series 3 reader and I/O modules; AES 128 bit encryption to Lenel Series 2 reader and I/O modules
- AES128 or TLS 1.2 (with AES256 support) communication to OnGuard
- RNDIS support enables USB connection to display controller web configuration pages

Reader Interface Functionality

- Supports Data 1/Data0, Clock/Data, Supervised and Unsupervised F2F and OSDP-compatible RS-485 readers and keypads
- Support for OSDP Biometric template transfer and Secure Channel Encryption
- Door contact supervision (open/closed) and REX push-button monitor for each door

System Diagram



Specifications

The interface is for use in low voltage, Class 2 Circuits only.
The installation of this device must comply with all local fire and electrical codes.

Primary Power	12 to 24 VDC \pm 10%, 500 mA maximum (reader current not included)
Reader Ports	600 mA maximum (add 600 mA to primary power current)
Primary Host Communication	Ethernet: 10-BaseT/100Base-TX
Secondary Host Communication	USB port (2.0) with optional adapter: pluggable model USB2-OTGE100
Serial I/O Device	One each: 2-wire RS-485, 2,400 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit
Inputs	Eight unsupervised / supervised, standard EOL: 1k/1k ohm, 1% 1/4 watt; two unsupervised inputs dedicated for cabinet tamper and UPS fault monitoring
Outputs	Four relays: Normally open contact (NO): 5 A @ 30 VDC resistive; Normally closed contact (NC): 3 A @ 30 VDC resistive

Reader Interface

Power	12 VDC \pm 10% regulated, 300 mA maximum each reader (input voltage [VIN] must be greater than 20 VDC) or 12 to 24 VDC \pm 10% (input voltage passed through), 300 mA maximum each reader
Data Inputs	TTL compatible, F/2F or 2-wire RS-485
RS-485 Mode	9,600 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit. Maximum cable length: 2,000 ft. (609.6m)
LED Output	TTL levels, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer Output	Open collector, 12 VDC open circuit maximum, 40 mA sink maximum

Cable Requirements

Power and Relays	One twisted pair, 18 to 16 AWG
Ethernet	CAT-5, minimum
TTL Reader	22 to 16 AWG, depending on length and requirements
Alarm Input	One twisted pair, 30 ohms maximum, typically 22 AWG @ 1,000 ft. (304.8m)
RS-485 I/O Device Port	One twisted pair with drain wire and shield, 120 ohm impedance, 24 AWG, 4,000 ft. (1,219m) maximum
RS-485 Reader Port	One twisted pair with drain wire and shield, 120 ohm impedance, 24 AWG, 2,000 ft. (610m) maximum

Mechanical

Dimensions	8.0 W x 6.0 L x 1.0 H in. (203.2 x 152.4 x 25mm)
Weight	9.0 oz. (255g) nominal, board only

Environmental

Temperature	-55° to +85° C, storage 0° to +70° C, operating
Humidity	5 to 95% RHNC
Heat Output (BTUs)	at 12 VDC, 20.5 BTU/hr at 24 VDC, 22.9 BTU/hr
Approvals	FCC Part 15, CE, RoHS, UL 294, UL 1076, CAN/ULC 60839-11-1:2016, CSA C22.2 No. 205-1983, cUL/ORD-C1076

Parts and Spare Parts

Part No.	Description
LNL-X2220	6 MB on-board flash memory available for cardholder database; 50,000 event battery backed RAM for event log.
USB2-OTGE100	USB to Ethernet converter, for LNL-X Series Controllers only. Provides optional Secondary NIC connection. Second NIC should be on different subnet than primary NIC.



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Specifications subject to change without notice.

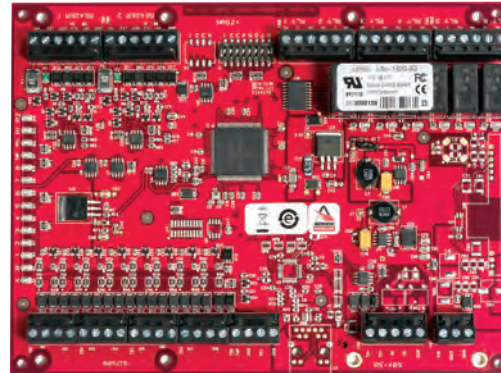
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LNL-1320 Series 3

Dual Reader Interface Module



Overview

LenelS2™ offers a Dual Reader Interface (DRI) module for access control solutions. Most access control card readers, keypads, or readers with keypads that use standard Wiegand Data1/Data0 or Clock/Data communication are supported, as are those that support the bidirectional RS-485 Open Supervised Device Protocol (OSDP™). Lock, unlock, and facility code offline access modes are supported on all readers connected to the DRI. Each DRI supports up to 16 different card formats as well as issue codes for both magnetic and Wiegand card formats.

The DRI provides a vital link between the Intelligent System Controller (ISC) and the card reader attached to the interface. As many as 32 DRI modules can be multidropped using RS-485 2-wire or 4-wire communication up to 4,000 feet per port away from the ISC. Each DRI module is individually addressed for increased reporting capabilities with OnGuard® access control software applications. The DRI includes eight inputs that support normally open, normally closed, supervised, and non-supervised circuits. In addition, six output relays support fail-safe or fail-secure operation.

Features & Functionality

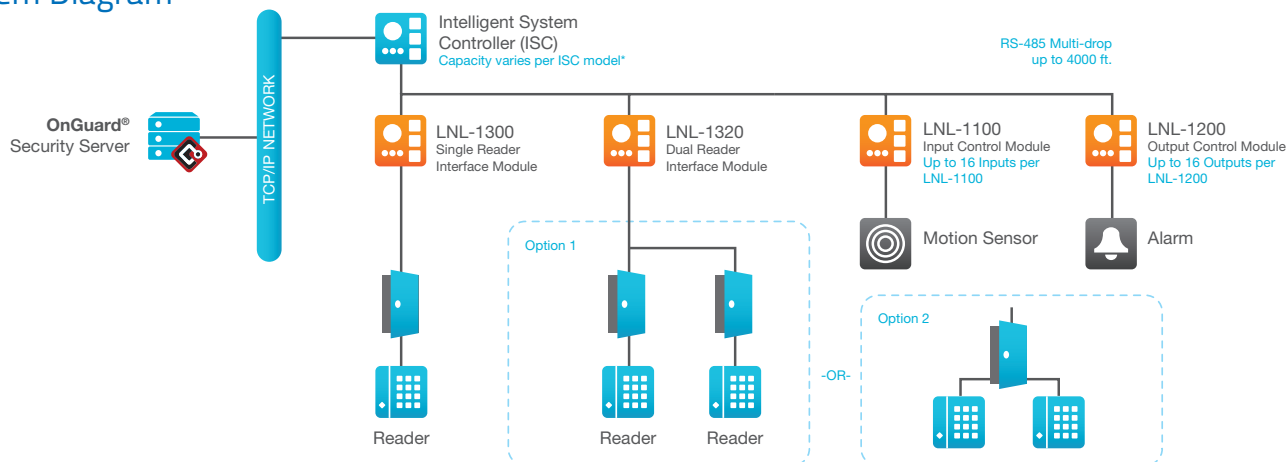
- 12 or 24 VDC power supply
- Supports Data1/Data0, Clock/Data, Supervised and Unsupervised F2F and OSDP-compatible RS-485 readers and keypads
- Supports Open Supervised Device Protocol (OSDP) readers, including biometric template transfer and Secure Channel encryption
- Downloadable firmware
- Six Form-C 5 A at 28 VDC relay outputs
- Up to 16 different formats
- Issue code support for magnetic and Wiegand formats
- Door contact supervision (open/closed)
- REX push-button monitor
- Strike control output
- Bicolor reader status LED support and 2-wire LED support
- Beeper control
- Dedicated tamper and power failure circuits
- Support for offline reader access mode
- On-board jumpers for termination
- On-board regulator allows 12 VDC reader support from 24 VDC power source
- DIP switch-selectable addressing
- Advanced Encryption Standard (AES) 128-bit algorithm for communications to ISC
- Supports Schlage® Handkey® template download
- Compatible with current and previous versions of OnGuard

Extended Functionality

- Connect FIPS-201 readers for embedded authentication (when used with LNL-4420 and appropriate HID® and OnGuard software and licenses)



System Diagram



* See ISC datasheets for specific capacities.

Power Supplies & Enclosures

LNL-AL400ULX	LenelS2 UL Listed 4A, 110VAC Power Supply – 12VDC 4A output, 115VAC input, continuous supply current with enclosure (15.5" x 12.5" x 4.5"), lock, tamper switch, UPS capable (Battery Optional) UL & CUL Approved
LNL-AL600ULX-4CB6	LenelS2 UL Listed Power Supply – 12VDC 6A output, 115VAC (1.6 amps) input, continuous supply current with enclosure (24" x 18" x 4.5"), lock, tamper switch, power distribution module, UPS capable (Battery Optional) UL & CUL Approved
ABT-12	Battery Kit - 12VDC, 12 AH battery (PS-12120)

Specifications

Primary Power	12 to 24Vdc $\pm 10\%$, 550mA maximum (plus reader current) 12Vdc @ 550mA (plus reader current) maximum, 22.5 BTUs 24Vdc @ 330mA (plus reader current) maximum, 27.0 BTUs
Outputs	6 outputs, Form-C contacts: Normally Open (NO) Contact: 5A @ 30 Vdc, Normally Closed (NC) Contact: 3A @ 30 Vdc
Inputs	8 unsupervised/supervised, standard EOL: 1k/1k ohm, 1% 1/4 watt 2 unsupervised, dedicated for cabinet tamper and UPS fault monitoring
Reader Interface	Reader power: 12Vdc $\pm 10\%$ regulated, 300mA maximum each reader (jumper selectable and input voltage (VIN) must be 20Vdc minimum) or 12 to 24Vdc $\pm 10\%$ (input voltage passed through) 300mA maximum each reader
Reader Port Compatibility	Wiegand Data 1/Data 0 Magnetic Clock/Data Supervised and Unsupervised F2F Open Supervised Device Protocol
Mechanical	Dimension: 6" (152mm)W x 8" (203mm)L x 1" (25mm)H Weight: 11 oz. (312g) nominal
Environmental Temperature	Operating: 32°F to 158°F (0°C to +70°C) Storage: -67°F to 185°F (-55°C to +85°C)
Humidity	5% to 95% RHNC
Compliance Approvals	FCC Part 15, CE, RoHS, UL 294, UL 1076, ULC CSA-C22.2, CAN/ULC-S319-05, cUL/ORD-C1076



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Trove2

Versatile Access & Power Integration Enclosure

TR²VE™

Altronix Trove2 can house Altronix backplanes which accommodate various combinations of access controllers and accessories from the industry's leading manufacturers with or without Altronix power supplies and accessories for access systems. Trove systems simplify board layout and wire management, reducing installation time and labor costs.



Trove2

Specifications

Features

- 16 AWG powder coated steel.
- Convenient knockout configuration:
 - One (1) single knockout 2.415" (2" Conduit).
 - Sixteen (16) double knockouts 1.362" (1" Conduit) / 1.115" (3/4" Conduit).
- Includes cam lock, tamper switch and mounting hardware.

Agency Listings

- UL: UL 294 Access Control Unit Accessory Enclosure.
cUL: cUL Listed For CSA Standard C22.2 No.205-M1983, Signal Equipment.
CE European Conformity

Capacity

- Accommodates up to four (4) 12VDC/7AH batteries.

Physical and Environmental

Dimensions (H x W x D)

27.25" x 21.5" x 6.5" (692.2mm x 546.1mm x 165.1mm).

Product Weight 29.1 lb. (13.2 kg).

Shipping Weight 35.1 lb. (15.9 kg).

Trove2

Versatile Access & Power Integration Enclosure

TROVE™

Optional Backplanes

Backplane Model	Backplane with Enclosure Model	Manufacturer	Dimensions (H x W x D)
TAG2	TROVE2AG2	AMAG M4000	25.375" x 19.375" x 0.3125" (644.5mm x 492.1mm x 8mm)
TAM2	TROVE2AM2	AMAG M2510	
TBH2	TROVE2BH2	Bosch	
TBL2	TROVE2BL2	Universal Blank Backplane	
TCV2	TROVE2CV2	CDVI	
	TROVE2PH2	Openpath	
TDM2	TROVE2DM2	DMP Wiegand	
THC2	TROVE2HC2	Hartmann	
THN2	TROVE2HN2	Honeywell NetAXS	
THW2	TROVE2HW2	Honeywell ProWatch and WinPak	
TKA2	TROVE2KA2	Keyscan	
TKH2	TROVE2KH2	Kantech	
TKS2	TROVE2KS2	Keri Systems	
TM2	TROVE2M2	Mercury	
TPX2	TROVE2PX2	Paxton Net2 Plus	
TSA2	TROVE2SA2	Salto	
TSH2	TROVE2SH2	Software House Pro and Ultra	
TSL2	TROVE2SL2	Sielox	
TSS2	TROVE2SS2	LenelS2	
TV2	TROVE2V2	HID Vertx	
TZ2	TROVE2Z2	ZKTeco	

Optional Door Backplanes

Backplane Model	Manufacturer	Dimensions (H x W x D)
TBHD2	Bosch	23.75" x 18.125" x 0.3125" (603.3mm x 460.4mm x 8mm)
TDMD2	DMP Control Panels and Expansion Modules	
THWD2	Honeywell ProWatch and WinPak	
TMV2	Mercury and HID Vertx	

Trove2

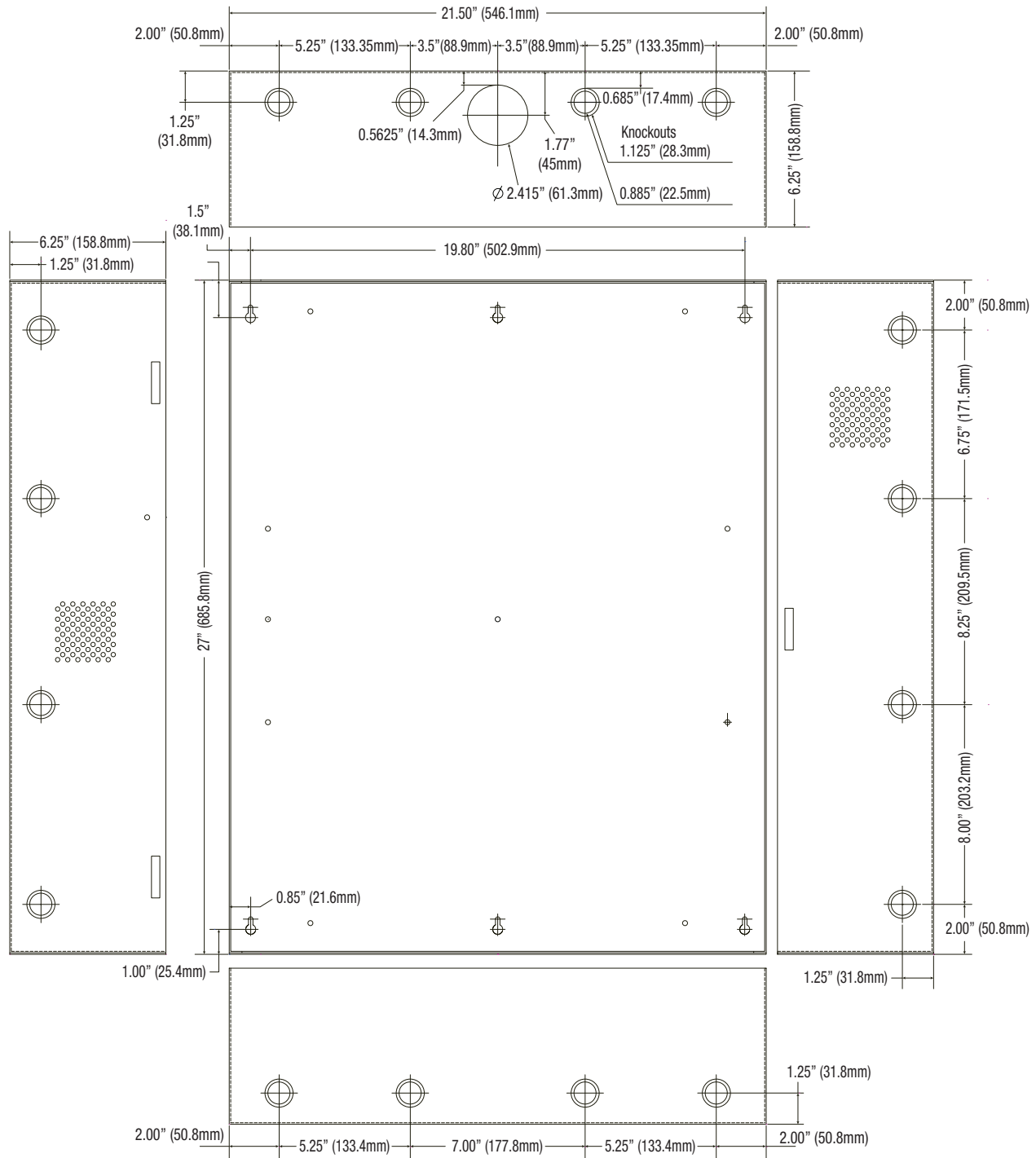
Versatile Access & Power Integration Enclosure

TRIVE™

Dimensions and Drawing

Dimensions (H x W x D approximate)

27.25" x 21.5" x 6.5" (692.2mm x 546.1mm x 165.1mm)



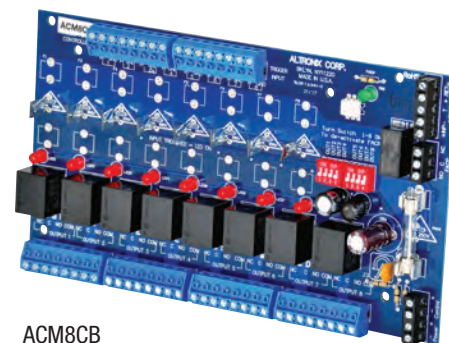


ACM8CB

Multi-Output Access Power Controller

Altronix ACM8CB converts one (1) 12 to 24 volt AC or DC input into eight (8) independently controlled Class 2 rated PTC protected power-limited auto-resettable outputs rated at 2.5A each. Outputs are activated by an open collector sink or normally open (NO) dry trigger input from an Access Control System, Card Reader, Keypad, Push Button, PIR, etc. ACM8CB will route power to a variety of access control hardware devices including Mag Locks, Electric Strikes, Magnetic Door Holders, etc. Outputs will operate in both Fail-Safe and/or Fail-Secure modes.

This unit is designed to be powered by one common power source which will provide power for both the board operation and locking devices, or two (2) totally independent power sources, one (1) providing power for board operation and the other for lock / accessory power. The FACP Interface enables Emergency Egress, Alarm Monitoring, or may be used to trigger other auxiliary devices. The fire alarm disconnect feature is individually selectable for any or all of the eight (8) outputs.



ACM8CB

Specifications

Input

Voltage:

12 to 24 VAC or VDC operation (setting not required),
0.6A @ 12V, 0.3A @ 24V current consumption
with all relays energized.

Main fuse is rated at 10A/250V.

Trigger Inputs:

Eight (8) Access Control System trigger inputs:

- Eight (8) normally open (NO) inputs.
- Eight (8) open collector sink inputs.
- Any combination of the above.

Input Options:

- One (1) common power input (board and lock power).
- Two (2) isolated power inputs (one (1) for board power and one (1) for lock/accessory power).

Outputs

Eight (8) independently controlled Class 2 Rated
PTC protected power-limited auto-resettable 2.5A outputs:

- Eight (8) Fail-Safe and/or Fail-Secure power outputs.
- Eight (8) auxiliary power outputs (unswitched).

Output ratings:

Output PTCs are rated 2.5A each.

Note: Total output current is determined by the power supply,
not to exceed a maximum of 10A total.

Indicators (LED)

Red LEDs

Outputs are triggered (relays energized)

Green LED

FACP disconnect is triggered

Agency Listings

UL:

UL294

Access Control

cUL:

General Signaling Equipment Evaluated
to CSA Standard C22.2 No. 205-M1983

Physical and Environmental

Dimensions (L x W x H)

Board:

8" x 4" x 0.75" (203.2mm x 114.3mm x 19.1mm).

Shipping:

10" x 8" x 4" (254mm x 203.2mm x 101.68mm)

Weights (approx.)

Product Weight: 0.65 lb. (0.29 kg).

Shipping Weight: 0.85 lb. (0.39 kg).

Temperature

Operating: 0°C to 49°C (32°F to 120°F)

Storage: - 20°C to 70°C (- 4°F to 158°F)

Relative Humidity

85% +/- 5%

BTU/Hr (approx.):

4 BTU/Hr.

Mounting hardware included

Lifetime Warranty

Altronix Corporation | 140 58th St | Brooklyn, NY 11220 USA

phone: +1 718. 557. 8100

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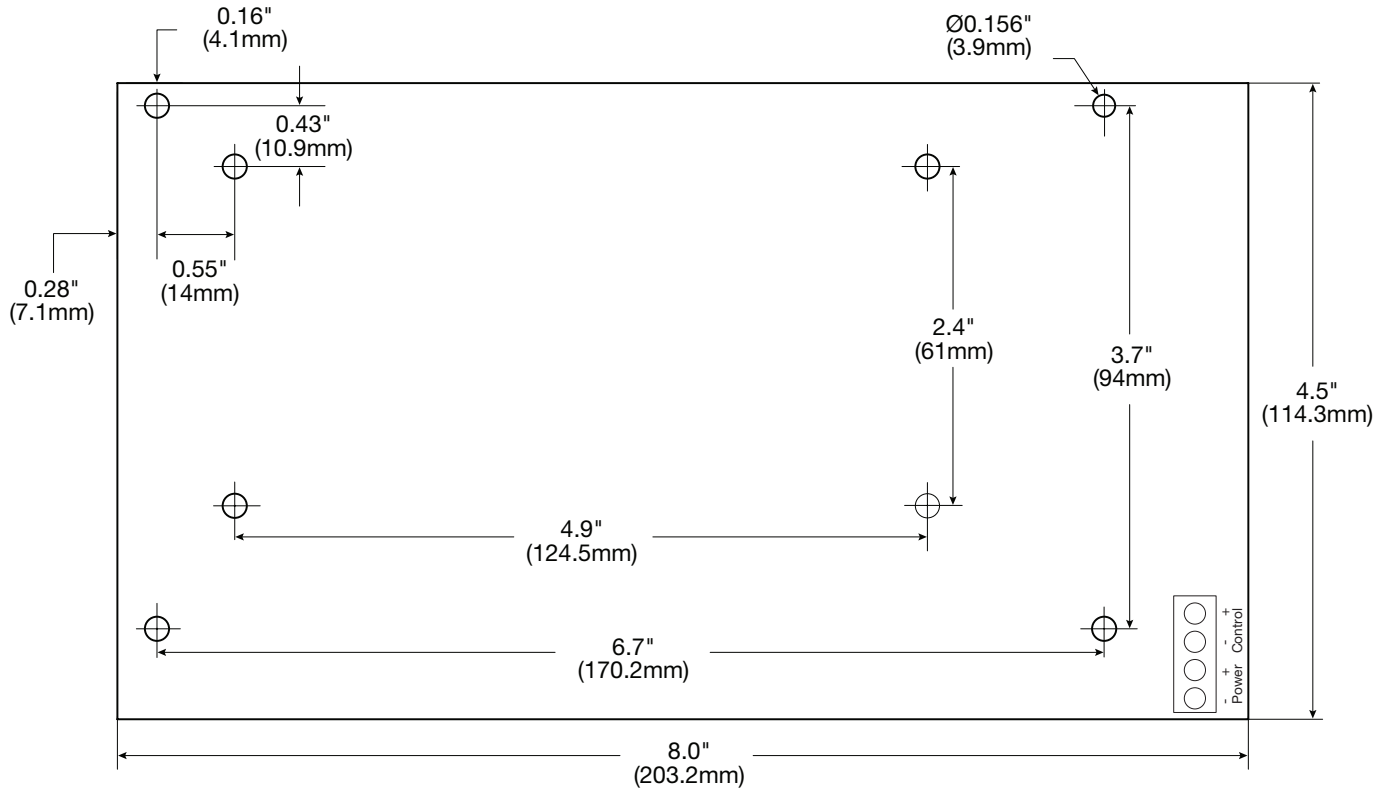
ACM8CB

Multi-Output Access Power Controller

Board Dimensions (L x W x H) and Drawing

8" x 4" x 0.75" (203.2mm x 114.3mm x 19.1mm)

Mounting Holes' Tolerance: +/- 0.04 in. (1mm).



Lifetime Warranty

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VR6

Voltage Regulator

Altronix VR6 Voltage Regulator converts a 24VDC input into a regulated 5VDC or 12VDC selectable output at up to 6A supply current. It reduces the cost of adding an additional power supply to achieve 24VDC and 12VDC or 5VDC simultaneously.



VR6

Specifications

Input/Output

Voltage Range 24VDC @ 1.75A = Output: 5VDC @ 6A
24VDC @ 3.5A = Output: 12VDC @ 6A

Output

5VDC or 12VDC regulated output
Output rating 6A max.
Surge suppression

Indicators (LED)

Input Indicates input voltage is present
Output Indicates normal operating condition

Agency Listings

UL/cUL:

UL 294 6th Edition: Access Control System Units

ULC-S319: Electronic Access Control Systems

Physical and Environmental

Dimensions (L x W x H)

5.375" x 3" x 1" (136.5mm x 76.2mm x 25.4mm)

Product Weight 0.4 lb. (0.18 kg)

Shipping Weight 0.5 lb. (0.23 kg)

Temperature

Operating 0°C to 49°C (32°F to 120°F)

Storage -20°C to 70°C (-4°F to 158°F)

Relative Humidity 85% +/-5%

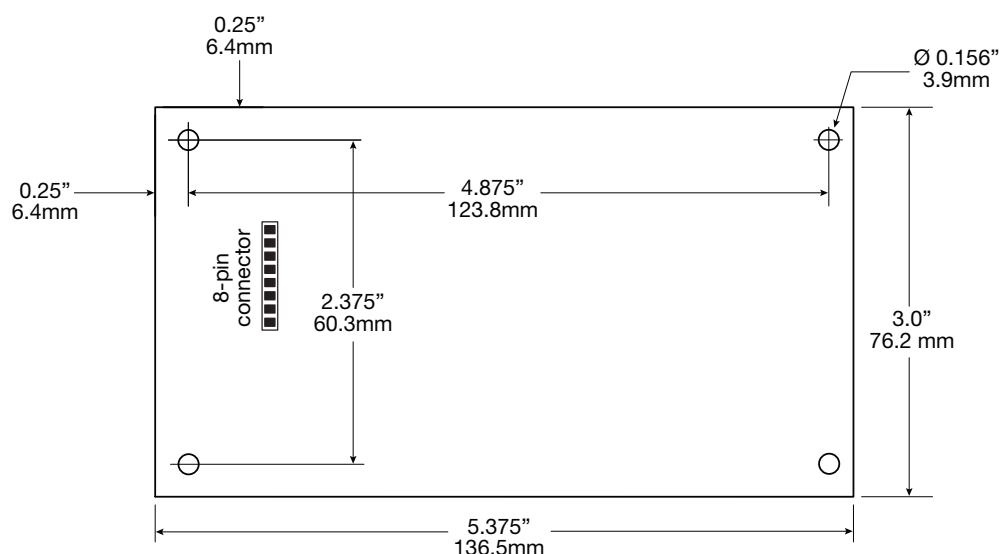
BTU/Hr (approx.):

5VDC: 15 BTU/Hr.

12VDC: 37 BTU/Hr.

Board Dimensions (L x W x H) and Drawing

5.375" x 3" x 1" (136.5mm x 76.2mm x 25.4mm)



Lifetime Warranty

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VR6

Voltage Regulator

VR6-Compatible Sub-Assemblies

PDS8(CB) and ACMS8(CB) are designed to piggyback onto the VR6 making an instant plug-in connection via common standoffs to provide 12VDC and 24VDC simultaneously – individually selectable for each of the 8 outputs, or OFF position for servicing... all on one footprint!

Stackable mounting configuration saves valuable enclosure space.

Total output current should not exceed max current rating of power supply employed.

PDS8 and PDS8CB - Dual Input Power Distribution Modules

- Eight (8) selectable independently controlled outputs.
- Any of the eight (8) outputs are switch selectable to follow power input 1 or input 2.

PDS8 - fuse protected outputs rated @ 3A.

PDS8CB - PTC protected outputs rated @ 2A.



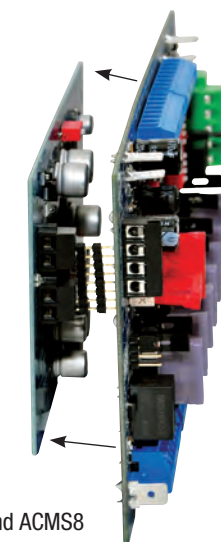
VR6 and PDS8

ACMS8 and ACMS8CB - Multi-Output Access Power Controllers

- Eight (8) individually controlled trigger inputs.
- Eight (8) selectable independently controlled outputs.
- Any of the eight (8) outputs are switch selectable to follow power input 1 or input 2.

ACMS8 - fuse protected outputs rated @ 2.5A.

ACMS8CB - PTC protected outputs rated @ 2A.



VR6 and ACMS8

Lifetime Warranty

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AL1024ULXB2

Power Supply/Charger Board

Altronix AL1024ULXB2 UL Listed Sub-Assembly power supply/charger converts 115VAC, 60Hz input into a single 24VDC non power-limited output. It also offers a suite of features that includes AC fail supervision, battery presence, and low battery supervision.



AL1024ULXB2

Specifications

Input

Voltage	115VAC 60Hz, 4.2A max.
Fusing	5A/250V

Output

Voltage	24VDC (UL 1481)
Current	8A continuous supply current with 10A supply current during alarm (UL 1481) 24VDC @ 10A (UL 294)
Other	Short circuit and thermal overload protection Filtered and regulated

Back-up Battery *(not included)*

Type	Sealed lead acid or gel type
Fuse Rating	15A/32V
Failover	Upon AC loss, instantaneous

Supervision

AC Failure	Form "C" contacts
Battery	Form "C" contacts

Indicators (LED)

Input	115VAC is present
DC Output	Powered
Battery	Discharged or not connected

Agency Listings

UL:

UL294	Access Control System Units
UL 603	Burglar Alarm
UL1481	Power Supplies for Fire Protective Signaling Systems

cUL:

Signal Equipment	CSA C22.2 No.205-M1983
------------------	------------------------

Physical and Environmental

Dimensions (L x W x H)

Board:	8.4" x 4.5" x 1.9" (213.4mm x 114.4mm x 49.7mm)
Shipping:	10" x 8" x 4" (254mm x 203.2mm x 101.6mm)

Weight (approx.)

Product Weight:	1.15 lb. (0.52 kg)
Shipping Weight:	1.45 lb. (0.66 kg)

Temperature

Operating:	0°C to 49°C (32°F to 120°F)
Storage:	- 20°C to 70°C (- 4°F to 158°F)

Relative Humidity

85% +/- 5%

BTU/Hr (approx.)

123 BTU/Hr.

Mounting hardware included

Lifetime Warranty

Altronix Corporation | 140 58th St | Brooklyn, NY 11220 USA
phone: +1 718. 527. 0100

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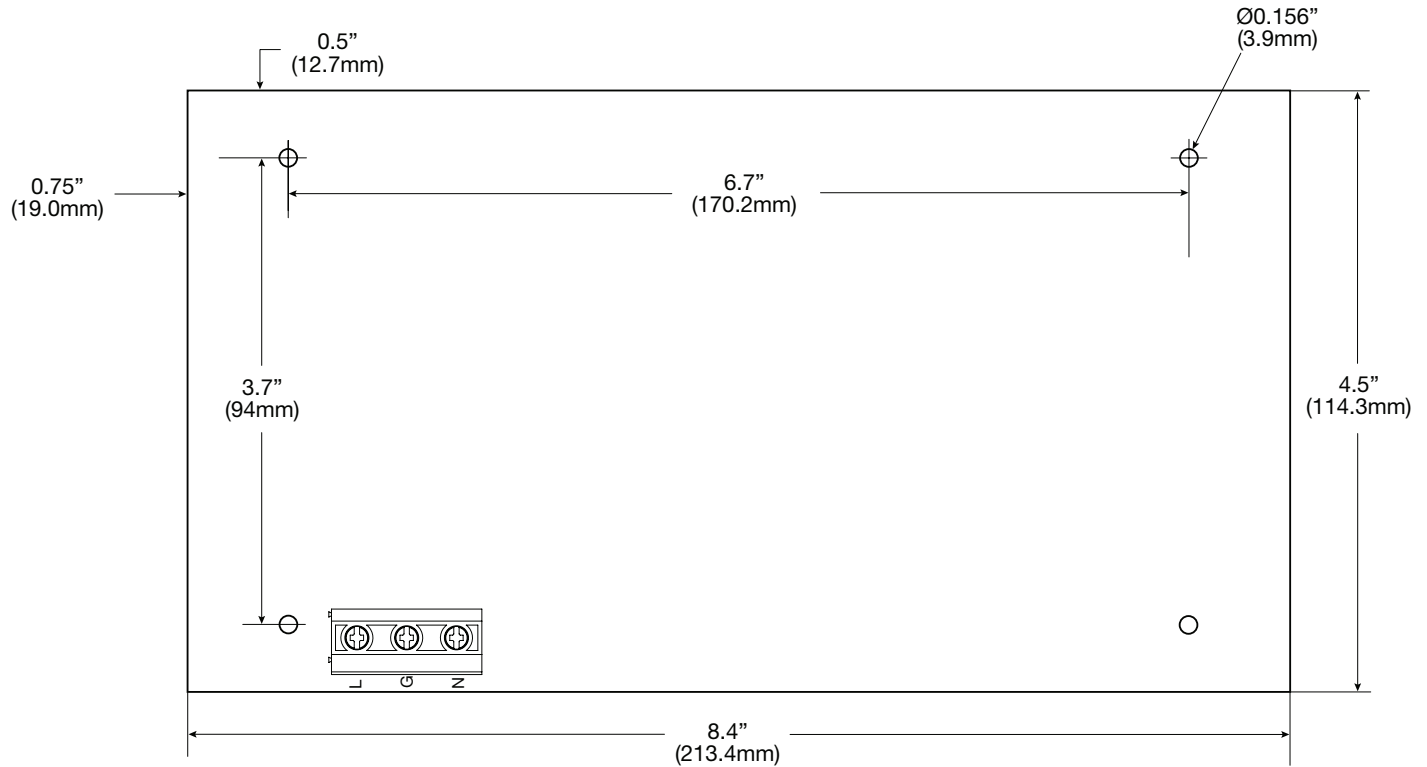
AL1024ULXB2

Power Supply/Charger Board

Board Dimensions (L x W x H) and Drawing

8.4" x 4.5" x 1.9" (213.4mm x 114.4mm x 49.7mm)

Mounting Holes' Tolerance: +/- 0.04 in. (1mm)



Lifetime Warranty

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AXIS P3267-LV Dome Camera

Indoor 5 MP dome with IR and deep learning

Featuring Lightfinder 2.0, Forensic WDR, and OptimizedIR, AXIS P3267-LV delivers excellent image quality under any light conditions. Based on the latest Axis system-on-chip (SoC), it includes a deep learning processing unit enabling advanced features and powerful analytics based on deep learning on the edge. Thanks to AXIS Object Analytics, it offers detection and classification of humans, vehicles, and types of vehicles—all tailored to your specific needs. Featuring audio and I/O connectivity, you can integrate equipment and extend the value of your system. Furthermore, this robust, IK10-rated, outdoor-ready camera includes built-in cybersecurity to help prevent unauthorized access and safeguard your system.

- > [Excellent image quality in 5 MP](#)
- > [Lightfinder 2.0, Forensic WDR, and OptimizedIR](#)
- > [Analytics with deep learning](#)
- > [Audio and I/O connectivity](#)
- > [Built-in cybersecurity features](#)



AXIS P3267-LV Dome Camera

Camera		Support for Session Initiation Protocol (SIP) for integration with Voice over IP (VoIP) systems, peer to peer or integrated with SIP/PBX.
Image sensor	1/2.7" progressive scan RGB CMOS	
Lens	Varifocal, 3–8 mm, F1.3 Horizontal field of view: 104°–40° Vertical field of view: 74°–29° Minimum focus distance: 1 m (3.28 ft) IR corrected, remote zoom and focus, P-Iris control	
Day and night	Automatically removable infrared-cut filter	
Minimum illumination	With Forensic WDR and Lightfinder 2.0: Color: 0.13 lux at 50 IRE, F1.3 B/W: 0 lux at 50 IRE, F1.3	
Shutter speed	1/33500 s to 1/5 s	
Camera angle adjustment	Pan ±190°, tilt -10 to +80°, rotation ±190°	
System on chip (SoC)		
Model	ARTPEC-8	
Memory	2048 MB RAM, 8192 MB Flash	
Compute capabilities	Deep learning processing unit (DLPU)	
Video		
Video compression	H.264 (MPEG-4 Part 10/AVC) Baseline, Main, and High Profiles H.265 (MPEG-H Part 2/HEVC) Main Profile Motion JPEG	
Resolution	2592x1944 to 160x90	
Frame rate	25/30 fps with power line frequency 50/60 Hz	
Video streaming	Multiple, individually configurable streams in H.264, H.265, and Motion JPEG Axis Zipstream technology in H.264 and H.265 Controllable frame rate and bandwidth VBR/ABR/MBR H.264/H.265 Video streaming indicator	
Multi-view streaming	Up to 2 individually cropped out view areas in full frame rate	
Image settings	Saturation, contrast, brightness, sharpness, Forensic WDR: up to 120 dB depending on scene, white balance, day/night threshold, local contrast, tone mapping, exposure mode, exposure zones, defogging, barrel distortion correction, compression, rotation: 0°, 90°, 180°, 270° including Corridor Format, mirroring, dynamic text and image overlay, privacy masks, polygon privacy mask	
Pan/Tilt/Zoom	Digital PTZ, preset positions	
Audio		
Audio streaming	Audio in, simplex, two-way audio via edge-to-edge technology	
Audio encoding	24bit LPCM, AAC-LC 8/16/32/44.1/48 kHz, G.711 PCM 8 kHz, G.726 ADPCM 8 kHz, Opus 8/16/48 kHz Configurable bit rate	
Audio input/output	External microphone input, line input, digital input with ring power, automatic gain control, network speaker pairing	
Network		
Security	Password protection, IP address filtering, HTTPS ^a encryption, IEEE 802.1x (EAP-TLS) ^a network access control, digest authentication, user access log, centralized certificate management, brute force delay protection, signed firmware, secure boot signed video, Axis Edge Vault, Axis device ID, secure keystore (CC EAL4 certified)	
Supported protocols	IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS ^a , HTTP/2, TLS ^a , QoS Layer 3 DiffServ, FTP, SFTP, CIFS/SMB, SMTP, mDNS (Bonjour), UPnP [®] , SNMP v1/v2c/v3 (MIB-II), DNS/DNSv6, DDNS, NTP, RTSP, RTCP, RTP, SRTP, TCP, UDP, IGMPv1/v2/v3, DHCPv4/v6, ARP, SOCKS, SSH, SIP, LLDP, CDP, MQTT v3.1.1, Syslog, Link-Local address (ZeroConf)	
System integration		
Application Programming Interface	Open API for software integration, including VAPIX [®] and AXIS Camera Application Platform; specifications at <i>axis.com</i> One-click cloud connection ONVIF [®] Profile G, ONVIF [®] Profile M, ONVIF [®] Profile S, and ONVIF [®] Profile T, specification at <i>onvif.org</i>	

Onscreen controls	Day/night shift Defogging Wide dynamic range Video streaming indicator IR illumination
Event conditions	Analytics, external input, supervised external input, virtual inputs through API Call: state, state change Device status: above operating temperature, above or below operating temperature, below operating temperature, within operating temperature, IP address removed, new IP address, network lost, system ready, ring power overcurrent protection, live stream active, casing open Digital audio: digital signal contains Axis metadata, digital signal has invalid sample rate, digital signal missing, digital signal okay Edge storage: recording ongoing, storage disruption, storage health issues detected I/O: digital input, manual trigger, virtual input MQTT: subscribe Scheduled and recurring: schedule Video: average bitrate degradation, day-night mode, live stream open, tampering
Event actions	Overlay text, external output activation, zoom preset, day/night mode, flash status LED, use lights, set defog mode, set WDR mode Calls: end SIP call, make SIP call, answer call I/O: toggle I/O once, toggle I/O while the rule is active MQTT: publish Notification: email, HTTP, HTTPS, TCP, and SNMP trap Pre- and post-alarm video or image buffering for recording or upload Record video: SD card and network share Upload of images or video clips: FTP, SFTP, HTTP, HTTPS, network share, and email
Data streaming	Event data
Built-in installation aids	Remote zoom and focus, straighten image, pixel counter, level grid
Analytics	
AXIS Object Analytics	Object classes: humans, vehicles (types: cars, buses, trucks, bikes) Trigger conditions: line crossing, object in area Up to 10 scenarios Metadata visualized with color-coded bounding boxes Polygon include/exclude areas Perspective configuration ONVIF Motion Alarm event
Applications	Included AXIS Object Analytics AXIS Video Motion Detection, active tampering alarm, audio detection Support for AXIS Camera Application Platform enabling installation of third-party applications, see <i>axis.com/acap</i>
General	
Casing	IP52- and IK10-rated Polycarbonate hard coated dome Polycarbonate casing Color: white NCS S 1002-B For repainting instructions, go to the product's support page. For information about the impact on warranty, go to <i>axis.com/warranty-implication-when-repainting</i> .
Mounting	Mounting bracket with junction box holes (double-gang, single-gang, and 4" octagon) and for wall or ceiling mount
Sustainability	PVC free, BFR/CFR free 7% bioplastics
Power	Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3 Typical 6.4 W, max 9.0 W
Connectors	RJ45 10BASE-T/100BASE-TX PoE I/O: 4-pin 2.5 mm (0.098 in) terminal block for 1 supervised digital input and 1 digital output (12 V DC output, max. load 25 mA)

	Audio: 3.5 mm mic/line in
IR illumination	Optimized IR with power-efficient, long-life 850 nm IR LEDs Range of reach 40 m (130 ft) or more depending on the scene
Storage	Support for microSD/microSDHC/microSDXC card Support for SD card encryption (AES-XTS-Plain64 256bit) Recording to network-attached storage (NAS) For SD card and NAS recommendations see axis.com
Operating conditions	0 °C to 50 °C (32 °F to 122 °F) Humidity 10–85% RH (non-condensing)
Storage conditions	–40 °C to 65 °C (–40 °F to 149 °F) Humidity 5–95% RH (non-condensing)
Approvals	EMC EN 50121-4, EN 55032 Class A, EN 55035, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, FCC Part 15 Subpart B Class A, ICES-3(A)/NMB-3(A), IEC 62236-4, KC KN32 Class A, KC KN35, RCM AS/NZS CISPR 32 Class A, VCCI Class A Safety CAN/CSA C22.2 No. 62368-1 ed. 3, IEC/EN/UL 62368-1 ed. 3, IEC/EN 62471, IS 13252 Environment IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-78 IEC/EN 60529 IP52, IEC/EN 62262 IK10 Network

	NIST SP500-267
Dimensions	Height: 107 mm (4.21 in) ø 149 mm (5.87 in)
Weight	800 g (1.8 lb)
Included accessories	Installation guide, Windows® decoder 1-user license, drill template, RESISTORX® T20 screw bit, terminal block connectors, cable gaskets, connector guard
Optional accessories	AXIS TP3201 Recessed Mount, AXIS TP3203 Recessed Mount, AXIS T94K01D Pendant Kit, AXIS T8355 Digital Microphone 3.5 mm, AXIS ACI Conduit Adapters, smoked dome, black casing For more accessories, see axis.com
Video management software	AXIS Companion, AXIS Camera Station, video management software from Axis Application Development Partners available at axis.com/vms
Languages	English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portuguese, Polish, Traditional Chinese
Warranty	5-year warranty, see axis.com/warranty

a. This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (openssl.org), and cryptographic software written by Eric Young (eyay@cryptsoft.com).

Environmental responsibility:

axis.com/environmental-responsibility

PART NUMBER 4461230

UL Listed and Rated Type CMP Plenum Composite Cable

■ 0275/0725 FT • SMARTWIRE ACCESS CONTROL CABLE DOOR/ZONE A B C D E 0 1 2 3 4 5 6 7 8 9

**CABLE SPECIFICATIONS**

DESCRIPTION	Elem1: 18 AWG 4 Conductor Bare Copper Overall Foil White Jacket with Orange Stripe; Elem2: 22 AWG 3 Pair Bare Copper Overall Foil White Jacket with Yellow Stripe; Elem3: 22 AWG 2 Conductor Bare Copper Overall Foil White Jacket with Purple Stripe; Elem4: 22 AWG 4 Conductor Bare Copper Overall Foil White Jacket with Brown Stripe Plenum Composite Cable, C(UL)US CMP
CONDUCTOR	Elem 1: 18 AWG 7 Strand Bare Copper Elem 2, 3, 4: 22 AWG 7 Strand Bare Copper
INSULATION	All Elements: Low-Smoke PVC .008"
COLOR CODE	Element 1: Black/Red/White/Green Element 2: Black/Red, White/Green, Brown/Blue Element 3: Black/Red Element 4: Black/Red/White/Green
SHIELD	All Elements Shielded
DRAIN WIRE	All Elements: 24 AWG 7 Strand Tinned Copper
JACKET	Low-Smoke PVC .020"
JACKET COLOR	Yellow Jacket
MARKING	Elem1: LOCK POWER ABCDE0123456789 Elem2: CARD READER ABCDE0123456789 Elem3: DOOR CONTACT ABCDE0123456789 Elem4: REX/SPARE ABCDE0123456789 Outer Jacket: SMARTWIRE ACCESS CONTROL CABLE DOOR/ZONE ABCDE0123456789 C(UL)US CMP MADE IN THE USA
OVERALL DIAMETER	0.415 Nom OD
CABLE WEIGHT	110 Lb/1000Ft Approx
DC RESISTANCE	Element 1: 6.66 Ohms/Mft. maximum @ 20 C Element 2: 16.9 Ohms/Mft. maximum @ 20 C Element 3: 16.9 Ohms/Mft. maximum @ 20 C Element 4: 16.9 Ohms/Mft. maximum @ 20 C
TEMPERATURE RATING	0 C to 75 C / 300 Volt

INDUSTRY STANDARDS

AGENCY APPROVALS UL Listed C(UL)US CMP, Made IN THE USA



All specifications referenced are nominal measurements unless otherwise noted.

PART NUMBER CAT6AP-GRN

C(ETL)US CMP

PAGE 1

■ 0275/0725 FT ● A B C D E 0 1 2 3 4 5 6 7 8 9 FTP 4/23 C(ETL) US CMP CAT 6A 9700851 WINDY CITY WIRE MADE IN USA


SMARTWIRE
GLIDE
 TECHNOLOGY

CABLE SPECIFICATIONS

DESCRIPTION	ANSI/TIA/EIA-568 CATEGORY 6A, NON-SHIELDED
CONDUCTOR	23 AWG SOLID BARE COPPER
INSULATION	FEP
BISECTOR TAPE	POLYOLEFIN
JACKET	FRPVC
JACKET COLOR	GREEN
COLOR CODE	BLUE/WHITE WITH BLUE STRIPE, ORANGE/WHITE WITH ORANGE STRIPE GREEN/WHITE WITH GREEN STRIPE, BROWN/WHITE WITH BROWN STRIPE
MARKING	A B C D E 0 1 2 3 4 5 6 7 8 9 FTP 4/23 C(ETL) US CMP CAT 6A 9700851 WINDY CITY WIRE, MADE IN USA
NOMINAL JACKET O.D.	0.300"
NOMINAL JACKET THICKNESS	0.053"
CABLE WEIGHT	42.40 LBS./1000 FT.
TEMPERATURE	INSTALLATION: 0°C TO 60°C; OPERATION: -20°C TO 60°C

INDUSTRY STANDARDS

AGENCIES APPROVALS

C(ETL)US CMP


WINDY CITY WIRE®
 CABLE & TECHNOLOGY PRODUCTS, LLC

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ACCESS CONTROL - 087100.A

 Appendix A to Section 087100, DOOR HARDWARE
 September 30, 2022

PART NUMBER CAT6AP-GRN

C(ETL)US CMP

PAGE 2

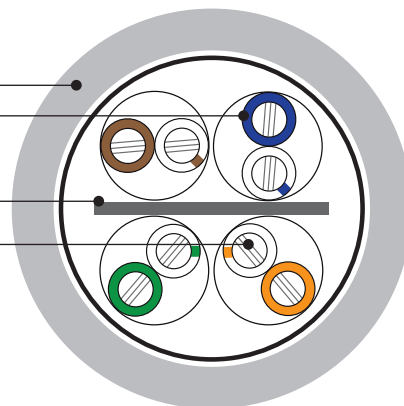
TWISTED PAIR CABLE – 4 PR. 23 AWG

JACKET

INSULATION

BISECTOR TAPE

CONDUCTOR



TWISTED PAIR CABLES

PAIR 1	BLUE/WHITE WITH BLUE STRIPE
PAIR 2	ORANGE/WHITE WITH ORANGE STRIPE
PAIR 3	GREEN/WHITE WITH GREEN STRIPE
PAIR 4	BROWN/WHITE WITH BROWN STRIPE

MECHANICAL SPECIFICATION

MUTUAL CAPACITANCE	6.0 nF/100m@1kHz
DC RESISTANCE/UNBALANCE	7.61Ω/100m / 4% MAXIMUM
DIELECTRIC BREAKDOWN	1500 VAC 2500 Vdc
NOMINAL VELOCITY OF PROPAGATION, NVP	66%
MAXIMUM OPERATING FREQUENCY	500 MHz

ELECTRICAL PERFORMANCE

FREQ MHZ.	IL		NEXT		ACR		PSNEXT		PSACR		ACRF		PSACRF		RL		TCL	ELTCTL
	STD	TYP	STD	TYP	STD	TYP	STD	TYP	STD	TYP	STD	TYP	STD	TYP	STD	STD	STD	STD
1.0	2.1	1.8	74.3	91.0	72.2	89.2	72.3	89.0	70.2	87.3	67.8	84.5	64.8	82.5	20.0	33.0	40.0	35.0
4.0	3.8	3.5	65.3	83.1	61.5	79.6	63.3	81.0	59.5	77.5	55.8	72.6	52.8	70.5	23.0	34.6	40.0	23.0
8.0	5.3	5.0	60.8	79.0	55.4	73.9	58.8	76.9	53.4	71.8	49.7	66.6	46.7	64.4	24.5	37.3	40.0	16.9
10.0	5.9	5.6	59.3	76.6	53.4	71.0	57.3	74.7	51.4	69.1	47.8	64.7	44.8	62.5	25.0	38.4	40.0	15.0
16.0	7.5	7.1	56.2	73.6	48.8	66.5	54.2	71.5	46.8	64.3	43.7	60.6	40.7	58.2	25.0	39.6	38.0	10.9
20.0	8.4	8.0	54.8	73.0	46.4	65.0	52.8	71.0	44.4	63.0	41.8	58.6	38.8	56.2	25.0	38.9	37.0	9.0
25.0	9.4	9.0	53.3	70.6	44.0	61.7	51.3	68.8	42.0	59.8	39.8	56.5	36.8	54.2	24.3	38.7	36.0	7.0
31.25	10.5	10.1	51.9	68.7	41.4	58.7	49.9	66.9	39.4	56.8	37.9	54.4	34.9	52.1	23.6	39.3	35.1	—
62.5	15.0	14.4	47.4	64.6	32.4	50.3	45.4	62.7	30.4	48.3	31.9	48.5	28.9	46.0	21.5	36.3	32.0	—
100.0	19.1	18.4	44.3	60.2	25.2	41.9	42.3	58.7	23.2	40.4	27.8	44.5	24.8	42.2	20.1	35.8	30.0	—
155.0	24.1	23.2	41.4	60.8	17.4	37.7	39.4	58.8	15.4	35.6	24.0	41.0	21.0	38.7	18.8	33.1	28.1	—
200.0	27.6	26.5	39.8	56.8	12.2	30.4	37.8	55.0	10.2	28.5	21.8	38.5	18.8	36.3	18.0	33.0	27.0	—
250.0	31.1	29.8	38.3	54.8	7.3	25.1	36.3	52.8	5.3	23.0	19.8	36.5	16.8	34.2	17.3	32.6	26.0	—
300.0	34.3	32.9	37.1	53.4	2.9	20.5	35.1	51.4	0.9	18.5	18.3	35.0	15.3	32.5	16.8	32.5	25.2	—
350.0	37.2	35.7	36.1	52.1	-1.1	16.4	34.1	50.1	-3.1	14.4	16.9	34.0	13.9	31.4	16.3	33.2	24.6	—
400.0	40.1	38.2	35.3	50.4	-4.8	12.2	33.3	48.3	-6.8	10.1	15.8	32.0	12.8	30.0	15.9	34.2	24.0	—
500.0	45.3	43.1	33.8	47.3	-11.4	4.2	31.8	45.5	-13.4	2.4	13.8	29.9	10.8	27.8	15.2	34.6	23.0	—
650.0	—	49.8	—	43.1	—	-6.6	—	41.3	—	-8.4	—	27.4	—	25.1	—	27.2	—	—

(ALL TESTS INCLUDE SWEPT FREQUENCY MEASUREMENTS)
(VALUES ABOVE 500 MHZ ARE FOR INFORMATION PURPOSES ONLY)



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SECTION 088000
GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Impact-resistant laminated safety glass used in non-fire-rated hollow metal doors and frames.
 - 2. Wire-less fire resistant rated glazing in designated rated doors and frames.
 - 3. All materials required to properly install glass furnished hereunder, including sealant, tapes, setting blocks, and spacers.
- B. Work of this section includes installation of glazing beads furnished under related sections.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.
- D. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Steel doors, door and window frames, and related glazing stops, for both fire-resistance rated (labeled) and non-rated (labeled) conditions.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. AAMA 804.1 - Ductile Back-Bedding Compound.
 - 2. ASTM C 1036 - Flat Glass.
 - 3. ASTM C 1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. ASTM E 546 - Test Method For Frost Point of Sealed Insulating Glass Units.
 - 5. ASTM E 576 - Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
 - 6. ASTM E 773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
 - 7. ASTM E 774 - Sealed Insulating Glass Units.
 - 8. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
 - 9. Federal Safety Standards for Architectural Glazing Materials 16CFR1201.
 - 10. IGCC: Certified Products Directory, and Certification Guidelines.
 - 11. NFPA Publication 80 - Fire Doors and Windows.
 - 12. SGCC: Certified Products Directory, and Certification Guidelines.
- B. The following reference materials are hereby made a part of this Section by reference thereto:
 - 1. GANA Laminated Glazing Reference Manual (2006 edition).

2. GANA - Glazing Manual (2004 edition).
3. SIGMA - Vertical Glazing Guidelines, Number A3000-87.
4. Consumer Product Safety Commission-Safety Standard for Architectural Glazing Materials.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
1. Field Measurements:
 - a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
 - b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

1.5 SUBMITTALS

- A. Information and Review Submittals:
1. Product Data:
 - a. Product data sheets for fritted glass.
 - b. Product data sheets on glazing products: Provide chemical, functional, and environmental characteristics, size limitations, special application requirements. Identify available colors.
 - c. Sample Warranty: Provide copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.
 2. Shop Drawings: Show sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
 - a. Plans and elevations 1/4 inch scale of each type of glazing assembly; indicate dimensions, and reference details. Verify dimensions with field measurements.
 3. Verification Samples:
 - a. 12 x 12 inch piece of fritted glass to obtain design approval from the Project Engineer/VA-COR and Architect.
 - b. 12 x 12 inch pieces of each specified type and thickness of glass, bearing labels indicating locations where each type of glass will be used.
 - c. Glazing tape: 12 inch length of specified type and size.
 4. Certificates: Manufacturer's written certification stating that the materials installed, meet or exceed the requirements specified under this Section.
- B. Closeout Submittals: Submit the following under provisions of Section 019999 - PROJECT CLOSEOUT.
1. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.

1.6 QUALITY ASSURANCE

- A. General: Perform glazing work in accordance with GANA - Glazing Manual, FGMA Glazing Manual, SIGMA and LSGA standards for glazing and installations methods.
1. Notify the COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Glass Labeling:
1. General: Manufacturer's Label shall be, acid-etched, sandblasted, ceramic-fired, laser-etched, embossed, or other similar type which, once applied, cannot be removed without being destroyed.

2. Safety glass: Label tempered and laminated safety glass with permanent manufacturer's label on each light with the mark visible after installation.
 - a. Furnish SGCC certification for safety glass in compliance with CPSC 16 CFR 1201 Cat 1 or Cat 11, or ANSI Z-97.1.
 3. Fire-rated glass: Label each individual glazing unit with appropriate UL, Warnock Hersey, or other approval labeled markings with the listing mark visible after installation.
- C. Qualifications:
1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.
 2. Welders Certificates: Utilize only qualified welders employed on the Work. Submit verification that Welder's are AWS D1.1 and D1.4 qualified within the previous 12 months.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
 2. Deliver materials in labeled, protective packages, when and as required.
- B. Storage and Handling Requirements:
1. Store and handle in strict compliance with manufacturer's instructions and recommendations of GANA Glazing Manual. Use clean gloves and tools when handling materials, avoid contamination. Use rolling blocks and suction cups to move glass units not in shipping crates.
 - a. Carefully store materials to avoid overloading any building component or structure.
 - b. Do not unpack material until it is to be set, unless un-packing is required for inspection by the Project Engineer/VA-COR and the Architect.
 2. Store glass in a dry place with acid-free paper between glass sheets.
 3. Protect factory finished materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

1.8 SITE CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees Fahrenheit.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

- A. General: Submit warranties under provisions of Section 019999 - PROJECT CLOSEOUT.
- B. Manufacturer Warranty/Guarantee: All shall include replacement of defective glass and delivery of replacement glass products furnished f.o.b. from point of manufacturer to project site.
1. Laminated glass: Manufacturer's 4 year written guarantee covering against defects in materials and workmanship of laminated glass and replacement of the same. Warranty shall be effective from date of original factory shipment to site.

- a. Provide coverage in Guarantee for manufacturing defects, including failure of laminated glass units as evidenced by edge separation, delamination, or discoloration of inner layer.

PART 2 - PRODUCTS

2.1 GLASS - GENERAL

- A. General requirements for glass: Of domestic and foreign manufacture, conforming to the referenced standards and with the additional requirements specified herein; factory labeled on each pane stating the strength, type, thickness and quality; with all labels remaining on glass until final cleaning.
 1. Glass thickness shown and heat treatment specified are minimum requirements. Provide glass thickness and heat treatment as required to meet specified performance criteria, State and local codes and ordinances.
- B. High-Strength Laminated glass: consisting of an outer face and inner face of specified glass, factory laminated to high strength interlayer DuPont Building Innovations Wilmington DE. Product "SentryGlassPlus (SGP)". Certified by Safety Glazing Certification Council. Glass shall be free from foreign substances and air pockets.
 1. Interlayer Physical Properties:
 - a. Young's Modulus: 43 kpsi, when tested in accordance with ASTM D5026
 - b. Tensile Strength: 5.0 kpsi, when tested in accordance with ASTM D638.
 - c. Elongation: 400%, when tested in accordance with ASTM D638
 - d. Flex Modulus: 50 kpsi, when tested in accordance with D790.
 - e. Heat Deflection Temperature at 0.46 MPa: 110 deg F, when tested in accordance with D648

2.2 GLASS – TYPES

- A. Glass Type GL-1: Nominal 1/4 inch thick laminated glass.
 1. Outer face: 1/8 inch (3 mm) thick heat strengthened clear glass
 2. Interlayer: 0.030 inch thick [translucent] [clear] polyvinyl butyl interlayer
 3. Inner face: 1/8 inch (3 mm) thick heat strengthened clear glass.
- B. Glass Type GL- 2: 8mm-9 mm thick (5/16 inch-3/8 inch) transparent wire-less fire rated ceramic glazing material with polished finish.
 1. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 - a. Nippon Electric Glass Co., Ltd., "Firelite Plus".
 - b. Vetrotech Saint-Gobain, "SSG Keralite FR-L".
 - c. SAFTI First, "Pyran Platinum L".
 2. For fire rated door assemblies, conform with latest edition of ASTM E152, ASTM E163, NFPA-80, NFPA 252, NFPA 257.
 3. Conforms to ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
 4. Permanently identify each individual glazing unit with a listing mark visible after installation.
 5. In accordance with manufacturer's specifications, Firelite Plus must be glazed into frames with a similar rating, using silicone glazing compound which shall be supplied with the Firelite Plus material.

2.3 FABRICATION

- A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
- B. Fabricate glass as required to openings with edge clearances and bite on glass as recommended by the manufacturer with clean-cut edges where concealed, and smooth-ground, polished and seamed edges where exposed to view. Do not cut, seam, nip or abrade glass after heat-tempering.
 - 1. For non-tempered to be cut at site, provide glass larger than required so as to obtain clean cut edges without seaming or nipping.
- C. Fabricate glass with the following edge treatments.
 - 1. Exposed edges: Polished-finished radiused (penciled).
 - 2. Concealed edges: Cut edges with minimum edge work.
 - 3. Butt-joint edges: Flat round and finished with edges eased.

2.4 ACCESSORIES

- A. Glazing tape: Preformed butyl-polyisobutylene rubber with 100 percent solids contained in extruded tape roll form and complying with AAMA 804.1; coiled on release paper; of sizes required for proper glazing. equal to one of the following:
 - 1. Protective treatments 3030 or 606.
 - 2. Tremco Preshimmed 440.
 - 3. Woodmont Chem-Tape 40.
- B. Setting blocks: Neoprene, 80-90 shore A durometer hardness, certified to be "silicone compatible"; sized as follows:
 - 1. Length: 0.1 inch per square foot of glass, but not less than 4 inches.
 - 2. Width: equal to glazing rabbet space minus 1/16 inch.
 - 3. Height to suit glazing method and pane weight and area.
- C. Spacers: Neoprene, 60-80 shore A durometer hardness; sized as required.
- D. Glazing sealant:
 - 1. General glazing sealant: One-part medium modulus, neutral curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, grade NS, Class 25 for uses NT, G and A, FS TT-S-001543A, Type, Class A. Color as selected by the COR and the Architect.
 - a. Dow Corning Corporation, Midland MI.; product, "Silicone Glazing Sealant".
 - b. General Electric Company (GE Silicones) Waterford NY.; product, "SilGlaze II SCS2800".
- E. Bond-breakers and backing materials: Type recommended by manufacturer of sealants and gaskets.
- F. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.5 ACCESSORIES FOR WIRE-LESS FIRE-RATED GLAZING

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.
- B. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and

compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:

1. Dow Corning Corporation, Midland MI.; product, "795".
 2. General Electric Company (GE Silicones) Waterford NY.; product "Silglaze-II 2800"
 3. Tremco, Beachwood OH.; product, "Spectrem 2".
- C. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Inspect receiving surfaces and ensure that they are dry and free from dust, or other foreign materials before glazing. Clean all surfaces with cloth saturated with mineral spirits of high-flash naphtha as recommended by glazing tape manufacturer, before glazing.
- B. Field Measurements: Verify that field measurements are as indicated on approved Shop Drawings.
1. Check all openings, prior to glazing, to make certain that the opening is square, plumb and secure in order that uniform face and edge clearances are maintained.
 2. Determine the actual sizes required by measuring the receiving openings. Size glass to permit required clearance and bite around full perimeter of glass, as set forth in the referenced FGMA standards, or as recommended by the glass manufacturer. Do not nip edges, to remove flares or to reduce oversize dimensions, under any circumstance.
- C. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION - DRY GLAZING

- A. Utilize dry glazing methods for field installation of glass in interior doors and frames.
1. Install in vision panels in fire-rated doors and frames to requirements of NFPA 80.
 2. Install so that appropriate UL, Warnock Hersey, or other approval labeled markings remain permanently visible.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (2 mm) above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane.
- E. Place glazing tape on free perimeter of glazing in manner as described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Knife trim protruding tape.

3.3 PROTECTION

- A. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Do not apply warning markings directly to the glass.
- B. Cover glass To protect it from activities that might abrade the glass surface.

3.4 CLEANING

- A. Clean glass surfaces promptly after installation, exercising care to avoid damage to the same. Remove excess glazing tape, labels, dirt, and other contaminants.

END OF SECTION

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SECTION 090506
COMMON WORK RESULTS FOR FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general requirements for flooring preparation, installation and temporary protection.
 - 1. Provide independent testing laboratory services to perform relative humidity, moisture vapor emission, and pH tests on in situ concrete slabs, which shall be in addition to testing as may be performed by the VAMC.

1.2 RELATED REQUIREMENTS

- A. Section 030136 - Resurfacing and Patching of Concrete Slabs:
 - 1. Restore concrete surfaces after conclusion of demolition.
 - 2. Fill openings in suspended slabs where indicated.
 - 3. Patch concrete at slabs-on-grade where trenching has occurred.
- B. Section 030513 - CONCRETE SEALERS: Concrete sealers/coatings on exposed-to-view concrete floors.
- C. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base.
- D. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring and integral base.
- E. Section 096519 - RESILIENT TILE FLOORING: Resilient tile and plank flooring.
- F. Section 096813 - TILE CARPETING: Carpet tile and transition strips.
- G. Section 096723 - RESINOUS FLOORING: Multi-layered resinous waterproof flooring.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Project Engineer/VA-COR and the Architect.
 - 1. ASTM F-710 - Preparing Concrete Floors to Receive Resilient Flooring.
 - 2. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. General: Coordinate flooring work with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Pre-Installation Meetings: At least 30 calendar days prior to commencing any flooring work, conduct a pre-installation conference at the Project site. Coordinate time of meeting to occur prior to installation of work under the related sections named below.
 - 1. Required attendees:
 - a. Project Engineer/VA-COR.
 - b. Architect.

- c. Contractor.
 - d. Project Superintendents representing each floor system installer.
 - e. Manufacturer's technical representative(s) for flooring products as designated by the Project Engineer/VA-COR and the Architect or Contractor.
 - f. Representatives of related trades as directed by the Project Engineer/VA-COR and the Architect or Contractor, and representatives for installers of related work specified under the following Sections:
 - 1) Section 030136 - RESURFACING OF CAST-IN-PLACE CONCRETE.
 - 2) Section 030513 - CONCRETE SEALERS.
 - 3) Section 096516 - RESILIENT SHEET FLOORING
 - 4) Section 096519 - RESILIENT TILE FLOORING.
 - 5) Section 096813 - TILE CARPETING.
 - 6) Section 096723 - RESINOUS WATERPROOF FLOORING.
 - 2. Agenda:
 - a. Scheduling of preparation and flooring operations.
 - b. Procedures for testing of relative humidity and moisture content of in situ substrates.
 - c. Water vapor emission control methods.
 - d. Review of staging and material storage locations.
 - e. Coordination of work by other trades.
 - f. Protection of completed Work.
 - g. Establish humidity and temperature limitations for performing the work, to which the Project Engineer/VA-COR and the Architect and Contractor must agree.
 - h. Discuss process for inspection and acceptance of completed Work of this Section.
 - C. Sequencing:
 - 1. Sequence flooring installation when base cabinets or other built-in casework is present on the substrate.
 - 2. Field Measurements:
 - a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
 - b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
 - 3. Ensure that installation of flooring and accessories occurs after other finishing operations, including painting.
- 1.5 RELATIVE HUMIDITY, MOISTURE VAPOR EMISSION AND ACIDITY/ALKALINITY (PH)TESTING**
- A. Concrete slabs and floors:
 - 1. Contractor shall employ and pay for services of an independent testing laboratory to perform relative humidity, moisture vapor emission, and pH tests on concrete slabs as follows. The test shall be witnessed by the Contractor, flooring subcontractors and Owner's Project Representative.
 - a. Relative Humidity, Moisture Vapor Emission and pH Testing on all concrete slabs over-which a finished floor is to be installed. This includes, but is not limited to:

- 1) Sealed concrete flooring.
 - 2) Resilient sheet flooring, including (but not limited to) linoleum, and vinyl flooring.
 - 3) Resilient tile flooring, including (but not limited to) linoleum, solid vinyl and composite flooring.
 - 4) Carpet tile.
- b. Perform moisture and pH tests on all concrete floors over-which stone flooring is to be applied.
2. Requirements: As specified under Part 3 of this Section.
 - a. Submit 1 copy of test data to the installers of all flooring materials or coating materials scheduled to be installed.
 - b. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that spaces to receive flooring finishes are suitable for installation. Do not proceed with work until unsatisfactory conditions are corrected. Comply with manufacturer's recommendations including the following:
 1. Substrates shall be dry and clean.
 2. Substrates shall be free of depressions, raised areas, or other defects which would telegraph through installed flooring.
 3. Verify concrete substrates have a flat tolerance of 3/16 inch in ten linear feet.
 4. Temperature of resilient flooring and substrate shall be within specified tolerances.
 5. Moisture condition and adhesive bond tests shall be performed as specified herein.
- B. For applications on concrete, verify curing, hardening, or breaking compounds have not been used. If there are any, do not proceed until compounds have been removed as specified.
- C. For applications on concrete slab on grade or below grade, verify vapor barrier below slab was installed. If no vapor barrier was installed, do not proceed with work unless written acceptance of such conditions is received and submitted.
- D. Perform testing of in situ concrete, relative humidity and surface pH testing to all concrete slabs specified to be covered with floor coverings or resinous coatings as specified herein. Do not proceed with work until results of moisture condition tests are acceptable.

3.2 PREPARATION

- A. General: Comply with flooring manufacturer's requirements for preparation of substrate to receive resilient flooring.
- B. Vacuum clean substrate, and ensure that substrate is dry, clean and smooth prior to application of flooring.
- C. Remove, by light sanding and grinding, all protruding edges, high spots.

- D. Ensure substrate is flat to a plus or minus 1/8 inch in 10 feet tolerance. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Ensure that substrate is free from paint, varnish, wax, oil, existing adhesive residue, or other foreign matter.
- F. Apply primers as recommended by adhesive manufacturer's written instructions.
- G. Condition flooring materials, accessories and adhesives to room temperatures for a period of 48 hours minimum.

3.3 TESTING IN SITU CONCRETE SUBSTRATES

- A. Scope:
 - 1. Provide in situ concrete relative humidity and surface pH testing to all concrete slabs specified to be covered with floor coverings or resinous coatings. Includes concrete placed as part of this Work which occurs below grade, above grade (suspended slabs), and slabs on grade.
 - a. Existing building suspended slabs may be excluded from this requirement.
- B. Scheduling:
 - 1. Testing shall take place after allowing concrete to dry for a minimum of 90 days. Testing to be scheduled no less than one, nor more than three weeks prior to scheduled flooring installation.
 - a. DO NOT conduct testing unless the slab environment is identical to that in which the finished flooring is to be installed.
 - 2. In the event new flooring is to be installed over existing resilient flooring, remove the portion of the existing flooring and adhesive directly under the area where testing will be conducted. Patch flooring to match existing construction after completion of testing.
- C. Test result submittals:
 - 1. Report all test results in chart form listing test dates, time, depth of test well, in situ temperature, relative humidity, moisture vapor and pH levels.
 - 2. List test locations on chart and show same on marked up Floor Plan Drawings.
 - 3. Submit results in duplicate. Deliver copies directly to the Project Engineer/VA-COR and the Architect, Construction Manager.
- D. Testing equipment: shall be equal to the following
 - 1. For relative humidity testing:
 - a. Digital Meter and Calibrated Humidity and Temperature probe kit as manufactured by Vaisala Inc. (Boston Office) 10D Gill Street, Woburn, MA, 01801 (telephone 781-933-4500).
 - 1) Minimum 2 point probe calibration.
 - 2. For pH testing:
 - a. pH test paper by Micro Essential Laboratory, Inc., P.O. Box 100824 4224 Avenue "H", Brooklyn, NY 11210, (telephone 718-338-3618).
 - b. Distilled or de ionized water.
- E. Testing Procedures Quantification of Relative Humidity
 - 1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75 degrees F (plus or minus 10 degrees F), and 50 percent (plus or minus 10 percent) relative humidity. When a

building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.

2. The number of In situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet and 1 per each additional 1,000 square feet.
 3. Drill test holes utilizing a roto hammer drill. Hole diameter shall not exceed outside diameter of the insertable test sleeve by more than 0.04 inch. Drilling operation must be dry. Determine the thickness of the concrete slab from Construction Documents. Depths of test holes shall be as follows:
 - a. For elevated slabs (not poured in pans): Drill test holes to a depth equal to 20 percent of the concrete thickness.
 - b. For slabs on grade and elevated slabs in pans: Drill test holes to a depth equal to 40 percent of the concrete thickness.
 4. Vacuum all concrete dust from test hole.
 5. Insert a hole liner, or sleeve, to the full depth of test hole, assuring that the liner is capped or plugged at the end protruding from the concrete surface.
 6. Permit the test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
 7. Remove the sleeve plug and place a probe into the sleeve assuring that it reaches the bottom of the test hole.
 8. Allow the probe to sit in the test sleeve for 30 minutes before taking readings.
 9. Read and record temperature and relative humidity at the test site.
- F. Testing Procedures Quantification of Acidity/Alkalinity (pH) Level
1. At or near the relative humidity test site, perform pH test.
 - a. At each testing site, lay down a loose 2 foot by 2 foot sheet of non perforated sheet backed by plywood. Leave in place for 48 hours.
 - b. Remove sheet and place several drops of distilled or de ionized water onto the concrete surface to form a puddle approximately 1 inches in diameter.
 - c. Allow the water to set for approximately 60 seconds.
 - d. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading
 2. Record and report results.
- G. Testing Procedures:
1. Initial testing: Provide 3 tests for the first 1,000 square feet.
 2. Add one test for each additional 1,000 square feet.
 3. Concrete surface area to be tested shall be completely clean. Remove all adhesives, residue, debris and sealing compounds. Remove all dust by vacuum or other methods. Do not use chemicals of any kind to clean concrete.
 4. Perform moisture tests in strict accordance with the kit manufacturer's Instructions. Moisture tests shall remain undisturbed for 60 to 72 hours.
 5. Immediately after moisture test has been removed from test area, conduct pH test in area previously covered by plastic dome of moisture test kit.
 6. After completion of tests submit 2 copies of test data to the Project Engineer/VA-COR and the Architect. Submit a copy of the test data to all installers of flooring materials and resinous flooring materials scheduled to be installed.

7. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

3.4 FLOOR PREPARATION – GENERAL REQUIREMENTS

- A. General: Comply with ASTM F 710-92 and manufacturer's recommendations for surface preparation. Remove substances incompatible with resilient flooring adhesive by method acceptable to manufacturer.
 1. Concrete floors with steel troweled (slick) finish shall be properly roughened up (sanded) to ensure suitable adhesion.
 2. Concrete floors with curing, hardening, and breaking compounds shall be abraded with mechanical methods only to remove compounds. Use blastrac or similar equipment.
- B. Fill voids, cracks, and depressions with trowel-applied leveling compounds acceptable to manufacturer. Remove projections and repair other defects to tolerances acceptable to manufacturer.
- C. Vacuum subfloors immediately prior to installation to remove loose particles.

3.5 ADHESIVE BOND TESTING

- A. Use the specified flooring and recommended adhesive, install approximately 3 by 3 foot sized flooring as specified under individual flooring specification sections. Install test samples approximately 50 feet apart throughout the area. Areas next to walls or other light traffic areas should be selected for the bond test. Tape down the perimeter of the flooring to prevent drying of the adhesive at the edges. After a minimum period of 72 hours the flooring should be pulled from the subfloor. If an unusual amount of force is required, the bond could be considered sufficient. Floors demonstrating unsuitable bond to substrate require modifications to flooring installation and may require application of moisture mitigation products. Review all conditions with the Project Engineer/VA-COR and the Architect.

3.6 PROTECTION

- A. General:
 1. Prohibit traffic on finished floor areas until flooring adhesives are fully set.
 2. Clean up the work area at end of each work day. Remove cartons, debris, and emptied containers as the work progresses, and at completion of flooring work.
 3. Provide protection of completed flooring areas from construction traffic until Substantial Completion of the General Contract. After cleaning and polishing, cover all resilient floor surfaces with non-staining heavyweight kraft paper and overlay with red-rosin paper, taping the edges to maintain position of the protection paper. Reapply papers as required to maintain floor protection.
- B. Resilient Tile Flooring: Prohibit washing, scrubbing or other similar 'wet' operations to occur on finished resilient tile floor areas for a minimum period of 5 calendar days after installation.
- C. Carpet and Carpet Tile: Prohibit traffic from carpet and carpet tile areas for 24 hours after installation. Protect with carpeted surfaces in manner to prevent any indication of deterioration, wear, or damage at time of VA's Acceptance. Cover carpeted areas with 6-mil thick polyethylene covering with taped joints. Overlay polyethylene with a non-slip walkable surface.

END OF SECTION

COMMON WORK RESULTS FOR FLOORING

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SECTION 092216
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of non-load bearing metal framing for partitions, ceilings, and soffits, where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.
- B. Furnish and install:
 - 1. Metal furring and framing where indicated on the Drawings, including cross bracing and knee bracing.
 - 2. Metal ceiling and soffit framing.
 - 3. Reinforcing plate blocking.
 - 4. Deflection track assemblies at tops of metal stud partitions.
 - a. Provide fire-rated assemblies at fire-rated, corridor, and smoke partitions.
 - b. Provide non fire-rated assemblies at all other partitions.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - ROUGH CARPENTRY:
 - 1. Wood blocking, where indicated.
 - 2. Installation of metal door frames in gypsum board work.
- B. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Furnishing steel door frames.
- C. Section 083100 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in partitions and walls.
- D. Section 092900 - GYPSUM BOARD: Gypsum board, applied over metal framing installed by this Section 092216 including: gypsum board, and related trim components.
- E. Section 095100 - ACOUSTICAL CEILINGS: Suspended acoustical tile ceiling, including metal suspension system.
- F. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Supply and return air registers.
- G. Division 26 - ELECTRICAL: Independent hangers for suspended lighting fixtures.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM C 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process..
 - 2. ASTM C 645 - Non-Load Bearing Steel Studs, Runners, and Rigid Furring Channels for Screw Application of Gypsum Board.
 - 3. ASTM C 646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gage Steel Studs.
 - 4. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard.
 - 5. ASTM E 90 - Method of Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - 6. ASTM E 119 - Fire Tests of Building Construction and Materials.

7. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum board.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work
 2. Work of this Section shall be closely coordinated with the work of Section 092900 - GYPSUM BOARD to assure the steady progress of the Contract.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA-COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer.
- C. Qualifications:
 1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
- B. Storage and Handling Requirements:
 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
 2. Protect materials from damage due to moisture, surface contamination, corrosion and damage from construction operations and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 1. Metal components and related items (including non-rated deflection track assemblies):
 - a. Marino\Ware, Division of Ware Industries, South Plainfield NJ.
 - b. Cemco Steel Framing and Metal Lath, City of Industry, CA.
 - c. Telling Industries, Mentor, OH.
 - d. Super Stud Building Products, Inc., Edison, NJ.
 2. Fire rated deflection track assemblies:
 - a. Cemco Steel Framing and Metal Lath, City of Industry, CA.
 - b. The Steel Network, Inc., Durham, NC.
 - c. Fire Trak Inc., Watkins, MN.

- B. The design and details as shown on the drawings and the model numbers specified herein are to establish the standards of design and quality and not to limit competition.

2.2 DESCRIPTION

- A. Regulatory Requirements:
1. Obtain certificate of compliance from authority having jurisdiction indicating approval of specified products.
 2. Fire resistance ratings: Where gypsum board systems with fire-resistance ratings are indicated, provide materials and assemblies of the rating required, tested per ASTM E 119, which are identical to those indicated by reference to Gypsum Association file numbers in "Fire Resistance Design Manual" or to design designation in the Underwriters Laboratories "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction and to the VA's insurance underwriters.
 - a. Fire-Test-Response Characteristics: Provide components that comply with rating requirements specified for fire-rated assemblies under UL 2079 for non-load bearing wall systems.
 - 1) Deflection Clips and Firestop Track: Connections and/or top runner provided in fire-resistance-rated assemblies shall be certified by UL 2079 for cyclic movement requirements.

2.3 FRAMING MATERIALS

- A. "Hat shaped" Furring channels: 7/8 x 2-3/4 inch, roll-formed, hat-shaped, furring channel 25 gage hot-dip galvanized steel conforming to ASTM C 645.
- B. Resilient furring channels: Roll-formed, hat-shaped, 1/2 x 2-5/8 inch, 26 gage hot-dip galvanized steel conforming to ASTM C 645, with pre-punched holes, equal to Dietrich Industries, Inc., Pittsburgh PA, Metal Channel "RC1".
- C. Furring channels: 'Z-shaped' 1-1/2 inch depth, roll-formed, 25 gage (0.179 inch [0.45 mm] minimum thickness), hot-dip galvanized steel.
- D. Studs: 'C-shaped' screw studs, hot-dip galvanized steel complying to ASTM C 645, 20 gage-equivalent (nominal 0.02 inches [0.75 mm] factory ribbed and/or embossed for performance equivalent to 20 gage (0.0329 inch [0.84 mm] minimum thickness studs), of widths indicated on the Drawings.
 1. Acceptable products include the following or approved equal:
 - a. MarinoWare, Division of Ware Industries, product: "ViperStud Viper20".
 - b. Cemco Steel Framing and Metal Lath, product; "ViperStud Viper20".
 - c. Telling Industries, product; "ViperStud".
 - d. Super Stud Building Products Inc., product: "Edge EQ, EDS20P".
 2. Provide full 20 gage (0.0329 inch [0.84 mm] minimum thickness studs where required under the indicated UL assemblies to meet fire resistance ratings.
- E. Runners for metal studs: 'U-shaped' hemmed, hot-dip galvanized steel track conforming to ASTM C645, of gage and width to match respective stud sizes, or heavier gage per design requirements, having 1-1/4 inch leg, provided at tops and bottoms of all studs and at heads of all openings in stud partitions.
- F. Internal reinforcement for various stud conditions, and bracing as required: 10 gage, minimum, galvanized steel.
- G. Furnish cross bracing and knee bracing, as required to assure a completely rigid assembly on metal stud partitions and furred areas.

2.4 DEFLECTION TRACK ASSEMBLIES:

- A. Non Fire-Rated Assemblies:

1. Deflection Track: Manufacturer's standard top runner with extended flanges designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs, and the following configuration.
 - a. Top runner with extended deep flanges that have one of the following: V-shaped offsets that compress, slots 1 inch on center that allow fasteners for stud attachment; 16 gage sliding clip assemblies attached to top track and clipped to stud, or double track systems as required to meet anticipated vertical movement.
 2. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 - a. Clarkwestern Dietrich Building Systems, LLC, product; "Deep Leg Deflection Track System", "Fast Top Clip", or "DoubleTrack System".
 - b. Marino\Ware, Division of Ware Industries, product: "Slotted Track".
 - c. Cemco Steel Framing and Metal Lath, product; "Slotted Track CST".
 - d. Telling Industries, product; "ViperTrack Deep Leg Deflection Track".
 - e. Super Stud Building Products Inc., product: "ITTC 450 Top Track Deflection Clip".
 - f. The Steel Network, Inc., product; "VertiTrack VT", "VertiTrack VTD", or "VertiClip SLD".
- B. Fire-Rated Assemblies: Head of wall dynamic fire rated joint systems for assemblies in compliance with UL 2079 HW-D. Provide clips or deep leg track system including step bushings complying with ASTM C 645 fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs.
1. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 - a. Clarkwestern Dietrich Building Systems, LLC, product; "SLP-TRK Slotted Deflection Track".
 - b. Cemco Steel Framing and Metal Lath, product; "FAS Track UL Assemblies".
 - c. The Steel Network, Inc., Durham, NC. product; "VertiClip SLD".
 - d. Fire Trak Inc., Watkins, MN, product "Fire Trak", or "Posi Clips"
- C. Coordination: Verify with partition schedule on the Drawings to ensure proper depth of flange offsets at various partitions types.

2.5 CEILING AND SOFFIT FRAMING MATERIALS

- A. Carrying channels, 2 inches deep, 16 gage cold-rolled channels, galvanized.
- B. Support channels: 3/4 inches deep, 16 gage cold-rolled channels, galvanized.
- C. Furring Channels: 7/8 x 2-3/4 inch, roll-formed, hat-shaped, furring channel 25 gage hot-dip galvanized steel conforming to ASTM C 645.
- D. Metal Studs used in soffit and ceiling framing: 'C-shaped' screw studs, hot-dip galvanized steel complying to ASTM C 645, 25 gage, of widths indicated on the Drawings, or other gages as required under the specified standards to meet fire resistance ratings.

2.6 ACCESSORIES

- A. Metal sheet plate blocking and bracing, where indicated: galvanized sheet 0.0312 inch thickness (20 gage).
- B. Fasteners:
 1. Expansion-type fasteners for securing vertical concrete and masonry surfaces.

NON-STRUCTURAL METAL FRAMING

2. Concrete stub nails for securing runners to concrete.
 3. N^o.7 by 7/16 inch Pan head self-drilling screw to attach metal framing components.
- C. Reinforcing plates for blocking: 20 gage cold rolled sheet steel, provide minimum 6 inch width, or as otherwise indicated on the drawings.

PART 3 – EXECUTION

3.1 INSTALLATION, QUALITY STANDARDS

- A. General: Perform erection procedures for the various gypsum board system conditions, except as otherwise specified, as set forth in GA 201, GA 206, the written instructions of gypsum board manufacturer, together with the additional requirements specified herein and as indicated on the Drawings.
- B. Wherever fire-resistive rated assemblies are indicated on the Drawings, erect gypsum board systems in strict accordance with the manufacturers' UL listed test constructions for the required fire rating on each specific assembly.

3.2 INSTALLATION OF FURRING

- A. Install metal furring channel horizontally, with channels spaced not more than 16-inch on centers, and attaching the channels to the masonry or concrete substrates with expansion type fasteners spaced not more than 8 inches on centers. Shim beneath channels as needed to ensure that a uniform receiving plane is maintained throughout.

3.3 INSTALLATION OF PARTITION FRAMING, GENERAL

- A. Install metal runners at floor and ceiling to structural elements with suitable fasteners located 2 inches from each end and intermediate fasteners spaced no greater than 24 inches.
- B. Install metal stud framing with open side facing in same direction, engaging floor and ceiling runners.
1. Stud spacing:
 - a. Typical: 16 inches on-center.
 - b. For cement board substrate to receive tile finishes: 16 inches on-center.
 - c. For partitions supporting wall cabinets and other wall mounted equipment: 12 inches on-center.
 2. When necessary to splice studs, nest stud with 8 inch overlap and screw studs together with screws on both flanges.
 3. Where studs are installed directly to exterior masonry walls, install asphalt felt between stud and wall.
- C. Install studs in direct contact with all door and window frame jambs, abutting partitions, partition corners and existing construction elements; screw fasten with screw through both flanges of studs and track, top and bottom.
- D. Securely anchor studs to jamb and head anchors of steel door and window frames. Over head of frames and openings in partitions, install a horizontal section of runner with a web flange bent at each end, horizontally and secure to strut studs with two screws in each bent web. Provide cripple studs over wall openings.
- E. Where horizontal studs are used for wall reinforcing or framing, cut pieces of stud and install horizontally between vertical studs. Cope horizontal studs to fit between flanges of vertical studs. Bend ends of horizontal studs or install clip angles in order to secure by screwing to vertical studs.
- F. Furnish and install additional cross bracing and knee bracing and other framing elements, as required to assure a completely rigid assembly on metal stud partitions and furred areas, whether or not such bracing has been indicated on the Drawings, and for proper receipt of items which will be attached to partition surfaces.

3.4 INSTALLATION OF DEFLECTION TRACK

- A. Isolate interior metal stud framing and shaft wall framing from building structure to prevent transfer of loading imposed by structural movement due to deflection.
 - 1. Install deflection track top runner in accordance with manufacturer's instructions and as required to attain lateral support and avoid axial loading.
 - 2. Install fire-rated deflection track top runner in accordance with manufacturer's instructions at top of fire-rated, corridor and smoke partitions.

3.5 INSTALLATION OF REINFORCING PLATE BLOCKING

- A. Install steel reinforcing plates in partitions and furred walls for the support of wall mounted objects as follows:
 - 1. Wherever such reinforcing plates are indicated on the drawings.
 - 2. All wall mounted casework locations.
 - 3. All markerboard and tackboard locations.
 - 4. All wall mounted acoustical room components.
- B. Secure gage sheet metal reinforcing plates to steel studs with 1-1/4", Type "S" bugle head screws.

3.6 INSTALLATION OF CEILING AND SOFFIT FRAMING

- A. Install framing to height indicated, independent of walls, columns, and above ceiling work. Erect after Work above ceiling is complete. Coordinate the location of hangers with other work.
- B. Securely anchor hangers to structural members or embed in structural slab. Space hangers to achieve deflection limits indicated.
- C. Space main carrying channels at maximum 48 inch centers; not more than 4 inches from wall surfaces. Lap splice securely.
- D. Securely fix furring channels or metal studs to hangers to prevent turning or twisting and to transmitted full load to hangers.
 - 1. Place furring channels perpendicular to carrying channels at 16 inches on center, not more 1 inch from perimeter walls and rigidly secure. Lap splice securely.
 - 2. Screw fasten metal studs perpendicular to carrying channels at 16 inches on center, not more 1 inch from perimeter walls. Lap splice securely.
- E. Reinforce openings in suspension system which interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.

3.7 TOLERANCES

- A. Install partition and ceiling framing and furring with a maximum variation from true flatness of 1/8 inch per 10 feet, noncumulative.

END OF SECTION

SECTION 092900
GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of gypsum board (drywall) and trim finishes for partitions, ceilings, and soffits, where shown on the Drawings, as specified herein, and as required for a complete and proper installation.
- B. Patch all existing gypsum board finishes disturbed by cutting work, and new construction.
 - 1. Patch all indentions, defects, cracks and holes in existing gypsum board surfaces which are to remain and which are indicated or required to be painted or receive a wall covering.
- C. Furnish and install:
 - 1. Taped, compounded and sanded gypsum board finishes.
 - 2. All trim and accessory components related to gypsum board work. Acoustical joint sealant and backing at perimeter of gypsum board partitions.
- D. Install access panels occurring in gypsum board work furnished by Section 083100 - ACCESS DOORS AND PANELS, and by trades requiring the same.

1.2 RELATED REQUIREMENTS

- A. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- B. Section 024100 - DEMOLITION: Removal of existing finishes, partitions and walls as indicated in the Drawings.
- C. Section 061000 - ROUGH CARPENTRY:
 - 1. Supplemental wood framing and blocking supporting gypsum board.
 - 2. Installation of metal door frames in gypsum board work.
- D. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Furnishing steel door frames.
- E. Section 083100 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in partitions and walls.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING: Non-load bearing partition and ceiling framing and furring.
- G. Section 095100 - ACOUSTICAL CEILINGS: Suspended acoustical tile ceilings.
- H. Section 098100 - ACOUSTICAL INSULATION: Acoustical batt insulation.
- I. Section 099100 - PAINTING: Applied finish coatings.
- J. Section 104413 - FIRE EXTINGUISHER CABINETS: Fire extinguisher cabinets and brackets occurring in gypsum wall board assemblies.
- K. Division 21 - FIRE SUPPRESSION: Sprinkler heads in ceiling system.
- L. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Supply and return air registers.
- M. Division 26 - ELECTRICAL: Independent hangers for suspended lighting fixtures.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. ASTM C 475 - Joint Treatment Materials for Gypsum Wallboard Construction.
 2. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.
 3. ASTM C 919 - Use of Sealants in Acoustical Applications.
 4. ASTM C 1002 - Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 5. ASTM C 1047 - Accessories for Gypsum wall board and veneer base.
 6. ASTM C 1396 - Gypsum Wallboard.
 7. ASTM E 90 - Method of Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 8. ASTM E 119 - Fire Tests of Building Construction and Materials.
 9. GA 201 - Gypsum Board for Walls and Ceilings.
 10. GA 214 - Recommended Specifications for Levels of Gypsum Board Finish.
 11. GA 216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
 12. GA 220 - Recommended Specifications for Gypsum Board Winter Related Job Problems.
 13. UL - Fire Resistance Directory.
 14. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 15. All applicable federal, state and municipal codes, laws and regulations for fire rated assemblies.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
 2. Work of this Section shall be closely coordinated with the work of Section 092216 - NON-STRUCTURAL METAL FRAMING, to assure the steady progress of the Contract.
- B. Sequencing: Do not install gypsum board until all pipes, ducts, conduits, and other such items which are to be enclosed thereby, have been permanently installed, inspected and approved.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

2. Shop Drawings:
 - a. Details of any special conditions associated with fireproofing.
 - b. Mark-up a set of blackline interior elevations indicate corrections to grid layout and provide dimensioning showing locations of all proposed control joints and expansion joints.
 - 1) Provide interior elevation drawings for interior elevations which are not included as part of the Contract Drawing set.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA-COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board.
- C. Qualifications:
 1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
 2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Storage and Handling Requirements:
 1. Store materials inside, under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.
 - a. Neatly stack board materials flat to prevent sagging.
 2. Handle board materials so to prevent damage to edges, ends and surfaces.
 3. Protect trim, accessories and corner beads from being bent or damaged.

1.8 SITE CONDITIONS

- A. Environmental Conditions: In accordance with GA 216, maintain minimum ambient temperature of 50 degrees Fahrenheit 48 hours before, during taping and compounding, and until completely dry thereafter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:
 1. Gypsum board products:
 - a. United States Gypsum Company, Chicago, IL. (USG).
 - b. National Gypsum Company, Gold Bond Products Division, Charlotte, NC. (Gold Bond).
 - c. G-P Gypsum Corporation, Atlanta, GA.

2. Metal trim and accessories:
 - a. Bailey Metal Products Ltd., Ville Mont-Royal, Quebec, Canada.
 - b. Deidrich Metal Framing, Pittsburgh, PA.
 - c. National Gypsum Company, Gold Bond Products Division, Charlotte, NC. (Gold Bond).
 - d. United States Gypsum Company, Chicago, IL. (USG).
 3. Joint Sealants:
 - a. Tremco, Beachwood, OH.
 - b. United States Gypsum Company, Chicago, IL.
 - c. Pecora Corporation, Harleysville, PA.
- B. The design and details as shown on the Drawings and the model numbers specified herein are to establish the standards of design and quality and not to limit competition.

2.2 DESCRIPTION

- A. Regulatory Requirements:
1. Obtain certificate of compliance from authority having jurisdiction indicating approval of specified products.
 2. Fire resistance ratings: Where gypsum board systems with fire-resistance ratings are indicated, provide materials and assemblies of the rating required, tested per ASTM E 119, which are identical to those indicated by reference to Gypsum Association file numbers in "Fire Resistance Design Manual" or to design designation in the Underwriters Laboratories "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction and to the Owners' insurance underwriters.

2.3 BOARD MATERIALS

- A. Standard gypsum board: Conforming to ASTM C1396, 1/2 inch thick, except where other thickness are indicated on Drawings, of lengths to minimize end joints, with tapered edges.
1. Acceptable products include the following, or approved equal:
 - a. USG Sheetrock brand "Gypsum Panels"
 - b. National Gypsum Company, Gold Bond brand product "Gypsum Board".
 - c. G-P Gypsum Corporation product, "Toughrock".
- B. Fire rated gypsum board: UL fire resistance rated, ASTM C 1396 'Type X' board, 5/8 inch thick, 48 inch width, of lengths to minimize end joints, with tapered edges.
1. Acceptable products include the following, or approved equal:
 - a. USG Sheetrock brand "Firecode Core"
 - b. National Gypsum Company, Gold Bond brand product "Fireshield Gypsum Board".
 - c. G-P Gypsum Corporation product, "Toughrock Fireguard".
- C. Sag-resistant gypsum board ceiling panels: Non-rated 1/2 inch thick, 48 inch width, of lengths to minimize end joints, with tapered edges, conforming to ASTM C1396, ASTM C1395 and ASTM C1396.
1. Acceptable products include the following or approved equal:
 - a. USG Sheetrock brand product "Interior Ceiling Panel, Sag Resistant".
 - b. National Gypsum Company, Gold Bond brand product "High Strength Ceiling Board".
 - c. G-P Gypsum Corporation product, "Toughrock" 1/2 CD Ceiling Board"

- d. Lafarge Corporation, product "Sagcheck"
- 2. At fire-resistant rated ceilings, provide 5/8 inch thick fire-rated gypsum board as specified herein.
- D. Mold and moisture resistant (MR) gypsum board, fire resistant: water-resistant, mold-resistant interior wall panel; conforming to ASTM C630 and C1396 (Section 5), with Type "X" core 5/8 inch thick, 48 inch width, of lengths to minimize end joints, with tapered edges.
 - 1. Treated paper faced acceptable products include the following or approved equal:
 - a. USG Sheetrock brand "Mold Tough Firecode Panels" .
- E. National Gypsum Company, Gold Bond brand product "XP Fireshield Gypsum Board".

2.4 ACCESSORIES

- A. Gypsum board metal trim accessories:
 - 1. Corner beads: 1-1/4 by 1-1/4 inch corner bead for finishing with joint compound fabricated from galvanized steel conforming with ASTM C-1047.
 - a. Acceptable products include the following or approved equal:
 - 1) Bailey Metal Products Ltd., model D100
 - 2) Deidrich Metal Framing, model CBS.
 - 3) Gold Bond product, 1-1/4 inch Wallboard Corner Bead.
 - 4) USG product "Dur-A-Bead - number 103"
 - 2. Casing beads: Edge casing bead with 1/2 inch back leg, for finishing with joint compound fabricated from galvanized steel conforming with ASTM C-1047.
 - a. Acceptable products include the following or approved equal:
 - 1) Bailey Metal Products Ltd., model D-200
 - 2) Deidrich Metal Framing, model M20B.
 - 3) Gold Bond product, Wallboard Casing number 100.
 - 4) USG product "Dur-A-Bead - number 200A"
 - 3. Control joints: Solid zinc "V-shaped control joint, having 3/32 inch thick perforated grounds.
- B. Tapes and compound:
 - 1. Joint tape (at paper-faced gypsum): Nominal 2 inch wide, high strength, cross-fibered paper drywall tape.
 - 2. Joint tape (at fiberglass faced gypsum): Nominal 2 inch wide, self adhering (adhesive backed), fiberglass mesh tape.
 - 3. Joint Compound for setting fiberglass joint tape:
 - a. Cetainteed, Valley Forge PA., product "ProRock Moisture and Mold Resistant 90".
 - b. Georgia Pacific Gypsum LCC., Pittsburgh PA, product "Densarmor Cote"
 - c. CTS Cement Manufacturing Corporation, Cypress CA., product "Rapid Set OnePass".
 - 4. Joint Compound for setting paper joint tape: 'Speed-setting type compound', field mixed.
 - a. Acceptable products, or approved equal:
 - 1) USG product "Durabond 20".
 - 2) Gold bond product "Stay Smooth 30".
 - 3) Georgia Pacific Gypsum LCC, product "ToughRock All-Purpose Dry Mix"

5. Joint Compound for finishing: field mixed joint compound or factory pre-mixed compound.
 - a. Field-mixed compounds: acceptable products, or approved equal:
 - 1) USG product "Durabond 90".
 - 2) Gold bond product "Stay Smooth 90".
 - 3) Georgia Pacific Gypsum LCC, product "ToughRock Setting Compound 90".
 - b. Factory pre-mixed compounds: acceptable products, or approved equal:
 - 1) USG product "Ready-Mixed Joint Compound".
 - 2) Gold bond product "All Purpose Compound".
 - 3) Georgia Pacific Gypsum LCC, product "ToughRock Ready Mix All-Purpose Compound"
- C. Fasteners (interior board systems):
 1. Type S, bugle head screws complying with ASTM C 1002, for applying gypsum board to metal framing, ceiling grid system, and furring channels.
 - a. Not less than 1 inch long for single layer gypsum board.
 - b. Not less than 1-5/8 inch [41mm] long for double-layer gypsum board.
 2. Type W, bugle head screws complying with ASTM C 1002, for applying gypsum board to wood framing and furring.
 - a. Not less than 1-1/4 inch [31mm] long for single layer gypsum board
 - b. Not less than 1-5/8 inch [41mm] long for double-layer gypsum board,
 3. Type S-12, fine thread self-drilling screws complying with ASTM C 1002, for applying gypsum board to light gage metal framing.
 - a. Not less than 1 inch [25 mm] long for 1/2 inch thick single layer gypsum board.
 - b. Not less than 1-1/4 inch [31mm] long for 5/8 inch thick single layer gypsum board.
 - c. Not less than 1-5/8 inch [41mm] long for double-layer gypsum board,
- D. Ceiling buttons, perforated type, 1 inch diameter, for use at multiple layered gypsum board ceiling systems.
- E. Laminating adhesive: Ready mix joint compounds as specified herein above.
- F. Joint Sealers (interior acoustical sealant type): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable. Acceptable products include the following, or approved equal.
 1. Tremco, Beachwood OH.; product, "Acoustical Sealant".
 2. United States Gypsum Company, Chicago IL.; product "USG Acoustical Sealant".
 3. Pecora Corporation, Harleysville PA.; product "AC-20 FTR".

2.5 SOURCE QUALITY CONTROL

- A. Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that all items which are to be enclosed by Work of this Section, have been permanently installed, inspected and approved.

- B. Inspect framing and other substrates; verify that they are in proper condition to receive the work of this Section.
- C. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

- A. During the operation of gypsum board work, protect all wood, metal, glass, flooring, and other finished materials against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.3 INSTALLATION - GENERAL

- A. General: Perform erection procedures for the various gypsum board system conditions, except as otherwise specified, as set forth in GA 201, GA 216, GA 220, the written instructions of gypsum board manufacturer, together with the additional requirements specified herein and as indicated on the Drawings.
- B. Where fire-resistive rated assemblies are indicated, erect gypsum board systems in strict accordance with the manufacturers' UL listed test constructions for the required fire rating on each specific assembly.
- C. Install specified control joints where indicated on Drawings and where run of partitions, or furred surfaces exceeds 30 feet. Show locations of all control joints on shop drawings.
 - 1. Locate control joints at corners of head frames of doors.
 - 2. Run vertical control joints continuously to top of partition or furred area, as applicable.

3.4 INSTALLATION OF GYPSUM BOARD

- A. Screw fasten only, gypsum board to framing and furring, with ends and edges occurring over firm bearing. At all door jambs screw fasten gypsum panels 8 inches on center to both box studs
 - 1. Erect single layer fire-resistance rated gypsum board vertically.
 - 2. Erect standard and moisture resistant layer board in most economical direction.
 - 3. Erect ceiling and soffit gypsum boards to meet UL requirements, where applicable, stagger end joints over supports. Secure gypsum board with fasteners inserted through ceiling buttons; anchor fasteners directly to framing or suspended support system.
- B. Wherever items penetrate the gypsum board surfaces, use extra care in cutting the gypsum board to ensure a uniformly-dimensioned joint between the penetrating item and the gypsum board, and fill joints with specified sealant material. Verify the expected deflection factor of the penetrating members, and cut the gypsum accordingly, to prevent damage thereto from the deflecting members.
- C. Installing Trim Accessories:
 - 1. General: For trim with back flanges intended for fasteners, attach to framing with same screw fasteners used for gypsum board. Otherwise, attach trim according to manufacturer's written instructions.
 - a. Nailing, stapling, or crimping methods to install trim components is prohibited.
 - 2. Install corner beads at all exterior corners of gypsum boards.
 - 3. Install casings (metal trim) wherever gypsum board meets a dissimilar material, and in other locations indicated on the Drawings, except at floors where bottom of the board will be concealed by base, integral with flooring, resilient base, wood base or carpeted base.

3.5 PATCHING EXISTING GYPSUM WALLBOARD

- A. Patch existing gypsum wallboard surfaces disturbed by new construction.
- B. All patching material shall be flush with, and match, existing surfaces to be patched.
- C. Install metal framing necessary for the support of new wallboard.
- D. Finish new wallboard as specified. Finish shall match surrounding surfaces for texture.

3.6 APPLICATION OF ACOUSTICAL SEALANT

- A. General: Install sealant and backing in accordance with the recommendations of ASTM C-919 and sealant manufacturer's recommendations.
 - 1. Perform preparation in accordance with C-790. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
 - 2. If so recommended and furnished by the specific sealant manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.
- B. Seal all partition perimeters prior to taping or compounding. Where perimeters are edged with metal trim, apply sealant and backing material between trim and dissimilar material.
- C. Seal all penetrations in partition types designated for "acoustical" insulation. Penetrations to receive sealant include electrical boxes, plumbing, heating and air conditioning ducts, telephone, intercom hookups and similar items.
 - 1. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.
 - a. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
 - b. Do not stretch back-up material into joints.
 - c. Install bond breaker wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.
 - 2. Apply sealant in continuous beads without open joints, voids or air pockets
 - a. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
 - 3. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.

3.7 APPLICATION OF JOINT TREATMENT

- A. Install joint tape at all joints where gypsum boards abut and where boards form internal corners, whether or not such joints will be concealed from view.
- B. Apply compound to all joints, edges, corners, fastener head depressions and abrasions in the surfaces, whether or not such conditions will be concealed from view. Sand completely smooth all compound surfaces, which will be exposed to view, and leave ready to receive applied coatings or finish.
- C. Provide the minimum levels of gypsum board finishes as defined by the Gypsum Association recommended specifications GA-214 and GA-216, per the following:
 - 1. At areas hidden from view, except as otherwise specified: Level 1.
 - 2. At areas hidden from view, requiring a fire resistance rating: Level 1.

3. At areas hidden from view, requiring smoke-resistance: Level 1.
4. At areas hidden from view, corridor side of all corridor partitions: Level 1.
5. At concealed plenum spaces above ceilings attic spaces: Level 1.
6. At non-occupied spaces (i.e. attics): Level 1.
7. At surfaces scheduled to receive tile: Level 2.
8. At surfaces scheduled to receive painted finishes: Level 4.

3.8 TOLERANCES

- A. Maximum variation for gypsum board partitions and ceilings from true flatness: 1/8 inch per 10 feet, noncumulative.

3.9 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris, scraps, and deposits of compound and gypsum fill.
- B. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of gypsum fill, and other materials installed under this Section.

END OF SECTION

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SECTION 093000

TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Interior wall floor tile.
 - 2. Interior wall tile.
 - 3. Tile base and trim.
 - 4. Cementitious tile backer board.
 - 5. Installation systems, adhesives, mortars and grouts.
 - 6. Control joints in tiled floors.
- B. Install the following furnished under the designated Sections:
 - 1. Install access panels into tiled walls as specified under Section 083100 - ACCESS DOORS AND PANELS.
- C. Perform drilling and cutting in tile surfaces, as required to accommodate penetrating items of other trades, from templates and instructions furnished by the respective trades.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 024100 - DEMOLITION: Removal of existing tile.
- D. Section 079200 - JOINT SEALANTS: Backer rod and sealant at control joints.
- E. Section 083100 - ACCESS DOORS AND PANELS, and by trades requiring the same: access panels, occurring in partitions and walls.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal stud framing to receive cementitious backer board installed under this Section.
- G. Section 092900 - GYPSUM BOARD: Gypsum board construction substrate for tile.
- H. Section 102813 - TOILET ACCESSORIES: Furnishing toilet accessories and installation templates.
- I. Division 22 - PLUMBING: Floor drains.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ANSI A108.1A - Installation of Ceramic Tile in the Wet Set Method, with Portland Cement Mortar.
 - 2. ANSI A108.1B - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - 3. ANSI A108.4 - Installation of Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.

4. ANSI A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
 5. ANSI A108.6 - Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy.
 6. ANSI A108.9 - Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
 7. ANSI A108.10 - Installation of Grout in Tilework.
 8. ANSI A108.11 - Interior Installation of Cementitious Backer Units.
 9. ANSI A118.1 - Dry-Set Portland Cement Mortar.
 10. ANSI A118.3 - Chemical-Resistant, Water-Cleanable, Tile Setting and Grouting Epoxy and Water-Cleanable Tile Setting Epoxy Adhesive.
 11. ANSI A118.4 - Latex-Portland Cement Mortar.
 12. ANSI A118.6 - Ceramic Tile Grouts.
 13. ANSI A118.7 – Polymer Modified Cement Grouts
 14. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
 15. ANSI A118.9 - Cementitious Backer Units.
 16. ANSI A118.10 - Waterproofing.
 17. ANSI A137.1 - Specifications for Ceramic Tile.
 18. ANSI A10.20 - Safety Requirements for Ceramic Tile, Terrazzo and Marble Work.
 19. ASTM C 144 - Aggregate for Masonry Mortar.
 20. ASTM C 150 - Portland Cement.
 21. ASTM A 185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 22. ASTM C 627 - Evaluating Ceramic Floor Tile Installation Systems.
 23. ASTM C 920 - Specifications for Elastomeric Joint Sealant.
 24. ASTM C 1026 - Measuring Resistance of Ceramic Tile to Freeze Thaw Cycles
 25. ASTM C 1027 - Determining Visible Abrasion Resistance of Glazed Ceramic Tile
 26. ASTM D 226 - Asphalt Saturate Felt used in Roofing and Waterproofing.
 27. ASTM D 2103 – Polyethylene Film
 28. ASTM E 119 – Fire Test of Building Construction and Materials.
- B. Inclusionary References: The following reference materials are hereby made a part of this Section by reference thereto:
1. TCNA (formerly TCA) - Handbook for Ceramic Tile Installation, latest edition.
- C. Definitions: For purposes of this specification, the following terms are defined:
1. Wet Areas: Rooms/spaces which has plumbing fixtures, sinks, toilets, or floor drains. Wet areas additionally include rooms/spaces which are exposed to weather.
 2. Dry Areas: Rooms/spaces which have no plumbing, sinks, toilets, or floor drains.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 - 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.
 - a. Include maintenance data and recommended cleaning materials, and cleaning and stain removal methods.
 - 2. Shop Drawings: 1/4 inch scale elevations and plans of tile patterns.
 - 3. Selection Samples:
 - a. Manufacturer's sample boards for each type and color group of tile specified, and grout colors, for selections by the Architect.
 - 4. Verification Samples:
 - a. Mount tile and apply grout on one 24 by 24 inch cement backerboard board, for each tile type and selected color, to indicate color and texture variations, tile flatness and joint size variations.
 - b. Trim shapes and base, in selected colors in types and shapes indicated for project conditions.
 - 5. Source Quality Control Submittals:
 - a. Grade Certificates: Manufacturer's Master Grade Certificates submitted prior to shipment of tile to project.
- B. Maintenance Material Submittals: Submit the following and clearly label and package extra materials securely to prevent damage.
 - 1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra materials in, an amount equal to 3 percent of tile and trim of each color, finish and type installed.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
 - 1. Conform to ANSI/TCNA A 137.1 and TCNA Handbook for Ceramic Tile Installation.
- B. Sole Source: Obtain installation products required for the Work of this Section from a single manufacturer.
- C. Qualifications:
 - 1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
 - 2. Deliver tile in manufacturer's sealed cartons, grade-sealed by the manufacturer in accordance with ANSI A 137.1, with grade-sealed unbroken, and clearly marked as to contents, color, and quantity.
 - 3. Deliver and store tile setting materials in original, sealed, containers showing manufacturer's identification, year of production, new weight, date of packaging, and location of packaging.
- B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Store and protect containers above floor level, keep dry until ready for use.
3. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions. Store epoxy mortar and epoxy grouts at 70 degrees Fahrenheit (21° C) temperature for 24 hours prior to use.

1.8 SITE CONDITIONS

- A. Environmental conditions:
1. General: Maintain ambient temperatures between 50 (10° C) and 80 (26° C) degrees Fahrenheit in tiled areas, for 24 hours prior to installation, during installation and for 7 days after completion.
 2. Special environmental conditions for epoxy setting and grout materials: Maintain ambient temperatures between 65 degrees Fahrenheit (18° C) and 80 degrees Fahrenheit (27° C) in tiled areas, for 24 hours prior to installation, during installation and for 7 days after completion.
 3. When temperature of substrate exceeds 90 (32° C) degrees Fahrenheit, contact manufacturer for instructions.
- B. Do not install setting or grouting materials in a closed, unventilated environment. Ventilate propane or fossil fuel heaters to prevent damage to tile work from carbon-dioxide build up.

1.9 WARRANTY

- A. Manufacturer Warranty: The manufacturer of installation systems, adhesives, grouts and mortars shall provide a comprehensive non pro-rated written five (5) year warrantee against defective products which covers replacement materials and labor costs for demolition, tile accessories, and installation systems.
1. Warranty to provide for tile lifting or separation from substrate, and setting bed/grout deterioration, when products have been installed with referenced TCNA setting systems using specified setting and grout materials.
 2. Warranty excludes structural failure, movement or cracking of substrate materials, and workmanship performed not in accordance with manufacturer's instructions and industry standard guidelines.
- B. Special Warranty: Provide 2 year, non pro-rated warranty which shall include provisions for cracking, breakage or failure of tile due to defective workmanship
1. Materials must be compatible and from one source, single source responsibility for waterproofing, installation, mortars and grouts. Job-site mixtures of sand portland cement and site dilution of additives shall not be permitted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Specified Manufacturer: Based on facility standards, Drawings and specifications have been based on the products and materials specified in the following Articles.
1. Tile: Manufacturers and products as scheduled on **Drawing 31-ID-104**.
 2. Cementitious tile backer board ("Cement board"); equal to:
 - a. Custom Building Products, Inc., Seal Beach, CA.
 - b. Unifix, Inc., division of National Gypsum Company, Charlotte, NC.
 - c. United States Gypsum Company, Chicago, IL.

2.2 TILE

- A. Tile: As scheduled on Materials and Finishes Index, **Drawing 31-ID-104**.
- B. Base trim and special shapes: Provide all bases, caps, stops, returns, trimmers, and other shapes indicated on **Drawing 31-ID-104** or required to produce a completely finished installation.
 - 1. Except as may be otherwise indicated, provide color and finish matching adjacent field tile.

2.3 SETTING MATERIALS

- A. Thin-set polymer-modified Portland cement dry-set mortar, complying with the bond strength requirements of ANSI A118.4.
 - 1. Acceptable products as follows, or approved equal:
 - a. Mapei product: "Kerabond" with "Keralastic" additive.
 - b. Laticrete product number 254 Platinum, with antimicrobial additive.
 - c. Custom Building Products "Porcelain Tile Mortar"

2.4 GROUTING MATERIALS

- A. Epoxy grout: Multi-component epoxy grout, non-pigmented, with colored highlight filler, stain resistant, and water cleanable, conforming to ANSI 118.3
 - 1. Acceptable products as follows, or approved equal:
 - a. Laticrete product "SpectraLOCK PRO" grout.
 - b. Custom Building Products "CEG-Lite".
 - c. Approved equal.

2.5 ACCESSORIES

- A. Base Cove, (AB-1): Schlüter Systems L.P., product series "Schluter / Dilex-AHK", 4 inches in height, fabricated from extruded aluminum with integrated joint spacer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 - 1. Verify that all concrete substrates are at least 28 calendar days old, completely cured and free of negative hydrostatic conditions or moisture problems.
- B. Beginning of installation means acceptance of substrate and site conditions.

3.2 PREPARATION

- A. During the operation of work of this Section, protect existing finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.
- B. Ensure that all anchors, plugs, electrical and mechanical work to be in or underneath tile have been installed.
- C. Vacuum clean substrate surfaces.
- D. Seal concrete substrate cracks with filler; level concrete substrate to acceptable flatness tolerances.
 - 1. The use of PVA bonding agents or gypsum based leveling materials is prohibited.

- E. Apply conditioner or primer to surfaces as recommended by adhesive manufacturer.

3.3 INSTALLATION - GENERAL REQUIREMENTS

- A. Installation Standards: The American National Standard Specifications for the Installation of Ceramic Tile, 1992 edition (ANSI A108), is hereby made a part of this specification. All work of this Section shall be installed in accordance with the requirements contained in referenced ANSI A108 standards, and as additionally specified below, and in accordance with the manufacturer's specifications of those products used.
- B. Installation Methods: Schedule of substrate conditions, generic type of tile used, with appropriate setting and grouting methods are listed at end of this Section.
 - 1. Use trowel shapes and sizes as recommended by setting materials manufacturer.
 - 2. Clean porcelain tiles (backs) and remove manufacturer's residue.
 - 3. Back-butter tiles as required to provide coverage indicated, except for tiles exceeding 144 square inches which require a complete back application of mortar (100% coverage).
- C. Tile Patterns and types: Tile patterns are shown on the Drawings, if more information is required, obtain the necessary information from the Architect. Do not interrupt tile pattern around openings.
- D. Tile Layout and installation
 - 1. Layout tile on room axis, leaving equal sized border units of not less than one-half tile width.
 - 2. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align base and wall joints.
 - 3. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, full without voids, cracks, excess mortar, or excess grout.
 - 4. Do not align joints of base units and lowest course of tile, offset joints by one-half of unit width.

3.4 INSTALLATION OF CEMENT BOARD

- A. Wall framing substrate: Do not install cement board directly over protrusions from stud plane such as heavy brackets or fastener heads.
- B. Make necessary cut-outs. Install cement board horizontally leaving 1/8 to 3/16 space at all joints, including joints with dissimilar materials. Stagger board joints with those of adjacent rows.
- C. Fasten cement board with 1-1/4 inch length type S bugle head screw. Fasten boards every 8 inches on center in field and along edges. At edge conditions, locate fasteners between 1/2 inch to 2 inches from board edge.
- D. At all joints and corners, fill gap solidly with dry-set or latex-modified, portland cement mortar and imbed 2 inch mesh fiberglass table and smooth material over joint and corner.

3.5 FLOORING INSTALLATION – TCNA NUMBER F115 MODIFIED WITH EPOXY GROUT

- A. Description: Thin-set tile installation.
- B. General: Install in accordance with ANSI A108.5, and TCNA installation method number F115, and as additionally specified herein below. Apply materials in strict accordance with the written instructions and recommendations of setting materials manufacturer.
 - 1. Setting materials: Latex modified portland cement (ANSI A118.4).
 - 2. Grout materials: epoxy grout (ANSI A118.3).

- C. Install latex/portland cement mortar bed over cured anti-fracture membrane to a nominal thickness of 3/32 inch.
- D. Install tile ensuring mortar coverage of at least 90 percent on back of tile.
- E. Grouting:
 - 1. Allow tile to fully set prior to grouting; do not grout in less than 24 hours after installation of tile.
 - 2. Grout tile joints in accordance with ANSI A108.10 and as additionally specified.

3.6 FLOORING INSTALLATION – TCNA NUMBER F122 MODIFIED WITH EPOXY GROUT

- A. Description: Thin-set tile installation with reinforced waterproofing membrane.
- B. General: Install in accordance with ANSI A108.5, and TCNA installation method number F122, and as additionally specified herein below. Apply materials in strict accordance with the written instructions and recommendations of setting materials manufacturer.
 - 1. Setting materials:
 - a. Membrane: Anti-fracture membrane (DIN18156, part 2).
 - b. Bonding coat: Latex modified portland cement (ANSI A118.4).
 - 2. Grout materials: epoxy grout (ANSI A118.3).
- C. Install liquid applied waterproofing membrane with reinforcing over entire tile substrate area in strict compliance with manufacturer's written instructions.
- D. Install latex/portland cement mortar bed over cured anti-fracture membrane to a nominal thickness of 3/32 inch.
- E. Grouting:
 - 1. Allow tile to fully set prior to grouting; do not grout in less than 48 hours after installation of tile.
 - 2. Grout tile joints in accordance with ANSI A108.10 and as additionally specified.

3.7 WALL TILE INSTALLATION - TCNA NUMBER W244C

- A. General: Install in accordance with ANSI A108.5, TCNA installation method number W244C, and as additionally specified herein below. Apply materials in strict accordance with the written instructions and recommendations of setting materials manufacturer.
 - 1. Waterproofing Membrane: Fluid applied waterproofing (ANSI A118.10).
 - 2. Setting materials: Medium bed latex modified Portland cement (ANSI A118.4).
 - 3. Grout materials: epoxy grout (ANSI A118.3).
- B. Install waterproofing membrane over cement board substrate.
- C. Install latex modified Portland cement mortar bed to a thickness recommended by manufacturer.
- D. Grouting:
 - 1. Allow tile to fully set prior to grouting; do not grout in less than 24 hours after installation of tile.
 - 2. Grout tile joints in accordance with ANSI A108.10 and as additionally specified.

3.8 INSTALLATION - GROUT

- A. Remove spacers, ropes, glue, and similar foreign matter prior to grouting.
- B. Force the maximum amount of the approved grout into joints in accordance with pertinent recommendations contained in ANSI A108.10.

- C. Fill in joints of cushion-edge tile to depth of the cushion; fill joints of square-edge tile flush with the surface.
- D. Fill all gaps and skips. Do not permit mortar or mounting mesh to show through grouted joints.
- E. Provide hard finished grout which is uniform in color, smooth and without voids, pin holes, or low spots.
- F. Remove all excess grout immediately after installation thereof, wash and rinse tile free from grout film, and tool grout to a uniform density throughout.

3.9 REPAIR

- A. Replace cracked chipped, broken, and otherwise defective tiles.
- B. Remove work not complying with requirements of the Contract Documents or the referenced standards, and promptly replace with work which does comply.

3.10 CLEANING

- A. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of mortar, grout, and other materials installed under this Section, and wash completed tilework.
 - 1. Do not use acid or acid cleaners to clean tile.
 - 2. When tile is thoroughly clean and dry, polish glazed tile with clean dry cloths.

3.11 CURING

- A. Cover with clean non-staining 40 pound kraft paper. Do not use polyethylene sheets directly over tile on horizontal surfaces.

3.12 PROTECTION

- A. Do not permit traffic over finished floor surface until grout and tile materials are fully set, and not less than 72 hours. Protect floor surfaces with heavy red-rosin paper or kraft paper.

END OF SECTION

SECTION 095100
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install the following:
 - 1. Suspended acoustical tile ceiling including suspension system and associated edge moldings.
- B. Patching acoustical tile ceilings to match existing ceilings where disturbed by demolition and Work of this Contract. This Section includes both concealed and exposed spline ceilings, suspension systems and associated edge moldings.
 - 1. In rooms where existing partitions have been removed, instead of patching, the Contractor shall replace the entire ceiling and suspension system in the room with new.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 024100 - DEMOLITION: Demolition of work abutting existing ceilings and demolition of existing ceilings for new construction.
- C. Section 083100 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in GWB walls and ceilings.
- D. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal ceiling and soffit framing for gypsum board, including hanger attachments, wire hangers, and screwable metal tee grid system.
- E. Section 092900 - GYPSUM BOARD: Suspended drywall construction ceilings and soffits.
- F. Section 079200 - JOINT SEALANTS: Sealant at gaps between new acoustical ceiling edge angles and all irregular walls.
- G. Division 21 - FIRE PROTECTION: Sprinkler heads in ceiling system.
- H. Division 23 - MECHANICAL: Air diffusion devices in ceiling.
- I. Division 26 - ELECTRICAL:
 - 1. Fire alarm and smoke detection equipment mounted in ceiling system.
 - 2. Light fixtures and independent hangers for suspended fixtures.

1.3 REFERENCE STANDARDS

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 - REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM A641 - Zinc- Coated (Galvanized) Carbon Steel Wire
 - 2. ASTM C523 - Light reflectance of Acoustical Material by the Integrating Sphere Reflectometer.
 - 3. ASTM E84 - Surface Burning Characteristics of Building Material "UL Classified"
 - 4. ASTM E119 - Fire Tests of Building Construction and Materials "UL Classified".
 - 5. ASTM E413 - Classification for Rating Sound Insulation.
 - 6. ASTM E1264 - Classification of Acoustical Ceiling Products.
 - 7. ASTM E1414 - Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum. "UL Classified".
 - 8. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

9. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
 10. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
 11. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
 12. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.
 13. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
 14. UL (FRD) - Fire Resistance Directory; Current Edition.
- B. General References The following reference materials are hereby made a part of this Section by reference thereto:
1. CISCA (Ceilings and Interior Systems Contractors Association) - Acoustical Ceilings: Use and Practice.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Sequencing:
1. Field Measurements:
 - a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
 - b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
 2. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, to allow work which will be concealed by the ceilings to be completed prior to commencing installing the ceilings in such locations.
- C. Scheduling:
1. Install acoustical units after interior wet work is dry.
 2. Schedule work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead work is completed, tested and approved.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
 2. Verification Samples:
 - a. 12 by 12 inch samples of acoustical units, illustrating material and finish.
 - b. 12 by 12 inch samples of existing acoustical units for comparison with supplied materials.
 - c. 12 inch long samples of suspension system components including main runners, cross runner and edge trim.
 - d. 12 inch long samples of existing exposed spline suspension system components including runners and edge trim for comparison with supplied materials.
- B. Closeout Submittals:
1. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and guarantees as specified elsewhere herein this Section.
- C. Maintenance Material Submittals: Clearly label and package extra materials securely to prevent damage.

1. Provide to the Owner, extra ceiling panels: 5 percent of each type installed.
2. Provide to the Owner, extra suspension components: 5 percent of each type installed.
3. Provide to the Owner, all extra salvaged ceiling panel and suspension components which have not been utilized in the Work.

1.6 QUALITY ASSURANCE

- A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
- B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of acoustical ceiling panels.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
 2. Do not deliver acoustical ceiling panels to the project until all concrete, masonry, plaster and other wet work has been completed and dry.
 3. Deliver acoustical ceiling panels in original, unopened packages and store protected in a fully enclosed space.
- B. Storage and Handling Requirements:
 1. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
- C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.8 SITE CONDITIONS

- A. Maintain uniform temperature of minimum of 60 degrees Fahrenheit and humidity of 20 to 40 percent prior to, during, and after installation.

1.9 WARRANTY

- A. Manufacturer Warranty:
 1. In addition to the requirements of Section 010000 - GENERAL REQUIREMENTS, the Contractor shall obtain in the Owner's name the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on products specified in the following Articles.
 1. Acoustic Tiles/Panels and Suspension Systems:
 - a. USG Corporation: www.usg.com.
- B. Acceptable Alternate Manufacturers may be any national recognized major brand only when it has been demonstrated that all of the design and performance characteristics set forth below have been met.

2.2 DESCRIPTION

- A. General Description: Manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance as indicated.

2.3 ACOUSTICAL UNITS

- A. Acoustical Panels, Type ACT-1: Mineral fiber with water-repellent membrane-faced overlay, with the following characteristics:
1. Basis of Design Products: USG Corporation, Mars Healthcare Acoustical Panels,
 - a. Model #88683, Provide at typical locations.
 - b. Model #88189CR, Provide at Isolation Rooms G-71, G-78, 103, 109, 111 and 129 and each room's associate toilet and ante spaces.
 2. Classification: ASTM E1264: Type IV
 - a. Form: 1 and 2,
 - b. Pattern:
 - 1) 88683: Pattern E.
 - 2) 88189CR: Pattern G.
 3. Size: 24 by 48 inches (610 by 1220 mm) scored to simulate (2) 24 by 24 inch panels.
 3. Thickness:
 - a. 88683: 3/4 inch.
 - b. 88189CR: 5/8 inch.
 5. Panel Edge:
 - a. 88683: Shadow Line Tapered.
 - b. 88189CR: Square Edge.
 6. Fire Rating per ASTM E84:
 - a. Class A.
 - b. Flame spread: 25 or less.
 - c. Smoke developed: 50 or less.
 7. Weight:
 - a. 88683: 1.03-1.24 lb./sq. ft.
 - b. 88189CR: 1.11 lb./sq. ft.
 8. ASTM D2486 scrubbability test, (standard test): Passes.
 9. ATM D4828 washability test, (modified test): Passes.
 10. Water Repellency, (Cobb method (Tappi T441 om-84) Water Drop Test): Passes.
 11. 88189CR: Clean Room tested to ISO 5 (Class 100).
 12. NRC:
 - a. 88683: 0.75.
 - b. 88189CR: N/A
 13. CAC Minimum: 35.
 14. Light Reflectance: 0.80.
 15. Color: White.
 16. VOC Emissions: Low.
 17. Recycled Content minimum: 50%.

2.4 SUSPENSION SYSTEM - GENERAL

- A. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.
- B. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C 635.
- C. Suspension systems shall conform to ASTM C 635, heavy duty.

1. Wide-faced, capped, double-web steel suspension system compatible with acoustical ceiling panels. Main and cross runners rolled formed from cold-rolled steel sheet, prefinished, electrolytically zinc coated, or hot dip galvanized, according to ASTM A 653, not less than G30 coating designation, with prefinished 15/16-inch wide metal caps on flanges.
 - a. Face Design: Flat, Flush.
 - b. Cap Material: Steel or aluminum cold-rolled sheet.
 - c. Cap Finish: Painted white.
 2. Clean-Room Gasket System: Wide-Faced, capped, double-web aluminum suspension system compatible with acoustical ceiling panels. Manufacturer's standard system including antimicrobial gasket and related adhesives, tapes, seals and retention clips, designed to seal out foreign material. 15/16-inch wide co-extruded aluminum with aluminum capped face prefinished with baked polyester paint.
 - a. Face Design: Flat, Flush.
 - b. Cap Material: Aluminum cold-rolled sheet.
 - c. Cap Finish: Painted White
 - d. Provide at Isolation Rooms G-71, G-78, 103, 109, 111, and 129 and each room's associate toilet and ante spaces.
 - D. Provide manufacturer's standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.
- 2.5 ACCESSORIES
- A. Drywall Grid: Armstrong, product as selected by Architect or as shown on the Drawings.
 - B. Edge moldings: Standard edge trim: Grid system manufacturer's standard L-shape edge trim compatible with exposed grid system and color matched.
 - C. Retention clips:
 1. Armstrong product number "0414," or approved equal.
 - D. Sealant as specified in Section 079200 - JOINT SEALANTS:
 1. Joint Sealer Type AP, (Acrylic painters caulk).
 2. Joint Sealer Type SP, (Silicone, Paintable all purpose).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 1. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

- A. Protection of In-situ Conditions: During the operation of work of this Section, protect existing finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.
- B. Surface Preparation:
 1. Carefully examine all receiving surfaces, to which attachments will be made hereunder, and determine the most practical way of making such attachments. Request Architect's approval of any attachment method which differs from that indicated on the approved shop drawings before proceeding with installation.
 2. Permit acoustical ceiling tile to reach room temperature and a stabilized moisture content prior to installation.

- C. Existing Acoustical Ceilings to be Salvaged or Patched:
 - 1. Where existing ceilings are disturbed by the work of this Contract and are not scheduled to be replaced with new ceilings; remove ceilings including suspension system, as required. Remove only that portion of the acoustical materials and suspension system as is necessary for the required work. Coordinate with all trades to determine the extent of area to be removed.
 - 2. Store materials in a neat manner and protect from damage and after all related work has been completed, reinstall the existing ceiling materials.
 - 3. Where acoustical panels, acoustical tiles and suspension system have been removed because of new construction and cannot be reinstalled, install new material to match existing. All materials to be used for patching and matching shall be approved by the Architect in advance of work.

3.3 INSTALLATION

- A. Locate system on room axis, leaving equal sized border units of not less than one-half tile width.
- B. Install all components of the suspended grid systems in accordance with the manufacturer's instructions, the approved shop drawings, conforming to ASTM C-636 requirements. Ensure a deflection not to exceed 1/360 span of 48-inch simple span.
- C. Install specified edge moldings wherever ceilings intersect a wall or partition surface, and around all items having any dimension of 4 inches or more which penetrate the ceilings, including circular penetrations. Set moldings absolutely level, using as long lengths as practicable, and secure with fasteners recommended by manufacturer for the type of substrate.
 - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant (type AA specified under Section 079200 - JOINT SEALANTS), concealed on back of vertical leg before installing moldings.
 - 2. Screw-attach moldings to substrate at intervals not over 16 inches on center. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.
- D. Install hanger attachments to overhead construction in accordance with the approved shop drawings, spacing the attachments not more than 48 inches on centers over location of each main tee member.
 - 1. Aluminum Suspension Systems: Provide hangers spaced not more than 30 inches on center in each direction and not more than 8 inches from ends
 - 2. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.
 - 3. Install hanger wire to attachments with triple twists.
- E. Install main tees parallel to the long dimension of each area, spacing the tees 48 inches on centers. Secure the bottom of hanger wires through slots in the main tee members and tie with triple twists. Level the main tees as the work progresses.
- F. Uniformly space the cross tees at 24 inches on centers, and secure the cross tees into the main tees as recommended by the system manufacturer.
- G. Fit acoustical ceiling tile units in place, free from damaged edges or other defects detrimental to appearance and function. Install acoustical ceiling tile level, in uniform plane, and free from twist, warp or dents.
 - 1. Field cut tegular type tile with a tegular reveal at all edge conditions.
 - 2. Where required by governmental agencies having jurisdiction, install retention clips, provide two clips per ceiling panel installed on opposite sides of panel.

3.4 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.5 CLEANING

- A. Properly clean surfaces of panels and open grids free from dirt and handling marks. Wherever surfaces cannot be cleaned by normal methods or have defects, remove and replace with new components.

END OF SECTION

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SECTION 096513
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare substrate to receive resilient base.
- B. Furnish and install the following:
 - 1. Coved resilient base at resilient flooring.
 - 2. Straight resilient base with carpet tile.
 - 3. Resilient 'Millwork' base.

1.2 RELATED REQUIREMENTS

- A. Section 024119 - SELECTIVE DEMOLITION: Removal of existing finishes.
- B. Section 033000 - CAST-IN-PLACE CONCRETE: Concrete substrate for resilient base.
- C. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection.
- D. Section 092900 - GYPSUM BOARD: Gypsum board substrate to receive resilient base.
- E. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring and integral base.
- F. Section 096519 - RESILIENT TILE FLOORING: Vinyl composition tile (VCT) flooring.
- G. Section 096813 - TILE CARPETING: Tile carpeting and transition strips.
- H. Section 096723 - RESINOUS FLOORING: Multi-layered resinous waterproof flooring.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 2. ASTM F 1861 - Standard Specification for Resilient Wall Base
 - 3. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Sequencing:
 - 1. Sequence work to ensure resilient flooring is not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, wet work is dry and cured, and work overhead is completed.
 - 2. Ensure that installation of flooring and accessories occurs after other finishing operations, including painting.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 - 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions.
 - a. Include certification of data indicating Volatile Organic Compound (VOC) content of all adhesives. Submit MSDS highlighting VOC limits.
 - 2. Selection Samples: Manufacturers' sample chain of colors available for selection by the Owner's Project Manager and the Architect.
 - 3. Verification Samples: Each type resilient base and color selected, 24 inches long.
- B. Maintenance Material Submittals: Submit the following under provisions of Section 019999 – PROJECT CLOSEOUT. Clearly label and package extra materials securely to prevent damage.
 - 1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra materials for future repairs and maintenance, an amount equal 24 linear feet for each color and type of resilient base installed.

1.6 QUALITY ASSURANCE

- A. General: Avoid color and pattern differential; provide base from one production run in any single room or contiguous areas.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
 - 2. Deliver resilient base materials in original, unopened packages and store protected for three days prior to installation in area of installation to achieve temperature stability.
- B. Storage and Handling Requirements:
 - 1. Store materials in a clean dry, enclosed space off the ground and protected from the weather. Protect adhesives from freezing.

1.8 SITE CONDITIONS

- A. Maintain uniform temperature of minimum of 65 degrees Fahrenheit and humidity of 20 to 40 percent 48 hours prior to, during, and 48 hours after installation. Store resilient flooring materials and accessories in the spaces where they will be installed for at least 48 hours before beginning installation. Thereafter, maintain a minimum temperature of 55 degrees Fahrenheit in the areas where the work is completed.

1.9 WARRANTY

- A. General: Submit warranties under provisions of Section 019999 – PROJECT CLOSEOUT.
- B. Manufacturer Warranty:
 - 1. Resilient Base: Provide manufacturer's standard one year limited product warranty for resilient base materials.
 - 2. Adhesives: Provide manufacturer's one year limited product warranty for adhesion reliability.
- C. General Warranty: Manufacturer's warranty specified in this section shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. Regulatory Requirements: Provide materials and assemblies conforming to applicable building codes and regulatory agencies for flame/fuel/smoke rating requirements of base trim in accordance with ASTM E 84.

2.2 PRODUCTS

- A. Resilient Base: Refer to Drawing 31-ID-104.
- B. Base accessories: Pre-molded end stops of same material, size and color as base. Job-form all external and internal corners from base material, pre-molded corner pieces will not be acceptable.
 - 1. All wall base shall be coil product. Products that come in straight lengths are not acceptable.

2.3 ACCESSORIES

- A. Adhesives:
 - 1. General: Water resistant, low VOC, acceptable to the resilient flooring manufacturer, for substrate conditions.
 - a. Cove Base Adhesives: Maximum VOC 50 [g/L less water]
 - 2. Acceptable manufacturers:
 - a. Advanced Adhesive Technology, Inc, Dalton GA, product: "No. 432 Modified Acrylic Cove Base Adhesive".
 - b. DAP Incorporated, Dayton OH, product: "Cove Base Construction Adhesive".
 - c. W.W. Henry Company, Aliquippa PA., product: "Henry 440 Cove Base Adhesive".
 - d. Roberts Consolidated Industries, Inc., City of Industry, CA, product: "Premium Solvent-Free Cove Base Adhesive".
- B. Joint Sealer for between the top of wall base and irregular wall surfaces: Plastic filler as recommended by manufacturer.
- C. Cleaning material: Domestic neutral floor detergent having a pH 7 or pH 8, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 INSTALLATION

- A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Installation of Resilient base: Install base on solid backing, bond to vertical substrate with continuous contact at horizontal and vertical surfaces. Apply wall base to walls, columns, casework and other permanent fixtures in areas where base is required.

1. Install in lengths as long as practical.
2. Scribe to fit to door frames and other interruptions.
3. Form all external and internal corners in accordance with manufacturer's written instructions. Cope inside corners and fit neatly.
4. Fill voids with plastic filler along the top edge of the resilient wall base on masonry surfaces or other similar irregular substrates.

3.3 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris, and scraps.
- B. Post-installation Cleaning: As installation progresses, continually remove excess adhesive from floor, base and wall surfaces without damage.

END OF SECTION

SECTION 096516
RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Sheet vinyl flooring, seam welded with integral base.
 - 2. Vinyl transition strips wherever edges of vinyl composition flooring materials abut dissimilar flooring, where no thresholds occur.

1.2 RELATED SECTIONS

- A. Section 024100 - DEMOLITION: Removal of existing finishes.
- B. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection.
- C. Section 096519 - RESILIENT TILE FLOORING: Vinyl composition tile (VCT) flooring.
- D. Section 096813 - TILE CARPETING: Carpet tile and transition strips.
- E. Section 096723 - RESINOUS FLOORING: Multi-layered resinous waterproof flooring.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS.
 - 1. ASTM F-710 - Preparing Concrete Floors to Receive Resilient Flooring.
 - 2. ASTM F-1869 – Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 3. NFPA 253 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
 - 4. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 SUBMITTALS

- A. Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.
 - a. Furnish manufacturer's product literature on flooring adhesive, highlight adhesive properties, including VOC's and maximum moisture pressure limits for substrates.
 - 2. Submit the manufacturer's certification that the resilient flooring has been tested by an independent laboratory and complies with the required fire tests.
 - 3. Shop drawings: 1/4 inch scale plans of each flooring area scheduled for Work of this Section; indicate layout of patterns, identify selected colors and patterns, show location of welded seams and joints with abutting materials. Drawings shall bear dimensions of actual measurements taken at the project.
 - 4. Samples for selection:
 - a. Manufacturers' sample chain of colors and patterns available for selection by the Project Engineer/VA-COR and the Architect.

5. Verification Samples:

- a. Sheet flooring: 12 by 12 inch illustrating color, and pattern for each color and type of flooring selected.
- b. Edging and transition strips: 12 inches long demonstrating profile, thickness, size and color.

1.5 QUALITY ASSURANCE

- A. Provide each type of resilient sheet flooring and accessories of one manufacturer, including leveling and patching compounds, and adhesives, or as recommended by primary manufacturer of flooring.
- B. Avoid color and pattern differential; provide flooring from one production run in any single room or contiguous areas.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver resilient flooring and base materials in original, unopened packages and store protected for three days prior to installation in area of installation to achieve temperature stability.
- B. Store materials in a clean dry, enclosed space off the ground and protected from the weather. Protect adhesives from freezing.

1.7 ENVIRONMENTAL CONDITIONS

- A. Maintain uniform temperature of minimum of 65 degrees Fahrenheit and humidity of 20 to 40 percent 48 hours prior to, during, and 48 hours after installation. Store resilient flooring materials and accessories in the spaces where they will be installed for at least 48 hours before beginning installation. Thereafter, maintain a minimum temperature of 55 degrees Fahrenheit in the areas where the work is completed.

1.8 WARRANTY

- A. Manufacturer Warranty: provide manufacturer's standard wear warranties for all flooring and stair tread materials installed under this Section.
- B. General Warranty: Manufacturer's warranty specified in this section shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence work to ensure resilient flooring is not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated and work overhead is completed.
- B. Install flooring and base after interior wet work is dry.

1.10 EXTRA MATERIALS

- A. Upon completion of the Work of this Section, deliver to the Owner extra flooring materials for future repairs and maintenance, from the same manufacturing runs as those installed, in the following amounts:
 - 1. Sheet vinyl: 3 percent of each different color and pattern installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Specified Manufacturer and Product:
 - 1. Refer to Drawing 31-ID-104.

2.2 REGULATORY REQUIREMENTS

- A. Provide materials and assemblies conforming to applicable building codes and regulatory agencies for flame/fuel/smoke rating requirements of flooring and base trim in accordance with ASTM E 84.
- B. Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
 - 1. ASTM E 648 (Critical Radiant Flux) of 0.45 watts per sq. cm. or greater, Class 1.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specified Optical Density of 450 or less.
 - 3. Sheet material meets ASTM F 1913 performance standards for homogeneous single layered vinyl floor covering.

2.3 PRODUCTS

- A. Resilient Sheet Flooring: Refer to Drawing 31-ID-104.
- B. Welding Rods: Solid color welded rods matching flooring, as recommended by manufacturer.
- C. Filler for patching, smoothing and leveling subfloors and underlayments: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:
 - 1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
 - 2. Quikrete Companies, product "Fast-Set Underlayment 1248".
 - 3. Silpro Masonry Systems Inc., product "Profinish".
- D. Adhesives and primers: Latex based, non-flammable in wet state, with NFPA, Class A rated, VOC compliant, as recommended by the resilient flooring manufacturer for the substrate and application intended.
- E. Transition strips: Homogeneous vinyl, of profiles required for thickness of abutting materials, in colors as selected by the Project Engineer/VA-COR and the Architect.
- F. Cleaning material: Domestic floor detergent, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Ensure of the following:
 - 1. Substrates shall be dry and clean.
 - 2. Substrates shall be free of depressions, raised areas, or other defects which would telegraph through installed flooring.
 - 3. Temperature of resilient flooring and substrate shall be within specified tolerances.
 - 4. Do not proceed with flooring installation if base cabinets or other built-in casework is present on the substrate.
- B. Preinstallation Testing, Evaluation and Assessment: Moisture testing of concrete substrate, refer to Specification Section 090506 - COMMON WORK RESULTS FOR FLOORING.
- C. Beginning of installation means acceptance of substrate and site conditions.

3.2 PREPARATION

- A. General: Comply with flooring manufacturer's requirements for preparation of substrate to receive resilient flooring.

- B. Remove, by light sanding and grinding, all protruding edges, high spots. Ensure that substrate is free from paint, varnish, wax, oil, or other foreign matter.
- C. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler. Apply, trowel and float finish subfloor filler and leave a smooth, level, hard surface. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate, and ensure that substrate is dry, clean and smooth prior to application of flooring.
- E. Apply primers as recommended by adhesive manufacturer's written instructions.

3.3 INSTALLATION - GENERAL

- A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.
- B. Install resilient flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install resilient flooring over concrete slabs until they have been cured and are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture test.
- C. Spread only enough adhesive to permit installation of materials before initial set.

3.4 INSTALLATION - SHEET VINYL FLOORING

- A. Install sheet vinyl using conventional full-spread method and heat welded seams. Application shall be performed by factory trained mechanics franchised by the manufacturer in accordance with the manufacturer's instructions, and using tools and techniques recommended by the flooring manufacturer.
- B. Cut sheet material into required lengths and sizes. Layout and cut to achieve minimum number of seams and for pattern match between abutting edges, Reverse every other sheet (if recommended by manufacturer)
 - 1. Seams in corridors shall run perpendicular to corridor.
- C. Lay cut sheets flat and allow to come to room temperature prior to installation.
- D. Lay sheet vinyl flooring so as to ensure full uniform contact with substrate and to produce finished surfaces which are smooth, even and in true planes, free of buckles, waves, and other imperfections.
- E. Install the sheets and roll the floor surface to work wrinkles and air pockets out past the outer edges.
 - 1. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer
- F. Fit the sheet vinyl neatly and tightly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.
- G. Weld seams with welding rods, as recommended by flooring manufacturer. When routing for seams, do not rout or groove through the flooring. Check temperature and speed of application to prevent charring, replace all damaged flooring. Weld seams in two pass method to prevent concave seaming. Use trim plates or sleds when making trimming first pass seam, use sharpened tools with second pass, trimming in a smooth continuous motion, resulting in a smooth seam.
- H. Provide integral base where scheduled on Drawings or Finish Legend.

1. Flash sheet vinyl flooring up the walls forming an integral coved base at wall surfaces. The height of the base at walls shall be 4 inches unless otherwise indicated on the drawings.
 2. Install continuous coved fillet strip behind sheet vinyl at the intersection of vertical surfaces and floor surfaces for walls and casework; cut, fit, and miter-weld at internal and external corners.
 3. Install continuous vinyl cap strip at top edge of sheet vinyl base at walls; securely fastened in place, with top edge of trim level, and with all trim joints mitered. Cap strip will not be required at underside of toe space.
 4. Install integral base at sides and at toe space of cabinets. The height of the integral base at casework shall match that of the toe space.
 5. All interior and exterior corners of the integral base shall be formed without hardware.
- I. Install reducer strips wherever new resilient sheet flooring terminates at carpeting and elsewhere as required to terminate flooring.

3.5 INSTALLATION OF ACCESSORIES

- A. Resilient edge and transition strips:
1. Install edge strips at all edges of flooring which would otherwise be exposed.
 2. Place resilient edge strips tightly butted to flooring and secure with adhesive recommended by the edge strip manufacturer.

3.6 PROTECTION

- A. Prohibit traffic on finished floor areas until flooring adhesive has fully set.
- B. Prohibit washing, scrubbing or other similar 'wet' operations to occur on finished floor areas for a minimum period of 5 calendar days after installation.
- C. Provide protection of completed flooring areas from construction traffic until Substantial Completion of the General Contract. Cover all resilient floor surfaces with heavyweight kraft paper and overlay with red-rosin paper, taping the edges to maintain position of the protection paper. Reapply papers as required to maintain floor protection.

3.7 CLEANING

- A. As installation progresses, continually remove excess adhesive from floor, base and wall surfaces without damage.
1. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.
- B. Sweep floors to remove all loose dirt and debris.
- C. Not sooner than five days after installation, clean all materials installed hereunder with a non-abrasive commercial detergent approved by the material manufacturers, and thoroughly rinse with clear water.
- D. After cleaning and polishing, ensure that the flooring is be protected with heavy kraft paper.

END OF SECTION

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SECTION 096519

RESILIENT TILE FLOORING

PART 1 – GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Vinyl tile flooring.
 - 2. Vinyl transition strips wherever edges of resilient tile flooring materials abut dissimilar flooring, where no thresholds occur.

1.2 RELATED REQUIREMENTS

- A. Section 024100 - DEMOLITION: Removal of existing finishes.
- B. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection.
- C. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base at tile flooring..
- D. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring and integral base.
- E. Section 096813 - TILE CARPETING: Tile carpeting and transition strips.
- F. Section 096723 - RESINOUS FLOORING: Multi-layered resinous waterproof flooring.

1.3 REFERENCES

- A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 2. ASTM F-710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 3. ASTM F-1066 - Vinyl Composition Floor Tile.
 - 4. ASTM F-1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 5. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
 - 6. NFPA 253 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
 - 7. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Sequencing:
 - 1. Do not order or deliver any materials until all submittals have been received and approved by the Project Engineer/VA-COR and the Architect.
 - 2. Sequence work to ensure resilient flooring is not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, wet work is dry and cured, and work overhead is completed.
 - 3. Sequence flooring installation when base cabinets or other built-in casework is present on the substrate.

4. Ensure that installation of flooring and accessories occurs after other finishing operations, including painting.

1.5 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.
 - a. Furnish manufacturer's product literature on flooring adhesive, highlight adhesive properties, including VOC's and maximum moisture pressure limits for substrates.
 2. Shop drawings: 1/4 inch scale plans of each flooring area scheduled for Work of this Section. Drawings shall bear dimensions of actual measurements taken at the project.
 - a. Identify each flooring type, colors and patterns, indicate layout of tile units and direction of tile patterns.
 - b. Where more than one adhesive type is specified or otherwise required by flooring manufacturer, identify on shop drawings areas for each adhesive type.
 3. Selection samples: Manufacturers' sample chain of colors and patterns available for selection by the Project Engineer/VA-COR and the Architect.
 4. Verification samples:
 - a. Full sized flooring tile, illustrating color, and pattern for each color and type of tile selected.
 - b. Edging: 12 inches long demonstrating profile, thickness, size and color.
 5. Certificates:
 - a. Submit the manufacturer's certification that the resilient flooring has been tested by an independent laboratory and complies with the required fire tests.
 6. Qualification Submittals: Installer/Applicator's work experience documentation.
- B. Closeout Submittals: Submit the following under provisions of Section 019999 – PROJECT CLOSEOUT.
 1. Operation and Maintenance Data: Furnish cleaning and maintenance data.
 2. Bonds and Warranty Documentation:
 - a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.
- C. Maintenance Material Submittals: Submit the following under provisions of Section 019999 – PROJECT CLOSEOUT. Clearly label and package extra materials securely to prevent damage.
 1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra flooring materials for future repairs and maintenance, from the same manufacturing runs as those installed, in the following amounts.
 - a. Vinyl composition tile: 3 percent of each material in each color, and pattern installed.
 - b. Furnish a quantity of adhesive of each type used in sealed cans or containers sufficient to apply the above materials.

1.6 QUALITY ASSURANCE

- A. General: Notify the Project Engineer/VA-COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
 1. Provide types of resilient tile and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
 2. Avoid color and pattern differential; provide flooring from one production run in any single room or contiguous areas.

- B. Qualifications: Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 MOCK-UPS

- A. Provide mock-up areas using accepted paint colors, minimum 40 square feet, illustrating color, texture and finish, and demonstrating the minimum standard for the Work.
- B. Locate mock-ups where directed and include all surfaces and materials scheduled to receive a field applied finish.
- C. Accepted mock-ups may remain as part of the work; the number of mock-ups shall not be restricted.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.
 - 2. Deliver resilient flooring materials in original, unopened packages and store protected for three days prior to installation in area of installation to achieve temperature stability.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets. Store materials in a clean dry, enclosed space off the ground and protected from the weather
 - 2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
 - 3. Protect adhesives from freezing.

1.9 SITE CONDITIONS

- A. Maintain uniform temperature of minimum of 65 degrees Fahrenheit and humidity of 20 to 40 percent 48 hours prior to, during, and 48 hours after installation. Store resilient flooring materials and accessories in the spaces where they will be installed for at least 48 hours before beginning installation. Thereafter, maintain a minimum temperature of 55 degrees Fahrenheit in the areas where the work is completed.

1.10 WARRANTY

- A. General: Submit warranties under provisions of Section 019999 – PROJECT CLOSEOUT.
- B. Manufacturer Warranty: provide manufacturer's standard wear warranties for all flooring and stair tread materials installed under this Section.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Provide materials and assemblies conforming to applicable building codes and regulatory agencies for flame/fuel/smoke rating requirements of flooring in accordance with ASTM E 84.
- B. Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
 - 1. ASTM E 648 (Critical Radiant Flux) of 0.45 watts per sq. cm. or greater, Class 1.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specified Optical Density of 450 or less.
 - 3. Tile material meets ASTM F 1700, Class I, Type A performance standards for solid vinyl floor tile.

2.2 PRODUCTS

- A. Resilient Tile Flooring: Refer to Drawing 31-ID-104.
- B. Filler for patching, smoothing and leveling subfloors and underlayments: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:
 - 1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
 - 2. Quikrete Companies, product "Fast-Set Underlayment 1248".
 - 3. Silpro Masonry Systems Inc., product "Profinish".
- C. Adhesives: Water resistant, acceptable to the resilient flooring manufacturer, for substrate conditions.
 - 1. VOC content: Less than 50 g/L.
 - 2. Acceptable manufacturers:
 - a. Advanced Adhesive Technology, Inc, Dalton GA.
 - b. DAP Incorporated, Dayton OH.
 - c. W.W. Henry Company, Aliquippa PA.
 - d. Roberts Consolidated Industries, Inc., City of Industry, CA.
- D. Transition and edge strips:
 - 1. General: Homogeneous vinyl, of profiles required for thickness of abutting materials.
 - 2. Edge strips: Tapered or bull nose edge.
 - 3. Colors: Match or contrast with the flooring, as selected by the Project Engineer/VA-COR and the Architect from standard colors available, of width shown on the drawings.
- E. Cleaning material: Domestic neutral floor detergent having a pH 7 or pH 8, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
 - 1. Ensure existing substrate is not cushion flooring or perimeter-bonded sheet flooring. Ensure substrate is firmly bonded to underlayment.
 - 2. Verify concrete substrate has been cured and is sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture test.
 - a. Insure that concrete substrate has a moisture content of not more than 3.5 percent by weight. Perform moisture test in several locations using carbide method dampness meter.
 - 3. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

- A. General: Comply with flooring manufacturer's requirements for preparation of substrate to receive resilient flooring.
 - 1. Close spaces to traffic during the installation of the flooring.
- B. Protection of In-situ existing finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.

C. Surface Preparation:

1. Remove by mechanical means (light sanding and grinding), all protruding edges, high spots. Ensure that substrate is free from paint, varnish, wax, oil, existing adhesive residue, or other foreign matter. Do not use solvents.
2. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler. Apply, trowel and float finish subfloor filler and leave a smooth, level, hard surface. Prohibit traffic from area until filler is cured.
3. Apply troweled subfloor filler and leveler to provide finished concrete surface smooth, with no more than 1/8 inch variation from plane within 10 feet in any direction.
 - a. Prohibit traffic until filler and leveler is cured.
4. Vacuum clean substrate, and ensure that substrate is dry, clean and smooth prior to application of flooring.

3.3 INSTALLATION - GENERAL

- A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.
 1. Apply primers as recommended by adhesive manufacturer's written instructions.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Mix tile to ensure that concentration of surface patterns is uniform throughout. Use tile from cartons in same sequence as manufactured and packaged, if so numbered.
- D. Maintain reference markers, holes and openings that are in place or have been marked for future cutting; repeat markers on flooring as marked on substrate. Use non-permanent marking devices which may be cleaning washed off when no longer required.

3.4 INSTALLATION - FLOOR TILE

- A. Lay flooring in a square grid pattern, with joints and seams parallel to building lines. Lay tile flooring in pattern as indicated on the drawings or if not indicated as such, lay with alternating pattern-grain to form a basket weave pattern. Lay tile with joints straight and continuous in both directions and with border tile not less than 1/2 the width of the tile.
- B. Neatly fit resilient materials to all intersecting surfaces, and make joints as inconspicuous as possible.
- C. Terminate flooring at centerline of door in closed position where adjacent floor finish is of different material or color.
- D. Apply resilient materials to have uniform contact with receiving surfaces throughout, with tight joints, and with all finish surfaces smooth, in true plane, free from buckles, waves, and other imperfections.
- E. Extend resilient flooring to wall lines beneath all movable equipment and movable casework. Fit resilient flooring onto breaks and recesses, against non-resilient bases, around pipes and other protrusions, under saddles, and to and around other fixed surfaces, making neat cuts in the flooring and minimizing joints.

3.5 INSTALLATION OF ACCESSORIES

- A. Resilient edge and transition strips:
 1. Install edge strips at all edges of flooring which would otherwise be exposed.
 2. Place resilient edge strips tightly butted to flooring and secure with adhesive recommended by the edge strip manufacturer.

3.6 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris, and scraps.
- B. Post-installation Cleaning:

1. As installation progresses, continually remove excess adhesive from floor, and wall surfaces without damage.
 - a. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.
 2. Sweep floors to remove all loose dirt and debris.
 3. After specified waiting period, clean all materials installed hereunder with a non-abrasive commercial detergent approved by the material manufacturers, and thoroughly rinse with clear water.
 - a. Vinyl composition tile floors: Wait at least 5 full days following completion of tile installation before commencing with cleaning.
- C. Final Cleaning:
1. General: Perform final cleaning not before 4 days prior to VA's intended occupancy date.
 2. Vinyl composition tile floors:
 - a. Wash floors with non-abrasive commercial detergent with floor machine equipped with green or blue pad. Apply manufacturer's recommended stripping solution when floors are badly soiled.
 - b. Apply a minimum of two coats of acrylic floor polish to protect flooring until regular maintenance procedures can be started.
 - c. After application and curing of floor polish, ensure that polished floors are protected with heavy kraft paper.

3.7 PROTECTION

- A. General: Protect finished work under provisions of Section 090506 - COMMON WORK RESULTS FOR FLOORING.
- B. Prohibit traffic on finished floor areas until flooring adhesive has fully set.
- C. Prohibit washing, scrubbing or other similar 'wet' operations to occur on finished floor areas for a minimum period of 5 calendar days after installation.
- D. Provide protection of completed flooring areas from construction traffic until Substantial Completion of the General Contract. After cleaning and polishing, cover all resilient tile floor surfaces with non-staining heavyweight kraft paper and overlay with red-rosin paper, taping the edges to maintain position of the protection paper. Reapply papers as required to maintain floor protection.

END OF SECTION

SECTION 096723

RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare surfaces to receive resinous flooring with integral sloping base.
 - 1. Base heights as indicated on the Drawings.
- B. Apply troweled seamless epoxy flooring system and subsequent touch-up and repairs.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 015000 - TEMPORARY FACILITIES AND CONTROLS: Application of protection paper to finished resilient flooring.
- E. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.
- F. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection.
- G. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base.
- H. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring.
- I. Section 096519 - RESILIENT TILE FLOORING: Resilient tile and plank flooring.
- J. Section 096813 - TILE CARPETING: Carpet tile and transition strips.
- K. Division 22 - PLUMBING: "floor-flange" type floor drains

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS.
 - 1. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 2. All applicable federal, state and municipal codes, laws and regulations for flammability and smoke generation of interior finishes.

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all products to be applied hereunder.
 - a. Include certification of data indicating Volatile Organic Compound (VOC) content of all floor system components.
 - 2. Manufacturer's instructions: Manufacturer's installation instructions indicating special procedures, integral base, and perimeter conditions.

- a. The manufacturer's recommended methods of installation, when approved by the Architect, will become the basis for inspecting and accepting or rejecting actual installation methods used on the Work.
- 3. Certification: Material certificates signed by manufacturer certifying that the waterproof mechanical equipment room flooring complies with requirements specified herein.
- 4. Selection samples: Sample card indicating Manufacturer's full range of colors available for selection by Architect.
- 5. Verification samples:
 - a. Samples of each level of slip resistance, aggregate, and pattern available in the specified products from the proposed manufacturer.
 - b. 12 x 12 inch samples of finished surface illustrating material color, texture and finish.
- B. Submit the following: Manufacturer's warranties: Include coverage of materials and installation and resultant damage from failure of installation to resist penetration of moisture.

1.5 QUALIFICATIONS

- A. Applicator: Company specializing in performance of the work of this Section with 5 years minimum documented experience and trained by manufacturer in installing resinous flooring types similar to that required for this Project, and who is acceptable to manufacturer of primary materials.

1.6 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain resinous flooring materials, including primers, resins, and finish coats, from a single manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site in sealed and labeled containers; container labeling shall include manufacturer's name, type of paint, color mix designation, expected coverage, surface preparation instructions, instructions for mixing and reducing, drying time, and clean-up recommendations.
- B. Store materials, conforming with applicable codes and fire regulations, in designated spaces. Keep storage area secure when direct access is not required or when not performing work under this Section. Take precautionary measures to prevent fire hazards and spontaneous combustion, maintain a dry-chemical type fire extinguisher in all areas where materials of this Section are being stored or used.
- C. Store materials in a well ventilated area at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.
- D. Do not use the sanitary system for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle. Remove oily rags and waste each day.

1.8 PROJECT CONDITIONS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Apply flooring materials within temperature and humidity range specified by coating manufacturer.

- C. Provide sufficient lighting to maintain 80 foot-candles measured mid-height at substrate surface.

PART 2 - PRODUCTS

2.1 FLOORING SYSTEM

- A. Specified Manufacturer: Refer to Sheet 31-ID-104.
- B. Troweled, three-component epoxy mortar system, consisting of an epoxy resin, amine curing agent, and selected, graded aggregates blended with inorganic pigments, having the following minimum standards for physical characteristics:
 - 1. Compressive strength:
 - a. Per ASTM C-579 - 12,500 psi.
 - b. Per ASTM D-695 - 17,500 psi, after 7 days.
 - 2. Tensile strength:
 - a. Per ASTM C-307: 2,600 psi.
 - b. Per ASTM D-638: 4,000 psi.
 - 3. Tensile Elongation ASTM D-638 7.50%
 - 4. Flexural strength per ASTM C-790: 6,250 psi.
 - 5. Flexural strength per ASTM C-580: 4,000 psi.
 - 6. Flexural modulus of elasticity per ASTM C-790: 6.2×10^5
 - 7. Hardness per ASTM D-2240, Shore D: 75 to 80.
 - 8. Linear Expansion ASTM D-696 2×10^{-5}
 - 9. Bond Strength to Concrete ASTM D-4541 400 psi substrate fails.
 - 10. Indentation per ML D-3134: .025 MAX.
 - 11. Impact Resistance per ML D-3134: Pass.
 - 12. Heat Resistance Limitation: 140°F - 200°F.
 - 13. Flame Spread/NFPA 101 per ASTM E-84: Class A.
 - 14. Abrasion resistance, (CS17 Wheel 1000 GM Load 1000 Cycles) per ASTM D-4060, 24 mg loss.
 - 15. Flammability per ASTM E-648: Class I.
 - 16. Flammability ASTM D-635: Self Extinguishing.
 - 17. Water absorption per ASTM D-570: 0.4%.
 - 18. VOC Content: 0 g/l.
 - 19. Coefficient of friction per ASTM D-2047:
 - a. Standard Slip-Resistant: 0.9.
 - b. Orange Peel: 0.8.
 - c. Smooth: 0.7.

2.2 PRODUCT MIXING

- A. Mix on site with manufacturer supplied mix and measure apparatus to ensure a timely, accurate mix ratio and minimize waste.

2.3 ACCESSORIES

- A. Wall base: Stainless steel base cap as manufactured by Schlüter Systems L.P., Plattsburgh, NY.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify Contractor of any condition that may potentially affect proper application of coatings.
 - 1. Do not proceed with flooring installation if base cabinets or other built-in casework is present on the substrate.
- B. Measure moisture content of surfaces, do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Masonry or concrete: 12 percent.
- C. Beginning Work of this Section means acceptance of existing substrate surfaces and site conditions.

3.2 PREPARATION - GENERAL

- A. Mix and prepare coatings in strict accordance with manufacturer's written instructions. Thoroughly mix to ensure uniformity of color and mass, unless otherwise directed by the manufacturer of the specific coating used. Except for epoxy mixtures, strain previously opened materials to remove skins, coating lumps, and other foreign matter prior to painting. Dispose of epoxy materials which have begun to set.

3.3 APPLICATION - GENERAL

- A. Apply all materials in strict accordance with the approved manufacturer's printed instruction, and in accordance with the best trade practices. Each coat shall be reviewed and approved by the Architect before succeeding coats are applied.
- B. Do not apply successive coating until the preceding coat is thoroughly dry, except as otherwise specified, and in no case in less than minimum period of time recommended by manufacturer.

3.4 SURFACE PREPARATION

- A. Upon acceptance of completed existing surfaces, thoroughly remove all dust and debris by sweeping or by vacuum cleaning.
- B. Remove laitance, curing sealers, existing adhesives and other foreign matter from concrete surfaces with necessary techniques such as shot blasting, muriatic acid etching, surface freezing and power scarification.
- C. If a curing compound exists on concrete slab, thoroughly etch concrete surfaces using well mixed solution consisting of two parts by volume water diluted with one part by volume 30 percent commercial grade hydrochloric acid at a rate of one quart per ten square feet. Apply evenly to thoroughly saturated areas and scrub into surfaces using stiff-bristled broom. Allow solution to activate undisturbed for not less than five minutes or for duration of boiling effect.

- D. Thoroughly remove etching solution by washing down surfaces with clean water; flooded at least three separate times at a rate of two gallons per ten square feet; thoroughly remove all contaminants that may be engrained or latent in surfaces.
- E. Perform a test application of a square foot in three locations, such as beneath casework. Allow to set for 72 hours, and test adhesion as recommended by the manufacturer.

3.5 FLOOR SURFACING

- A. Work shall be done only under optimum conditions as recommended by manufacturer. Surfaces over which matrix is to be applied shall be completely dry and thoroughly clean. Substrate and ambient temperature shall be 50 degrees F or above; if below 60 degrees F, temperature must be stable or rising.
- B. Allow surfacing to set undisturbed for a minimum period of 48 hours. Maintain temperature at 50 degrees F minimum until floor surfacing has completely cured.
- C. Finished surfaces shall be uniform in texture and pattern, and level within a degree of tolerance of 1/4 inch in 10'-0" in any direction.

3.6 INSTALLATION

- A. If curing compound exists on substrate, brush or trowel epoxy bonding coat if required by manufacturer based on results of test installations.
- B. System shall be seamless, and installed in accordance with the manufacturer's specifications. Include the following minimum applications:
 - 1. Apply basecoat and broadcast colored quartz aggregate.
 - 2. Allow basecoat to set and remove excess aggregate.
 - 3. After surfacing has cured, apply epoxy top coating uniformly on all surfaces in accordance with manufacturer's instructions.
- C. Apply all coats to floor surfaces, and to cove material 4 inches up on abutting vertical bases, and vertical surfaces of casework and permanent items.
- D. Allow surfacing to set undisturbed for a minimum period of 48 hours. Maintain temperature at 50 degrees F minimum until floor surfacing has completely cured.

3.7 CLEANING

- A. Upon completion of the work in each area, remove all coating splatters from glass, prefinished surfaces, bright metals, and from other surfaces that have not been painted or finished hereunder. Do not use abrasive paper or abrasive cleaner on any prefinished surface or bright metal. Remove all materials and debris; leave work area in a clean condition.

3.8 PROTECTION AND TOUCH-UP

- A. Clean up the work area at end of each work day. Remove all cartons, debris, emptied containers, as the work progresses, and finally at completion of work of this Section Legally dispose of same off the Site.
- B. During application of coatings, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Properly clean, repair or replace any work so damaged and soiled.

- C. Protect all finished surfaces against damage until the date of final acceptance of the work. The Architect will conduct a final review of all work performed. Re-coat or touch-up, all scratches and other blemishes on surfaces, and as directed by the Architect, any areas found which do not comply with the requirements of this Section, and bear all costs therefor.
- D. Any re-coating or touch-up work, required after the work of this Section has been reviewed and accepted by the Architect, will be paid for by the Contractor.

END OF SECTION

SECTION 096813
TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare substrates to receive carpet tile as required to ensure specified tolerance level for finish surface of carpeting. Preparation work includes patching, smoothing and leveling subfloors and underlayment, including:
 - 1. Grinding down high spots of substrate.
 - 2. Providing Portland cement-based latex underlayment (filler).
- B. Furnish and install carpet tile directly adhered over floors, where indicated on the Drawings, including all accessories necessary to complete the work

1.2 RELATED REQUIREMENTS

- A. Section 024100 - SELECTIVE DEMOLITION: Removal of existing finishes.
- B. Section 033000 - CAST-IN-PLACE CONCRETE: Concrete substrate for resilient flooring, and concrete sealers.
- C. Section 087100 - DOOR HARDWARE: Furnishing metal thresholds.
- D. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection
- E. Section 096513 - RESILIENT BASE AND ACCESSORIES: Straight resilient bases, where indicated in conjunction with carpeting.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
 - 1. ASTM D 2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.
 - 2. ASTM D5116 - Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
 - 3. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 4. ASTM E 648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
 - 5. CRI Indoor Air Quality Testing and Labeling Program.
 - 6. NFPA: Publication 253 - Test for Critical Radiant Flux of Floor Covering Systems.
 - 7. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 SUBMITTALS

- A. Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, for each item furnished hereunder, including carpet, accessories, adhesives, and leveling materials.
 - a. Include certification of data indicating Volatile Organic Compound (VOC) content of all adhesives. Submit MSDS highlighting VOC limits.
 2. Manufacturer's installation instructions: Provide manufacturer's application methods or installation instructions for each item furnished hereunder. Indicate special procedures, and perimeter conditions requiring special attention.
 3. Manufacturer's sample warranties.
 4. Manufacturer's certificate: Provide certificate stating that the carpet, and other related materials to be supplied hereunder meet all requirements specified herein.
 - a. Submit certification from the fiber producer verifying use of the branded fiber in the submitted carpet product.
 5. Indoor Air Quality Test Reports: Submit for specified products, indicating that the test results do not exceed the stated emission criteria of the CRI Indoor Air Quality Testing Program.
 6. Shop drawings: 1/8 inch scale plans of all carpeted areas indicating direction of carpet, location of seams and method of joining seams.
 - a. Show location of different patterns or styles of carpet.
 7. Selection samples:
 - a. Sample swatches containing manufacturer's full color and blend range.
 - b. Vinyl edge strip sample illustrating manufacturer's full color range.
 8. Verification samples:
 - a. 12 inch long samples of edge strip.
 - b. After initial selection of carpet and color blends has been made by the Architect: 18 inches by 27 inches sample of selected carpet for final approval of the Architect. Approved samples shall be used as the standard of quality and colors for materials furnished under this Contract.
- B. Submit the following under provisions:
1. When the installation is complete, the manufacturer shall deliver (1) a certificate of recycling, which describes the method by which the uplifted carpet was recycled; and (2) a warranty of recycling, which specifies the method by which the new carpet tile will be recycled at the end of its useful life.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Mill specializing in manufacturing specified recyclable carpet tile with a minimum of three years documented experience.
- B. Applicator: Company specializing in carpet tile installation of the type specified herein with a minimum of three years documented experience, approved by carpet tile manufacturer and participation in manufacturer's environmental program including responsible carpet removal, recycling, and installation.

1.6 MOCK-UPS

- A. Provide mock-up sample of one room to be designed by Architect, demonstrating the minimum quality of installation for the Work.

- B. Locate mock-ups where directed and include all surfaces and materials scheduled to receive a field applied finish.
- C. Reviewed and accepted mock-up may remain as part of the work.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not install carpet until areas have been fully enclosed and environmental conditions have reached the levels indicated during occupancy.
- B. Store materials for 3 days (72 hours) prior to installation in area of installation to achieve temperature and humidity stability. Carpet and adhesive must be stored at a minimum temperature of 68 degrees F.
- C. Maintain a temperature of at least 60 degrees Fahrenheit, with a relative humidity of between 15 and 60 percent, for a period of 72 hours before, during, and after installation.
- D. Ventilate spaces where work of this Section occurs, during and for a period of 72 hours after completion of curing. Ventilate to dissipate humidity, and to prevent accumulation of fumes, vapors, and gases. Provide temporary fan units and ducting as required for venting operations

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store all carpeting material under cover in dry, well-ventilated spaces as soon as delivered. Protect carpeting from damage, dirt, stain, moisture, and mildew.
- B. Waste Reduction: Collect polyethylene roll wrap at site and recycle into more roll wrap. Redirect small pieces of waste carpet to be appropriately recycled.
- C. Store all carpeting material under cover in dry, well-ventilated spaces as soon as delivered. Protect carpeting from damage, dirt, stain, moisture, and mildew.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence work to ensure carpet is not installed until dust generating activities have terminated and work overhead is completed.
- B. Sequence work to ensure carpet is not installed until building is enclosed, sufficient heat is provided, and dust generating activities have terminated and work overhead is completed.
- C. Install carpet after interior wet work is complete and fully cured.

1.10 WARRANTY

- A. Furnish the following warranties:
 - 1. Furnish carpet installer's written guarantee covering prompt and proper replacement of any and all carpeting which indicates improper installation workmanship and/or defective material within twelve months from completion of the installation and acceptance thereof by the Architect, said corrective work being performed by the Carpet installer at no cost to the VA.
 - 2. Furnish carpet manufacturer's warranty which shall contain the following:
 - a. Commencement date for warranty: Date of Project Substantial Completion.
 - b. Wear Warranty - Lifetime of Carpet. No more than 10% face yarn loss by weight in normal use.
 - c. Static Warranty - Lifetime of Carpet.
 - d. Edge Ravel Warranty - Lifetime of Carpet. Guaranteed no edge ravel in normal use (no seam sealers required).

- e. Delamination Warranty - Lifetime of Carpet. Guaranteed no delamination in normal use (no chair pads required).
 - f. Tuft Bind Warranty - Lifetime of Carpet. Guaranteed not to zipper, wet or dry.
- B. General Warranty: Manufacturer's warranty specified in this section shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.11 EXTRA MATERIALS AND MAINTENANCE DATA

- A. Upon completion of the Work of this Section, submit the following:
 - 1. Extra Materials: Deliver to the Owner extra materials for future repairs and maintenance. Clearly label and package securely to prevent damage.
 - a. Owner's carpet stock: An amount equal to 3 percent of each color, pattern and type of carpet installed.
 - 2. Maintenance Data: Prior to final acceptance of the carpet installation, carpet subcontractor shall deliver to the Architect 3 printed copies of the carpet manufacturer's detailed maintenance recommendations for the care cleaning and stain-removal, and repair of the types of carpets installed. Include product data and Material Safety Data Sheets (MSDS) for cleaning materials.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Carpet Tile - General: Shall conform with or pass tests of the following Standards and additional requirements:
 - 1. AATCC-134 (Electrostatic Propensity): Maximum electrostatic generation below level of human sensitivity.
 - 2. ASTM D-2859 (Methenamine Reagent Pill Test).
 - 3. ASTM E-648 (Flooring Radiant Panel Test): Class I (Minimum Average CRF of 0.48).
 - 4. NBS Smoke Chamber Test: Maximum average of 450.
 - 5. CRI – Green Label Plus.
 - 6. Carpet fiber: Nylon 6.6 or proprietary equivalent.
 - 7. Weave: Patterned Loop.
- B. Specified Manufacturer and Product: Refer to Drawing 31-ID-104.
- C. Check matching of carpet before installation and ensure there is no visible variation between dye lots.

2.2 ACCESSORIES

- A. Adhesives for carpet tile: NFPA Class A or UBC Class 1 types, as determined by ASTM E-84 Tunnel Test, as recommended by Carpet manufacturer for application and intended use. Acceptable manufacturers include the following or approved equal:
- B. Advanced Adhesive Technology, Inc, Dalton, GA.
 - 1. DAP Incorporated, Dayton, OH.
 - 2. W.W. Henry Company, Aliquippa, PA.
 - 3. Macklanburg-Duncan Company, Oklahoma City, OK.

- C. Transition strips, carpet reducers, edgings and accessories , (carpet to sheet vinyl): Homogeneous vinyl, in colors as selected by the Architect.
 - 1. Acceptable manufacturers:
 - a. Schluter-Systems, Plattsburgh, NY.
 - b. Burke-Mercer Flooring Products (Division of Burke Industries), San Jose, CA.
 - c. Roppe Corporation, Fostoria, OH
 - 2. Transition strips: equal to Schluter-Systems (submit model to Designer for approval). Exact model number dependent on height of carpet tile.
 - 3. Profiles as indicated, submit shop drawings for all conditions not indicated and obtain Architect's approval for each transition/reducer.
- D. Filler for patching, smoothing and leveling subfloors and underlayments: Portland cement-based latex underlayment acceptable to flooring manufacturer. Acceptable products include the following, or approved equal
 - 1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
 - 2. Quikrete Companies, product "Fast-Set Underlayment 1248".
 - 3. Silpro Masonry Systems Inc., product "Profinish".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
- B. Ensure that newly placed concrete has cured for a minimum period of 30 days and that moisture content of concrete is within range specified by adhesive manufacturer.
- C. Verify that surfaces are smooth and flat with a maximum variation of 1/8 inch in 10 feet, and are ready to receive work.
- D. Request correction of defects in receiving surfaces which are not correctable by the methods specified herein. Do not commence work until such defects are entirely corrected. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

- A. Preheat areas to receive carpet to a minimum temperature of 60 degrees F for 72 hours prior to installation, with a relative humidity between 15 and 60 percent. Maintain minimum temperature of 60 degrees F thereafter.
- B. Remove sub-floor ridges, and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to leave smooth, flat and hard surface, as required to ensure that carpeted surfaces will be level to within 1/8 inch tolerance in 10 feet in any direction.
- D. Prohibit traffic until filler is cured.
- E. Thoroughly sweep and vacuum substrate and remove all foreign matter.
- F. Measure all areas to receive materials to be furnished and installed hereunder, and verify in the field their actual dimensions, including wall-to-wall dimensions, offsets, door locations, and details, fixed equipment, and all other installed items. Extra charges will not be allowed because of lack of familiarity with actual project conditions. Small pieces of carpet will not be acceptable.

3.3 INSTALLATION

- A. Install carpet tile in accordance with carpet and adhesive manufacturers' instructions. Immediately notify Architect of conflicts. Cement carpet directly to the substrate with specified installation adhesive. Trowel adhesive evenly on the substrate. Install the carpet within thirty minutes after spreading adhesive.
- B. Lay carpet tile in a square grid pattern, with joints and seams parallel to building lines. Lay joints straight and continuous in both directions and with border carpet tile not less than 1/2 the width of the tile.
 - 1. Install carpet tile using ¼ turn method as recommended by manufacturer.
- C. Install specified edging wherever carpeting abuts a dissimilar flooring material, except where wood thresholds, or resilient floor tile trim occurs.

3.4 CLEANING

- A. Daily clean work areas by disposing of carpet scraps. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of adhesives and other materials installed under this Section.
- B. Clean and vacuum carpet surfaces upon completion of the installation.

3.5 PROTECTION

- A. Prohibit traffic from carpet areas for 24 hours after installation. Protect with carpet with non-staining cover until Owner's final acceptance.

END OF SECTION

SECTION 097213
HIGH IMPACT WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Rigid vinyl sheet, used for wall covering, kick plates, push plates, armor plates.
- B. Adhesive, accessories, and trim.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL:
Procedural and administrative requirements for construction and demolition recycling.

1.3 REFERENCES

- A. ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2007.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.
- C. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 1996 (Reapproved 2002).
- D. ASTM G 22 - Standard Practice for Determining Resistance of Plastics to Bacteria; 1976 (Reapproved 1996).
- E. CAN/ULC-S102.2 - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies; 2003.
- F. SAE J1545 - Instrumental Color Difference Measurement for Exterior Finishes, Textiles, and Colored Trim; Society of Automotive Engineers; 2005.

1.4 SUBMITTALS

- A. See Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, for submittal procedures.
- B. Product Data: Manufacturer's complete and current product information, including installation instructions showing mounting details and recommended adhesives.
- C. Shop drawings: Show locations of joints, extent of wall covering and installation details. Show methods of attachment to adjoining construction.
- D. Certificate: Submit certification by manufacturer that products to be furnished comply with the requirements of this specification.
- E. Selection Samples: Color charts consisting of actual product pieces, illustrating full range of colors and textures available, for initial color selection.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

- B. Installer Qualifications: Installer specializing in performing the work of this section and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to project site in manufacturer's packaging, properly labeled.
- B. Store materials flat in a clean, dry area.

1.7 PROJECT CONDITIONS

- A. Field Measurements: When project conditions permit, take field measurements of areas where assemblies will be located; note discrepancies between drawings and actual dimensions on submitted shop drawings.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain storage temperature at or above 50 degrees F (10 degrees C).
- B. Acclimatize materials and bring surfaces to receive wall covering to a temperature between 65 and 85 degrees F (18 and 29 degrees C) for not less than 48 hours prior to installation.
- C. Maintain surfaces to receive wall covering at a temperature between 65 and 85 degrees F (18 and 29 degrees C) during installation.
- D. Maintain relative humidity at 80 percent or less during installation.
- E. Do not expose walls to direct sunlight for 48 hours after installation to avoid high temperatures that could cause blistering or distortion.

1.9 MAINTENANCE MATERIALS

- A. Provide maintenance materials comprising 5 percent, but not less than two complete sheets of each type of wall covering installed, for use by Owner.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Wall Covering: PVC-Free Thermoplastic, consisting of the following.
 - 1. Refer to Drawing 31-ID-104.
 - 2. Materials: Engineered PETG: Rigid sheet should be high impact PVC, nominal .060" (1.52mm) thickness and supplied in 4' x 8' or 10' (1.22m x 2.44m or 3.05m) sheet sizes in Suede texture.
 - 3. Surface Burning Characteristics: Flame spread index of 25 or less; smoke developed index of 450 or less when tested in accordance with ASTM E 84 or CAN/ULC-S102.2 in 0.06 inch (1.5 mm) thickness using adhesive recommended by manufacturer.
 - 4. Self-extinguishing: CC1 classification when tested in accordance with ASTM D 635.
 - 5. Impact Strength: 30.4 ft-lbs/inch of thickness when tested in accordance with ASTM D 256.
 - 6. Chemical and Stain Resistance: Stain resistant when tested in accordance with ASTM D 1308.
 - 7. Fungal and Bacterial Resistance: Demonstrated not to support fungal or bacterial growth by testing in accordance with ASTM G 21 and ASTM G 22.

8. Thickness: .060".
9. Sheet Size: Use the largest sheet size available, minimizing seams.
10. Color: Color as scheduled.
11. Color Consistency: Controlled to Delta E not greater than 1.0, measured in accordance with SAE J1545.

2.2 ACCESSORIES

- A. Trim: Extruded material to match wall covering; provide all necessary trim members in color matching wall covering. Provide the following in standard lengths:
 1. Top caps: "J" molding.
 2. Joint covers: "H" divider.
 - a. For back-of-house areas only.
 3. Inside corners.
 4. Outside corners.
 5. Saratoga vertical and horizontal 2 inch wide trim.
- B. Adhesives: As recommended or supplied by manufacturer of high impact wall covering.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that walls are in proper condition to receive installation of high impact wall covering.
- B. Verify that environmental conditions specified herein have been achieved and can be maintained.

3.2 PREPARATION

- A. Clean substrate to remove dust, debris and loose particles.

3.3 INSTALLATION

- A. Install high impact wall covering in full compliance with manufacturer's installation instructions; arrange for manufacturer's representative to review installation instructions with installer prior to starting work.
- B. Follow manufacturer's instructions regarding sheet size, use of rolled material, maximum dimension between seams, and adhesive application.
- C. Install panels with expansion gap of 1/16 inch (1.6 mm) between sheets, at door frames, baseboards, and other fixed elements. Cut oversized holes when installing fixtures through wall covering.
- D. Install with vertical seams plumb and horizontal seams level.
- E. Provide special curved cuts as indicated using templates and laser cutting tools.
 1. Do not install trim on laser cut curved edges.
- F. Wood grain pattern to be installed in a vertical direction unless otherwise indicated.

3.4 CLEANING

- A. Clean wall covering and accessories of adhesive and other surface blemishes, using materials and methods recommended by manufacturer.

3.5 PROTECTION

- A. Protect installed units after installation from damage from construction operations.
- B. If damage occurs, remove and replace damaged components or entire unit as required to provide unit in its original, undamaged condition.

END OF SECTION

SECTION 098100
ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of acoustical insulation where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.
- B. Furnish and install:
 - 1. Acoustical insulation as scheduled and where indicated on the Drawings.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 024119 - SELECTIVE DEMOLITION: Removal of existing partitions, walls and related insulation.
- E. Section 061000 - ROUGH CARPENTRY: Wood blocking, nailers.
- F. Section 092216 - NON-STRUCTURAL METAL FRAMING.
- G. Section 092900 - GYPSUM BOARD: Installation of wall board over acoustical insulation.
- H. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Ductwork and piping insulation.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. ASTM C 518 - Thermal Transmission Properties by Means of the Heat Flow Meter.
 - 2. ASTM C 553 - Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - 3. ASTM C 665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 4. ASTM E 84 - Surface Burning Characteristics of Building Materials.
 - 5. ASTM E 96 - Water Vapor Transmission of Materials.

1.4 SUBMITTALS

- A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:
1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
 2. Certificates:
 - a. Provide manufacturer's written certification of recycled slag content in mineral wool insulation.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 2. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
- B. Storage and Handling Requirements:
1. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acoustical batt insulation, (for rated walls): Mineral wool fiber insulation batts, conforming to ASTM C665 Type 1, and ASTM C553 with a nominal density of 2.5 pounds per cubic foot, nominally 3-1/2 inches thick.
1. Flame Spread Classification: Class A (less than 25, per testing by NFPA 255, ASTM E-84 or UL 723).
 2. Recycled content of slag in mineral wool insulation: Use maximum available percentage of material (slag). Mineral wool insulation products incorporated into the work shall contain not less than 75 percent of recycled material (slag) by weight.
 3. Acceptable products include:
 - a. Fibrex Insulations Inc. product: "Fibrex Sound Attenuation Fire Batt (SAFB)"
 - b. Roxul, Inc., product "Roxul AFB".
 - c. Thermafiber, Inc. product "Thermafiber SAFB".
- B. Acoustical batt insulation, (for non-rated walls):: Un-faced glass fiber insulation nominal 3-1/2 inches [89mm] thick conforming to ASTM C-665 Type I, of width appropriate for spacing of framing or furring members with which used.
1. Flame Spread Classification: Class A (less than 25, per testing by NFPA 255, ASTM E-84 or UL 723).
 2. Recycled content of glass in glass-fiber insulation: Use maximum available percentage of recycled glass. Fiber glass insulation products incorporated into the work shall contain not less than 20 percent of recycled glass cullet.

2.2 ACCESSORIES

- A. Staples, tape and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each insulation type.
- B. Adhesive: Nonflammable type recommended by insulation manufacturer to suit application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install insulation without voids.
2. Pack insulation around door frames and windows, in building expansion joints, door soffits, and other voids.
3. Pack behind outlets, around pipes, ducts, and services encased in walls.
4. Hold insulation in place with pressure sensitive tape.
5. Lap facer flanges together over framing for continuous surface. Seal all penetrations through the insulation and facers.
6. Do not compress insulation below required thickness except where embedded items prevent required thickness.

B. Semi rigid, batts and blankets:

1. When insulation is not full thickness of cavity, adhere insulation to one side of cavity, maintaining continuity of insulation and covering penetrations or embedments.
2. When insulation is installed in framing above ceiling without gypsum board on either side, adhere insulation to one side of cavity, maintaining continuity of insulation and covering penetrations or embedments
3. Wood Framing:
 - a. Fasten blanket insulation between wood framing and joists with nails or staples through flanged edges of insulation.
 - b. Space fastenings maximum 150 mm (6 inches) on center.
4. Metal Framing:
 - a. Fasten insulation between metal framing with pressure sensitive tape continuous along flanged edges.
 - b. At metal framing or ceilings suspension systems, install blanket insulation above suspended ceilings or metal framing at right angles to the main runners or framing.
 - c. Tape insulation tightly together so no gaps occur and metal framing members are covered by insulation.

3.2 CLEANING

- A. Daily clean work areas by sweeping and disposing of debris and scraps.
- B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

3.3 PROTECTION

- A. Protect insulation from construction operations.
- B. Repair damage.

END OF SECTION

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SECTION 098400
ACOUSTIC ROOM COMPONENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Fabric-covered mineral fiber core panels and mounting accessories.
- B. Fabric-covered fiberglass core panels and mounting accessories.
- C. Fabric-covered mineral fiber core ceiling baffles.
- D. Fabric-covered fiberglass core ceiling baffles.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - ROUGH CARPENTRY: Wood blocking behind wall panels.
- B. Section 099100 - PAINTING.

1.3 REFERENCES

- A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2002a.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.
- C. ASTM E 795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2005.

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop drawings: Show fabrication and installation details for acoustical wall panels, including plans, elevations, sections, details, and attachments to other work.
 - a. Show orientation of fabric application, pattern matching, and seams.
 - 3. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and pattern available for facing materials for each type of acoustical wall panel indicated. Include samples of installation devices and accessories.
 - 4. Samples for Verification: 8-by-11 inch (200 by 280 mm) units of each type of acoustical wall panel indicated; in sets for each color, texture, and pattern for facing materials, showing the full range of variations expected in these characteristics. Include samples of installation devices and accessories.
 - 5. Product Certificates: Signed by manufacturers of acoustical wall panels certifying that products furnished comply with requirements.
 - 6. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - 7. Product Test Reports: From a qualified testing agency indicating acoustical wall panels comply with requirements, based comprehensive testing of current products.
 - 8. Maintenance Data: For acoustical wall panels and facings to include in maintenance manuals specified in division.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing acoustical wall panels similar to those indicated for this Project and with a record of successful in service performance.
- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- C. Source Limitations for Acoustical Wall Panels: Obtain acoustical wall panels from one source with resources to provide products of consistent quality in appearance and physical properties.
- D. Fire-Testing Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical wall panels with appropriate markings of applicable testing and inspecting agency.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation.
- B. Store panels flat, in dry, well-ventilated space; do not stand panels on end.
- C. Protect panel edges from damage.

1.7 EXTRA MATERIALS

- A. Provide 5 percent, but not less than one of each type of panel, for the Owner's use in maintenance.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical wall panels until construction in spaces in complete and ambient temperature and humidity conditions are maintain at the levels indicated for Project when occupied for its intended use.
- B. Air-Quality Limitations: Protect acoustical wall panels from exposure to airborne odors, such as tobacco smoke, and install panels under conditions free from color contamination of ambient air.
- C. Field Maintenance: Verify wall surface dimensions by field measurements before fabrication and indicated measurements on Shop Drawings. Coordinate fabrication schedule with coordination progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, established surface dimensions and proceed with fabricating acoustical wall panels without field measurements. Coordinate wall construction to ensure that actual surface dimensions correspond to establish dimensions.

1.9 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties make by Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 ACOUSTICAL WALL PANELS

- A. Panel description: Prefinished, factory assembled fabric-covered panels.
- B. Basis of Design: Refer to Drawing 31-ID-104..
- C. NRC Rating A Mounting: 0.65
- D. Materials: Mineral Fiber.
- E. Surface Finish: Woven fabric:
- F. Fire Rating: 25 or less.
- G. Fabric: Maharam / Tek-Wall

2.2 FABRICATION

- A. Fabricate panels to sized and configurations indicated; where required, attach facing materials to cores to produce installed panels with visible surfaces fully covered and free from waves in fabric weave, wrinkles, sage, blisters, seams, adhesive, or other foreign matter.
 - 1. Fabricate back-mounted panels in factory to exact sized required to fit wall surfaces, based on field measurements of completed substrates indicated to receive acoustical wall panels.
 - 2. Where square corners are indicated, tailor corners.
 - 3. Where fabrics with directional or repeating patterns, or directional weave, are indicated, mark fabric top and attach fabric in same direction.
 - 4. Where fabric facings with seams are indicated, fabricate invisible seams and comply with Shop Drawings for location.
 - 5. Where radiused or mitered corners are indicated, install fabric to avoid seams or gathering of material.
 - 6. For panels suspended from ceiling, provide fabric covering both sides, with seams only at panel edges.

2.3 ACCESSORIES

- A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
 - 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.
 - 2. Metal impaling clips designed to support full weight of panels, mechanically attached to substrate and adhesively bonded to back of panels.
 - 3. Hook and loop strips adhered to substrate and to back of panels.
 - 4. Z-clip hanger and magnet system with magnets recessed into panel frame and designed to engage steel mounting plates secured to substrate with screws.
 - 5. Mechanically Mounted Metal-Framed Panels: Metal panel-clip system designed to engage metal framing of panels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and blocking with Installer present, for compliance with requirements for installation tolerances and other conditions affecting acoustical wall panel performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- B. Suspend ceiling baffles at locations and heights indicated.
- C. Install panels to the following construction tolerances:
 - 1. Plumb and level: plus or minus 1/16 inch.
 - 2. Flatness: plus or minus 1/16 inch.
 - 3. Width of joints: plus or minus 1/16 inch.

3.3 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.
- B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.
- C. Clip loose threads; remove pills and extraneous materials.

3.4 PROTECTION OF FINISHED WORK

- A. Provide protection of installed acoustical panels until completion of the Work.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect, before time of substantial completion.

END OF SECTION

SECTION 099100

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: This Section consists of painting work where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Painting work includes, but is not limited to, the surface preparation and application of coated finishes, and subsequent touch-up, of interior items and surfaces as indicated on the Contract Drawings and as scheduled herein.
- B. Surfaces and Materials: In general, without limiting the generality thereof, the following surfaces, fixtures and equipment require a painted finish:
 - 1. New, existing and repaired gypsum board partition and wall surfaces, ceilings and soffits, including all surfaces disrupted and repaired in the process of installing new building systems and components.
 - 2. New and existing metal doors and frames.
 - 3. New and existing interior wood trim.
 - 4. Access panels and frames.
 - 5. Refer to Interior Drawings.
- C. DO NOT PAINT the following surfaces and materials.
 - 1. Concealed from view surfaces, except as indicated otherwise in the Contract Documents or as specified herein.
 - 2. Chrome or nickel plating, stainless steel, bronze, brass.
 - 3. Aluminum other than mill finished or factory primed.
 - 4. Factory finished mechanical and electrical equipment, pumps, machinery and similar items which occur in mechanical, storage or equipment rooms or areas.
 - 5. Factory finished materials, specialties, and accessories unless otherwise specified.
 - 6. Ceramic tile, acoustical tile, resilient flooring, and other integrally finished floor, wall and ceiling finishes.
 - 7. Prefinished millwork items.
 - 8. Fire resistant testing and certification labels, code required labels, safety warning labels, performance rating plates, nomenclature plates, identification plates, and similar other labels.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.
- D. Section 024119 - SELECTIVE DEMOLITION: Removal of existing finishes.xxx
- E. Section 062000 - FINISH CARPENTRY: Wood trim items, setting and filling of nails, sanding of wood trim.
- F. Section 079200 - JOINT SEALANTS: Requirements for sealant and backing materials.

- G. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Shop priming of metal frames and steel doors.
- H. Section 083100 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in partitions and walls.
- I. Section 092900 - GYPSUM BOARD: Drywall partitions, ceilings and soffits, including joint treatment and sanding.
- J. Section 104400 - FIRE PROTECTION SPECIALTIES: Shop priming of cabinet doors and frames; shop finishing of cabinet.
- K. Division 22 - PLUMBING: Prefinished items such as plumbing fixtures, sprinkler heads, convectors, anemostates and similar surfaces and materials.
- L. Division 26 - ELECTRICAL: Prefinished items such as light fixtures, switch gear, electrical distribution cabinets and similar surfaces and materials.

1.3 REFERENCES

- A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
 - 1. ANSI/ASTM D 16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
 - 2. ASTM D 2016 - Test Method for Moisture Content of Wood.
 - 3. All applicable federal, state and municipal codes, laws and regulations for flammability and smoke generation of interior finishes.
- B. Definitions:
 - 1. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials specified herein, whether used as prime, intermediate or finish coats.
 - 2. Sheen: Specular gloss readings in accordance with ASTM D52.
 - a. Flat: less than 5 (measured at 85 degrees).
 - b. Eggshell: 5 – 20 (measured at 60 degrees).
 - c. Satin: 15-35 (measured at 60 degrees).
 - d. Low Luster: 25 – 35 (measured at 60 degrees).
 - e. Semi-Gloss: 30 -65 (measured at 60 degrees).
 - f. Gloss: 65 or more (measured at 60 degrees).

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder.
 - a. Include certification of data indicating Volatile Organic Compound (VOC) content of all paint materials.

2. Samples:
 - a. Manufacturer's color selector for custom mixed colors for Architect's color scheduling.
 - b. Opaque coatings: Two 9 x 12 inch finished samples on hardboard of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.
 - c. Transparent finishes and stains: Two 9 x 12 inch finished samples on same species of solid wood and plywood to be furnished under Section 062000 - FINISH CARPENTRY, of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.

B. Submit the following under provisions of Section 019999 – PROJECT CLOSEOUT:

1. Color chips: After final approval of all colors and tints by the Architect, submit to the Owner, color chips of all coatings used, with manufacturer's name and mix designation of the coating for the purpose of future re-ordering of coatings. Color chips shall be at least six (6) square inches in size, for each color and tint.

1.5 QUALITY ASSURANCE

- A. Applicator: Company specializing in commercial painting and finishing with 3 years minimum documented experience.
- B. Single source responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- C. Environmental Requirements for Volatile Chemicals:
 1. For interior applications use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the following chemical restrictions:
 - a. Flat Paints and Coatings: VOC not more than 50 g/L.
 - b. Non-Flat Paints and Coatings: VOC not more than 150 g/L.
 - c. Anti-Corrosive Coatings: VOC not more than 250 g/L.
 - d. Clear wood finishes:
 - 1) Varnishes: VOC not more than 350 g/L.
 - 2) Lacquer: VOC not more than 550 g/L.
 - e. Floor coatings: VOC not more than 100 g/L.
 - f. Sealers:
 - 1) Waterproofing sealers: VOC not more than 250 g/L.
 - 2) Sanding sealers: VOC not more than 275 g/L.
 - 3) All other sealers: VOC not more than 200 g/L.
 - g. Stains: VOC not more than 250 g/L.
 2. Do not use water based paints formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure), formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Water based paints shall be low VOC and shall have a flash point of 61 degrees C or greater.

3. Where it is necessary to use solvent-based paints, with less than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
4. The following shall be low VOC and not be formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure).
 - a. High performance water based acrylic coatings.
 - b. Pigmented acrylic sealers.
 - c. Catalyzed epoxy coatings.
 - d. High performance silicone grafted epoxy coatings.
5. Restricted Components: Paints and coatings used on this Project shall not contain any of the following compounds. (Excluded from this restriction are residual quantities of naturally occurring elements and chlorinated organics which are found in chlorinated water supplies; contaminate levels shall be below that of the National Primary Drinking Water Standard):
 - a. 1,2-dichlorobenzene
 - b. Alkylphenol ethoxylates (APEs)
 - c. Formaldehyde-donors
 - d. Heavy metals, including lead, mercury, cadmium, hexavalent chromium and antimony in the elemental form or compounds
 - e. Phthalates
 - f. Triphenyl tins (TPT) and tributyl tins (TBT).

1.6 FIELD SAMPLES

- A. Provide field samples under provisions of Section 014000 - QUALITY REQUIREMENTS for purpose of verifying selected colors.
- B. Paint on-site sample areas, minimum 40 square feet, illustrating selected color, and tint.
- C. Locate samples where directed. The Contractor shall provide in the base Contract, a total amount of samples equal to one sample per room.
- D. Accepted samples may remain as part of the work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site in sealed and labeled containers; container labeling shall include manufacturer's name, type of paint, color mix designation, expected coverage, surface preparation instructions, instructions for mixing and reducing, drying time, and clean-up recommendations.
- B. Store materials, conforming with applicable codes and fire regulations, in designated spaces. Keep storage area secure when direct access is not required or when not performing work under this Section. Take precautionary measures to prevent fire hazards and spontaneous combustion, maintain a dry-chemical type fire extinguisher in all areas where materials of this Section are being stored or used.
- C. Store paint materials in a well ventilated area at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.
- D. Do not use the sanitary system for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle. Remove oily rags and waste each day.

1.8 PROJECT CONDITIONS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Apply paints and finishes above minimum temperature conditions in strict accordance with manufacturer's instructions.
- C. Provide sufficient lighting to maintain 80 foot-candles measured mid-height at substrate surface.

1.9 SEQUENCING AND SCHEDULING

- A. The applicator of work specified herein is responsible to ensure that all paints, enamels, and coatings, proposed to be applied hereunder, are compatible with coatings used for shop-primed items and items which have been prime-coated under the work of other trades.
- B. Immediately notify the Architect in writing of conditions which may require a change in the specifications of this Section before proceeding with the work. Failure to do so, in a timely fashion, so as not to interfere with the schedule of work of this Contract, shall be construed as acceptance of the coatings specified. Perform all corrective measures, at no cost to the Owner, for any defects in the work, resulting from the use of such materials.
- C. Painting work should be scheduled so as to minimize touch-ups. Interior painting is to be without flashmarks. Should flashmarks occur due to touch-ups, the Contractor shall be required to redo the entire surrounding wall surface.
- D. Do not order materials until all required schedules have been properly submitted, reviewed by the Contractor and Approved by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
 - 1. Paints, interior stains and clear finishes for wood, and general finishes:
 - a. Basis of Design:
 - 1) Benjamin Moore & Company, Montvale, NJ.
 - 2) Sherwin Williams, Cleveland, OH.

2.2 MATERIALS

- A. Coatings: Ready mixed, except for field catalyzed coatings with good flow and brushing properties; capable of drying or curing free of streaks or sags. Color pigments shall be processed to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating. Provide best quality grade, where manufacturer makes more than one grade of any material specified.

2.3 ACCESSORIES

- A. Accessory materials: other materials not specifically indicated, but are required to achieve the finishes specified of commercial quality.
- B. Cleaning Materials: Tri-Sodium Phosphate (TSP) substitute. Acceptable products include the following, or approved equal:
 - 1. Savogran, Norwood MA, products "TSP-PF", or "Liquid TSP Substitute".
 - 2. Custom Building Products, Seal Beach, CA., product "Custom T.S.P. Substitute".

3. DAP Inc., Baltimore MD., product "T.S.P. Substitute Heavy Duty Cleaner".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify Contractor of any condition that may potentially affect proper application of coatings.
- B. Measure moisture content of surfaces, do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum board and joint treatment: 12 percent.
 - 2. Interior wood: 15 percent.
- C. Beginning Work of this Section means acceptance of existing substrate surfaces and site conditions.

3.2 PREPARATION

- A. Furnish and lay suitable drop cloths in all areas where coating work is being done to protect floors and all other surfaces from damage during the work. Protect adjoining surfaces with painters mask tape.
- B. Prior to preparing surfaces or finishing, remove all finish hardware for painting doors and frames, remove electrical plates, light fixture trim and fittings. Re-install hardware and other removed items after painted surfaces are thoroughly dry.
- C. Mix coatings thoroughly, unless otherwise directed by the manufacturer of the specific coating used, to ensure uniformity of color and mass. Strain previously opened coatings to remove skins, lumps, and other foreign matter prior to painting.
- D. Thin or reduce materials only as recommended by the specific material manufacturer, and only with the approval of the Architect.
- E. Impervious surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to thoroughly dry.
- F. Previously painted surfaces to receive wall covering:
 - 1. Sand with 320 grit waterproof paper until surfaces are uniformly abraded.
- G. New interior wood items scheduled to receive paint finish.
 - 1. Smooth minor defects and remove all foreign matter by sanding, and if necessary, steel wool.
 - 2. Wash sap spots and knots with mineral spirits. When dry, touch up knots, pitch streaks, and sappy sections with commercial stain sealer.
 - 3. Fill up nail holes and cracks with wood putty or plastic wood after primer of first coat of finish is dry, and sand smooth.
- H. Existing interior wood items scheduled to receive paint finish.
 - 1. Smooth minor defects by sanding. Remove all foreign matter with mineral spirits and fine sandpaper or steel wool.
 - 2. Touch up knots and pitch streaks with commercial stain sealer.
 - 3. Fill up nail wood defects, chips in layers of paint, and cracks with spackle. Ease edges of existing paint by application of spackle and sanding smooth.
- I. Gypsum board surfaces, new and existing: Fill minor defects with latex based spackle. Spot-seal all compound surfaces and repair areas in gypsum board, with specified first coat material before application of the first coat.

3.3 APPLICATION

- A. Apply all materials in strict accordance with the approved manufacturer's printed instruction, and in accordance with the best trade practices. Each coat shall be reviewed and approved by the Architect before succeeding coats are applied.
- B. Do not apply successive coating until the preceding coat is thoroughly dry, and in no case in less than 24 hours after the preceding coat.
- C. Number of coats is indicated under Painting Schedules. Number of coats is indicated as a minimum number to be applied over scheduled substrates. An additional coat or coats may be required for proper color coverage of substrate as determined by the Architect, at no additional cost to the Owner. Examples of these conditions include, but are not limited to:
 - 1. Dark colored substrates may require an additional primer or intermediate coat to stabilize color, if final applied top-coat color is light.
 - 2. Pre-finished or pre-primed products may require an additional field applied coat to stabilize the shop/factory applied base color prior to application of top-coat finishes.
 - 3. Dark color top coat finishes may require additional finish coat over white or light colored substrates to obtain correct color density.
- D. Apply each coat to a uniform finish; Apply primer and first coat of slightly lighter in color tint than the scheduled color of the final coat.
- E. Sand lightly between coats to achieve required finish and remove sanding dust prior to applying succeeding coat.
- F. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- G. Prime back surfaces of all interior woodwork scheduled for painted finish with primer.
- H. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.4 CLEANING

- A. Upon completion of the work in each area, remove all coating splatters from glass, prefinished surfaces, bright metals, and from other surfaces that have not been painted or finished hereunder. Do not use abrasive paper or abrasive cleaner on any prefinished surface or bright metal. Remove all materials and debris; leave work area in a clean condition.

3.5 PROTECTION AND TOUCH-UP

- A. During painting work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Properly clean, repair or replace any work so damaged and soiled.
- B. Protect all painted and finished surfaces against damage until the date of final acceptance of the work. The Architect will conduct a final review of all work performed hereunder. Re-coat or touch-up, all scratches and other blemishes on surfaces, and as directed by the Architect, any areas found which do not comply with the requirements of this Section, and bear all costs therefore.
- C. Any re-coating or touch-up work, required after the work of this Section has been reviewed and accepted by the Architect, will be paid for by the Contractor.

3.6 PAINTING SCHEDULE

- A. Colors: The Architect will furnish a schedule of colors for each area and surface. Tinting and matching shall be to the satisfaction of the Architect. No limit is placed on

the number of colors that may be required, or the number of colors in any one room, area, or surface. Premium paints of deep-hued, bright, pigment intensive, accent and primary colors may be scheduled for up to 25 percent of all interior surfaces without additional cost to the Owner.

1. Colors of priming coats (and body coats where specified) shall be lighter in tint than those of finish coat.
 2. Colorants: Pure, non-fading pigments, mildew-proof, ultra-violet resistant, finely ground in approved medium; and be limeproof, when used in coatings to be applied on masonry, concrete, plaster, and gypsum board surfaces.
- B. Paint schedule for interior surfaces and materials: Refer to Section 099123 – INTERIOR PAINTING SCHEDULE.
- C. Exterior metal, galvanized, new or existing:
1. Wash primer apply if recommended by individual paint manufacturer.
 2. One coat primer.
 - a. Devoe Coatings: Devflex 4020PF Direct To Metal Primer and Flat Finish.
 - b. Moore: "DTM. Acrylic Gloss Enamel", WM28
 - c. Pittsburgh: "Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel", 90-712 Series.
 - d. Sherwin-Williams: "Pro Industrial 0 VOC", B66-600 Series.
 3. Two coats of gloss finish direct-to-metal acrylic enamel paint.
 - a. Devoe Coatings: Devflex 659 Gloss DTM Waterborne Acrylic Enamel.
 - b. Moore: "DTM Acrylic Gloss Enamel", WM28
 - c. Pittsburgh: "Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel", 90-374 Series.
 - d. Sherwin-Williams: "Pro Industrial 0 VOC", B66-600 Series.

END OF SECTION

SECTION 099123
INTERIOR PAINTING SCHEDULE

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. General: Number of coats scheduled herein below is minimum required, refer to Article entitled "APPLICATION" in specification Section 09 91 00 - PAINTING, regarding coverage.

1.2 PAINTING SCHEDULE FOR INTERIOR SURFACES AND MATERIALS

- A. Interior touch-up of field cut acoustical ceiling tiles:
1. Two coats:
 - a. Sherwin-Williams ProMar® 400 interior flat latex paint.
- B. Interior gypsum board (drywall) partitions and walls, previously painted:
1. Two coats eggshell paint:
 - a. Sherwin-Williams: "Superpaint Air Purifying Satin", A87-61.
 - b. Moore: "Eco Spec Interior Latex Eggshell", N°. 223.
- C. Interior gypsum board (drywall) partitions:
1. One coat latex primer.
 - a. Sherwin-Williams: "Promar 200 Zero VOC Primer", B28W02600.
 - b. Moore: "Eco Spec Interior Latex Primer Sealer", N°. 231.
 2. Two coats eggshell paint:
 - a. Sherwin-Williams: "Superpaint Air Purifying Satin", A87-61.
 - b. Moore: "Eco Spec Interior Latex Eggshell", N°. 223.
- D. Interior gypsum board (drywall) partitions, and ceilings, at toilet rooms, janitor's closets, food preparation and dishwashing areas for VOC compliant epoxy finish:
1. One coat of sealer:
 - a. Sherwin-Williams: "ProMar 200 Zero VOC Interior Latex Primer", B28w2600 Series.
 - b. Moore: "SuperSpec Primer", N°. 253.
 2. Two coats of semi-gloss Water Based Acrylic-Epoxy Coatings (3 mils DFT each coat).
 - a. Sherwin-Williams: "Water Based Catalyzed Epoxy" B70/B60V15 Series.
 - b. Moore: "Industrial Acrylic Epoxy Enamel", N°s. P43/P44.
- E. Interior gypsum board (drywall) ceilings and underside of soffits, previously painted:
1. Two coats flat paint:
 - a. Sherwin-Williams: "Superpaint Air Purifying Flat", A86-61.
 - b. Moore: "Eco Spec Interior Latex, Flat", N°. 219.
- F. Interior gypsum board (drywall) ceilings and underside of soffits:
1. One coat latex primer.
 - a. Sherwin-Williams: "Promar 200 Zero VOC Primer", B28W02600.
 - b. Moore: "Eco Spec Interior Latex Primer Sealer", N°. 231.
 2. Two coats flat paint:
 - a. Sherwin-Williams: "Superpaint Air Purifying Flat", A86-61.
 - b. Moore: "Eco Spec Interior Latex, Flat", N°. 219.

- G. Interior metal, ferrous, excluding railings, to receive semi-gloss finish: (includes galvanized metal doors and frames):
 - 1. One coat of rust prohibitive primer for unfinished metal surfaces, and touch up bare metal at shop primed, existing and previously coated surfaces:
 - a. Sherwin-Williams: "DTM Acrylic Primer Finish", B66 W1 Series.
 - b. Moore: "Acrylic Metal Primer", N°. P04.
 - 2. Two coats acrylic semi-gloss enamel:
 - a. Sherwin-Williams: "Sher-Cryl HPA Semi-Gloss", B66 Series.
 - b. Moore: "Super Spec HP DTM Semi-Gloss Enamel", N°. P29.
- H. Interior metal, railings (handrails and guardrails):
 - 1. One coat of epoxy primer (dry film coat 3.0 to 4.0 mils)
 - a. Sherwin-Williams: "Pro Industrial Pro-Cryl Universal Primer", B66-310 Series.
 - b. Moore: "Epoxy Metal Primer", P33 Series.
 - 2. Two coats of gloss finish epoxy coating (dry film coat 2.5 to 3.0 mils).
 - a. Sherwin-Williams: "Waterbased Catalyzed Epoxy, B70W211/B60V15 Series".
 - b. Moore: "Acrylic Epoxy Gloss Coating", N°s. P43/P44.
- I. Interior wood trim, unfinished, to receive clear polyurethane (water-based) finish.
 - 1. One coat paste wood filler for open-grained woods.
 - a. Sherwin-Williams: "SherWood Paste Filler", D70T1 Series.
 - b. Moore: "Benwood Paste Wood Grain Filler", N°. 238.
 - 2. Two coats of satin-gloss (low luster) finish clear water-based polyurethane
 - a. Sherwin-Williams: "Minwax Fast Drying Polyurethane Satin", 71028000.
 - b. Moore: "Benwood Clear Acrylic Polyurethane Finish - Low Lustre", N°. 423.
- J. Interior wood trim to receive painted (opaque) finish:
 - 1. One coat acrylic primer-sealer (undercoater):
 - a. Sherwin-Williams: "PrepRite ProBlock Primer/Sealer", B51-600.
 - b. Moore: "Alkyd Enamel Underbody", N°. 217.
 - 2. Two coats acrylic semi-gloss enamel:
 - a. Sherwin-Williams: "ProClassic Waterborne", B31W20 Series.
 - b. Moore: "Superspec Latex Semi Gloss", 276 Series.
- K. Wood door tops and bottoms, cut in the field, (includes all wood doors, with or without a factory applied finish):
 - 1. Two coats of high-gloss finish clear water-based polyurethane:
 - a. Sherwin-Williams: "Minwax Fast Drying Polyurethane Gloss", 63000444.
 - b. Moore: "Benwood Clear Acrylic Polyurethane Finish – High Gloss", N°. 422.

1.3 PAINTING SCHEDULE FOR FIRE RESISTIVE AND RATED DESIGNATIONS

- A. In compliance with Section 703.6 of the 2009 International Building Code and as additionally specified herein, provide identification for all fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions and any other wall or partition which is required to have protected openings or penetrations.
 - 1. Application:
 - a. Apply to outside of fire rated shafts, and to both sides of partitions at intervals not to exceed 30'-0" for entire length of partition or wall, or once on any partition 30'-0 feet or less in length.

- b. Locate identification in all accessible concealed floor, floor-ceiling and attic spaces. Locate identification within 12 to 18 inches above finished ceilings.
 - c. Apply stenciled lettering by spray or brush, or provide permanent signage. Identification shall be waterproof, fade-proof and non-combustible. Signage shall be mechanically fastened or permanently adhered to partition.
 - d. Stencil character height: 1 inch minimum.
 - e. Color: Easily identifiable color, contrasting with background, acceptable to Owner.
2. Apply stenciled lettering to the following types of partitions using wording specified:
- a. Applied identification for 2 hour fire rated partitions shall read: "2 HOUR FIRE WALL - PROTECT ALL OPENINGS".
 - b. Applied identification for 1 hour fire rated partitions shall read: "1 HOUR FIRE WALL - PROTECT ALL OPENINGS".
 - c. Applied identification for Smoke barriers shall read: "1 HOUR SMOKE BARRIER - PROTECT ALL OPENINGS".
 - d. Applied identification for Smoke partitions shall read: "SMOKE BARRIER PARTITION - PROTECT ALL OPENINGS".

1.4 PAINTING SCHEDULE FOR MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black enamel.
- B. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- C. Remove unfinished louvers, grilles, covers and access panels on and paint as scheduled above.
- D. Plywood backboards for electrical panels and other equipment. Paint both front and back surfaces and all edges of plywood backboards before backboards are installed.
 - 1. One coat latex primer-sealer (undercoater):
 - a. Sherwin-Williams: "Promar 200 Zero VOC Primer", B28W02600.
 - b. Moore: "EcoSpec Interior Latex Primer Sealer" 231.
 - 2. Two coats latex semi-gloss paint:
 - a. Sherwin-Williams: "Superpaint Air Purifying Semi Gloss", A88-61.
 - b. Moore: "EcoSpec Interior Latex Semi-gloss" N°. 224.
- E. Interior RECYCLED WATER PIPING, Insulated and Wrapped to receive - semi-gloss finish including concealed locations.
 - 1. Sequencing: all recycled water piping must be painted prior to being concealed by work of other trades.
 - 2. Paints:
 - a. At non insulated conditions: Same as specified for ferrous metal.
 - b. At insulated conditions: Apply one prime coat and two finish coats of a paint recommended by the approved paint manufacturer for application on the exposed wrapping material.
 - 3. Color(s): As required by State Plumbing Code.
- F. Prime and paint insulated and exposed cold pipes, conduit, electrical boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are located in storage, mechanical or equipment spaces or those items which are factory prefinished.

- G. Exposed to view un-insulated hot pipes within finished painted areas: Two coats heat-resistant enamel conforming to Federal Specification TT-E-496, Type I, applied when surfaces are less than 140 degrees Fahrenheit.

END OF DOCUMENT

SECTION 101123
TACK BOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this section includes:
 - 1. Tackboards and accessories.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
 - A. Section 061000 - ROUGH CARPENTRY: Wood blocking, and nailers.
 - B. Section 079200 - JOINT SEALANTS: Requirements for and scheduling of sealants and backing materials.
 - C. Section 092900 - GYPSUM BOARD: Gypsum drywall substrate.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS.
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics for Building Materials.

1.4 SUBMITTALS

- A. Submit the following:
 - 1. Product Data: Provide list of items proposed to be provided under this Section. Include manufacturer's specifications, installation instructions, and other data needed to demonstrate compliance with specified requirements.
 - 2. Shop Drawings: Provide Shop Drawings in sufficient detail to show fabrication, layout, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
 - 3. Samples:
 - a. Tackboard, 300 by 300 mm (six by six inches), each color, mounted on backing.

1.5 QUALITY ASSURANCE

- A. Boards shall be the products of one manufacturer.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- B. Composite Panel Association (CPA):

- | | |
|--------------|-----------------|
| 1. A208.1-09 | Particleboard |
| 2. A135.4-04 | Basic Hardboard |

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- B. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- C. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

1.8 SITE CONDITIONS

- A. Temperature: Maintain ambient temperature above 55 degrees Fahrenheit for 5 calendar days before, and during installation of architectural woodwork; maintain temperature after installation until Owner's Final Acceptance.
- B. Relative Humidity: Maintain a relative humidity between 25 and 55 percent for a minimum period of 5 calendar days before, and during, installation of architectural woodwork; maintain relative humidity after installation until Owner's Final Acceptance.

PART 2 - PRODUCTS

2.1 TACK BOARDS

- A. General; Fabric wrapped tack surface shall consist of a tackable material, with fabric surround, as indicated on the Drawings.
- B. Components:
1. Tackboard: Cork face, 6 mm (1/4-inch) thick factory laminated to a hardboard or particleboard backing, of thickness required so that the thickness is, 6 mm to 9 mm (1/4 to 3/8-inch).
 - a. Width: As indicated on the Drawings.
 - b. Length: As indicated on the Drawings.

- c. Backing: Jute.
- d. Adhesive: Equal to Forbo L 910W Adhesive or approved equal.
- e. Fabric characteristics:
 - 1) Style, manufacturer and color: Refer to Sheet 31-ID-104.
 - 2) 63% Solution-Dyed Polyolefin.
 - 3) Traffic designation: High Traffic.
 - 4) Finish: PFOA-Free Stain Resistant.
 - 5) Backing: Acrylic.
 - 6) Width: 54" (137cm).
 - 7) Bolt Size: 50 yards (46 m).
 - 8) Weight: 13.8 oz/ly (400 gr/lm).
 - 9) Performance:
 - a) Flammability: This textile meets all appropriate flammability requirements for upholstered walls and walls.
 - b) Lightfastness: 200+ hours.
 - 10) Environmental:
 - a) Greenguard and Greenguard Gold Certified.
 - b) 37% Solution-Dyed Post-Consumer Recycled Polyester.
 - c) FR Free
 - d) PFOA-Free Finish
 - e) Solution-Dyed Product
 - f) Produced in an ISO 14001 Facility
 - 11) Warranty:
 - a) 10 years: Walls
 - b) 3 years: Upholstered Walls..

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Beginning of installation means acceptance of existing substrate.

- B. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation. Use concealed fasteners.
- C. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (bond testing, etc.). Inspect surfaces and related construction to receive units. Partitions shall have reinforcing to receive fasteners. Verify type and placement of reinforcement.
- D. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- E. Verify that internal wall blocking or reinforcing plate blocking is ready to receive work of this Section.
- F. Verify that wall surfaces are true and plumb and are prepared and ready to receive boards.
 - 1. Substrate shall be sound, smooth, flat, permanently dry, clean, and free of all foreign materials including, but not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue.
- G. Do not proceed with the installation until reinforcement is in place and surfaces are flat.

3.2 INSTALLATION OF TACK BOARDS

- A. Material Installation: Cut required length from roll, allowing 2-3 inches overlap. Lay sheets flat to acclimate, preferably 48 hours prior to installation. Back roll sheets once in reverse direction to release roll stretch. Remove the factory edge from both sides of the material. Apply adhesive and place sheet into wet adhesive and roll with a three-section wall roller.
- B. Adhesive Installation: Use trowel as recommended by manufacturer for specific adhesive (1/8 by 1/8 by 1/16 inch V notch trowel). Spread rate is approximately 90 ft²/gallon.
- C. Installation Techniques:
 - 1. Apply the material to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 - a. Use adhesive applied to substrate in compliance with manufacturer's recommendations, including those for mixing, trowel notch, and adhesive open and working times.
 - b. Roll material as required by manufacturer.
- D. Finish patterns: As selected by Architect.

3.3 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
 - 1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by manufacturer.
 - 2. Dust or wipe with a damp cloth.

3.4 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

END OF SECTION

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SECTION 101400
SIGNAGE – VAMC WHITE RIVER JUNCTION, VT

INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies interior signage for room identification, life safety and directional / wayfinding signs.

1.2 MANUFACTURER'S QUALIFICATIONS

- A. Sign vendor shall provide evidence that they regularly and presently manufacture signs similar to those specified in this section as one of their principal products. Sign vendor shall have at least 5 years experience and have completed 5 other similar VA signage projects within the last 5 years. Recommended Vendor: Creative Signage Systems, Inc. 11460-B Edmonston Road Beltsville, MD 20705 P: 301-345-3700 E: creative@creativesignage.com.

1.3 SUBMITTALS

- A. Manufacturer's Literature:
1. Showing the methods and procedures proposed for the concealed anchorage of the signage system to each surface type.
 2. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions.
- B. Samples: Sign location plan, showing location, type and total number of signs required.
- C. Shop Drawings: Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.
- D. Certification of meeting environmental attributes required within specification.
- E. Physical sample of sign type D1A/F1/BP with bid submittal.

1.4 DELIVERY AND STORAGE

- A. Deliver materials to job in manufacturer's original sealed containers with brand name marked thereon. Protect materials from damage.
- B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- C. Deliver signs only when the site and mounting services are ready for installation work to proceed.
- D. Store products in dry condition inside enclosed facilities.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
B209-07Aluminum and Aluminum-Alloy Sheet and Plate

B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire,
Shapes, and tubes.

C. Federal Specifications (Fed Spec):

MIL-PRF-8184FPlastic Sheet, Acrylic, Modified.

MIL-P-46144CPlastic Sheet, Polycarbonate

1.6 MINIMUM SIGN REQUIREMENTS

A. Permanent Rooms and Spaces (Refer to VA White River Junction Sign Standard Drawings):

1. Tactile and Braille Characters, raised minimum 0.793 mm (1/32 in). Characters shall be accompanied by Grade 2 Braille.
2. Type Styles: See Drawings.
3. Character Height: Minimum 16 mm (5/8 in) high, Maximum 50 mm (2 in).
4. Symbols (Pictograms): Equivalent written description shall be placed directly below symbol, outside of symbol's background field. Border dimensions of symbol background shall be minimum 150 mm (6 in) high.
5. Finish and Contrast: Characters and background shall be discovery white, matte or other non-glare finish with adequate contrast with background.
6. Mounting Location and Height: To comply with ADA Regulations. Mount on wall adjacent to the latch side of the door and to avoid door swing and protruding objects.
7. All signs shall have a ¼" back-plate laminated in a dual sided thermofoil with two 1/8" x 8 ½ " integral anodized aluminum rails containing 75% recycled aluminum.
8. All wall mounted signs must be mechanically fastened to the wall with concealed screws and plugs.
9. Acrylic sign components holding inserts must be magnetically mounted allowing sign messages to be easily slid out and changed.
10. Insert software program with unlimited license that auto scales the copy to fit each sign approximately allowing signs to be updated in house on any standard computer and printer must be provided.
11. Background color, non-tactile copy and graphics shall be subsurface digitally printed direct to substrate with variable dot pattern, UV ink containing NO VOCs and LED curing. Painting and screen printing shall not be used.

B. Overhead Signs (Refer to VA White River Junction Sign Standard Drawings):

1. Type Styles: As shown. Characters shall have a width-to-height ratio between 3:5 and 1:1. Characters shall have a stroke width-to-height ratio of between 1:5 and 1:10.
2. Character Height: minimum 75 mm (3 in) high for overhead signs. As shown, for directional signs.
3. Finish and Contrast: Same as for signs of permanent rooms and spaces.
4. Mounting Location and Height: As shown.

5. Background color, non-tactile copy and graphics shall be subsurface digitally printed direct to substrate with variable dot pattern, UV ink containing NO VOCs and LED curing. Painting and screen printing shall not be used.

1.7 COLORS AND FINISHES:

All acrylic shall be 2-Ply Non-Glare. Metal accents shall be anodized aluminum with 75% recycled content. Sign backing to be an Environmental Preferable Product (EPP Downstream Certified). Overhead Signage shall feature a 2" Solid Wood Header to match sign back-plate. Life Safety Signage color Fire Red Background with White Copy & Graphics. Final color and finishes TBD – Refer to VA White River Junction Sign Standard Drawings.

1.8 REPLACEMENT AVAILABILITY

All products designed must be readily available non-proprietary items on GSA Schedule for ease in future procurement. All signs must be American made and under standard GSA warranties.

PART 2 - PRODUCTS

2.0 BASIS OF DESIGN: SEE APPENDIXES AT THE END OF THIS SECTION.

2.1 GENERAL

- A. Signs of type, size and design shown on the drawings and as specified.
- B. Signs complete with lettering, framing and related components for a complete installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D. Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. Resident Engineer to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.

2.2 PRODUCTS

- A. Aluminum:
 - 1. Sheet and Plate: ASTM B209.
 - 2. Extrusions and Tubing: ASTM B221.
- B. Cast Acrylic Sheet: MIL-PRF-8184F; Type II, class 1, Water white non-glare optically clear. Matte finish water white clear acrylic shall not be acceptable.
- C. Polycarbonate: MIL-P-46144C; Type I, class 1.
- D. Vinyl: 0.1 mm thick machine cut, having a pressure sensitive adhesive and integral colors.

2.3 SIGN STANDARDS

A. Topography:

1. Type Style: Helvetica Medium and Futura. Initial caps or all caps as indicated in Sign Message Schedule.
2. Arrow: See graphic standards in drawings.
3. Letter spacing: See graphic standards on drawings.
4. Letter spacing: See graphic standards on drawings.
5. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only; final text for signs is listed in Sign Message Schedule.

2.4 CONSTRUCTION

Interior signs - are composed of a two ply laminate, the first ply being 1/16" thick matte finish acrylic, the second ply being 4mm thick closed cell PVC, and the laminate being a double coated pressure sensitive polypropylene film rated at 56 oz/in minimum adhesion per PSTC-1. Pocket signs created using No. 38 -.080" separating rib(s) to form insert space for custom computer generated acetate with package results in 5 3/16" inserts and 2 1/16" inserts (**the use of adhesive strips instead of acrylic ribs is not acceptable**). Signs to nest into a 1/4" back-plate laminated in a dual sided thermofoil with two 1/8" x 9" integral anodized aluminum rails containing 75% recycled aluminum. The room number portion to use injected molded ABS characters. Grade II Braille to be produced with high pressure surface beading directly below tactile number 3/16" minimum. Braille translation via Duxbury Braille translator. **Color, non-tactile copy and graphics shall be subsurface digitally printed direct to substrate with a variable dot pattern, UV Ink containing NO VOCs and LED curing.** Painting and screen printing shall not be used. Surface color or copy is not acceptable.

2.5 FABRICATION

- A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.
- C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.
- D. Contact surfaces of connected members be true. Assembled so joints will be tight and practically unnoticeable, without use of filling compound.

- E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces be smooth flat and without oil-canning, free of rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches. Restore texture to filed or cut areas.
- F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth surfaces.
- G. Extruded members to be free from extrusion marks. Square turns and corners sharp, curves true.
- H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.
- I. Finish hollow signs with matching material on all faces, tops, bottoms and ends. Edge joints tightly mitered to give appearance of solid material.
- J. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.
- K. Movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of members. Doors and covers centered in opening or frame. All contact surfaces fit tight and even without forcing or warping components.
- L. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the Resident Engineer & forwarded to contractor.

PART 3 – SIGN TYPES

- A. Signage Message List:** (See Appendix 101400-A at the end of this section and drawing 31-AS-701; SIGNAGE LOCATION PLAN)
- B. Room Identification:** (See Appendix 101400-B: ROOM IDENTIFICATION)
 - D1A/F/BP (IN-03.01/04.01) 9" x 9" ADA Room ID with changeable slot for all hard wall primary rooms.
 - D1A/F1/cP/BP 15-3/8" x 9" ADA Room ID with changeable slot and information tabs for all hard wall single patient rooms.
 - D1A/F1/cP/BP 17-1/2" x 9" ADA Room ID with changeable slot, permanent message, and information tabs for all hard wall double patient rooms.
 - D1A/BP (IN-03.01) 3" x 9" ADA Room Number for restrooms within patient rooms and other elected areas.

- D1A/F1/O/BP (IN-03.01/07.02) 9" x 8" ADA Room Number with changeable slot and "In Use | Vacant" slider module for Consultation Room.
- D1A/F1/BP (IN-03.01/04.02) 6" x 9" ADA Room ID with changeable slot for secondary room identification.
- D1A/SA/BP (IN-09.01,.02,.03) 9" x 9" ADA Stair / Restroom ID with 3" x 9" ADA Room Number for restrooms and stairs.
- A complete sign message schedule identifying each sign, its message and its type should be develop by vendor. Room Identification signs must feature an open license application that auto scales copy to fit each sign to create new sign inserts in house on any standard computer and printers. Refer to sign drawings for detailed design. See sign schedule for further detail.

Additional Components:

- Q/R/S/BP (IN-08.01) 9" x 9" regulatory graphics, i.e., No Smoking, Authorized Personnel Only, etc. provided for appropriate locations.
- P5/W (IN-11.01) 9" x 9" and 12" x 12" framed general permanent information signage as needed for to provide assistance to patients and visitors.
- E1/P/BP (IN-10) 13" x 12" updateable pocket information display for areas that have continually updated information to display.

C. Directional Signs: (See Appendix 101400-C: DIRECTIONAL & LIFE SAFETY SIGNAGE)

Provide plan for primary and secondary wayfinding components at all decision points and key node areas requiring directional information. Emphasis should be placed on areas and services commonly sought-after by Veterans and their families. Provide various directional/wayfinding components including sign types:

- E1/P/BP (IN-14.05) small wall mounted pocket directional with arrow panel and pocket to hold 8-1/2" x 11" insert for easy updatability.
- C4-DF (IN-15.01) single or double faced overhead sign; 2 ply non-glare acrylic with Subsurface color, vinyl graphics and wood accent.
- G-D/F (IN-13) 9" x 12" and 9" x 9" Right Angle / Flag Mount target sign with anodized aluminum bracket.
- ML-F (IN-19.01) in 4" and 5" heights by 1/4" deep water jet cut black aluminum letters to highlight key destination areas.

D. Life Safety Components: (See Appendix 101400-C DIRECTIONAL & LIFE SAFETY SIGNAGE)

- V/W (IN-01.01.01) 18" x 18" evacuation plan with updatable insert
- E/W (IN-01.03) 6" x 9" pull station (RACE) information

- G D/F (IN-01.31) 9" x 9" Fire Extinguisher / Crash Cart right angle
- E3A/W (IN-01.10) 9" x 9" stairwell / exit ID sign with ADA copy
- V3/W (IN-01.04) 9" x 9" elevator warning at all call button locations
- P5/NFPA (IN-01.11) 18" x 18" stairwell egress mandatory code information

PART 4 - EXECUTION

4.1 INSTALLATION

- A. Protect products against damage during field handling and installation.
- B. Mount signs in proper alignment, level and plumb according to the sign location plan and the dimensions given on elevation and sign location drawings. Where otherwise not dimensioned, signs shall be installed where best suited to provide a consistent appearance throughout the project. When exact position, angle, height or location is in doubt, contact Resident Engineer for clarification.
- C. All wall mounted signs must be mechanically fastened to the wall unless noted as an exception.
- D. Remove or correct signs or installation work Resident Engineer determines as unsafe or as an unsafe condition.

4.2 ATTACHMENTS

- A. APPENDIX A, 101400.A: INPATIENT WAR SIGNAGE MESSAGE LIST
Information provided by Creative Signage Systems, Inc., Eight (8) pages.
- B. APPENDIX B, 101400.B: ROOM IDENTIFICATION
Information provided by Creative Signage Systems, Inc., Twenty (20) pages.
- C. APPENDIX C, 101400.C: DIRECTIONAL & LIFE SAFETY SIGNAGE
Information provided by Walton Signage, Eighteen (18) pages.

END OF SECTION

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101400.A
INPATIENT WARD SIGNAGE MESSAGE LIST

APPENDIX A TO SECTION 101400, INTERIOR SIGNAGE

COVER SHEET

VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST

Loc	Dwg #	Sign Type	Qty	Message	Remarks
<u>Room Identification</u>					
100	1	D1A/F/BP	1	Family Waiting Area	9" x 9" ADA Room # w/1 Slot & BP
100A	1	D1A/F/BP	1	Reception	9" x 9" ADA Room # w/1 Slot & BP
101	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
101A	4	D1A/BP	1	101A	3" x 9" ADA Room Number w/BP
102	1	D1A/F/BP	1	Dayroom	9" x 9" ADA Room # w/1 Slot & BP
103	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
103A	4	D1A/BP	1	103A	3" x 9" ADA Room Number w/BP
103B	1	D1A/F/BP	1	PPE Ante-Room	9" x 9" ADA Room # w/1 Slot & BP
104	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
104A	4	D1A/BP	1	104A	3" x 9" ADA Room Number w/BP
105	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
105A	4	D1A/BP	1	105A	3" x 9" ADA Room Number w/BP
106	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
106A	4	D1A/BP	1	106A	3" x 9" ADA Room Number w/BP
107	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
107A	4	D1A/BP	1	107A	3" x 9" ADA Room Number w/BP
108	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
108A	4	D1A/BP	1	108A	3" x 9" ADA Room Number w/BP
109	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
109A	4	D1A/BP	1	109A	3" x 9" ADA Room Number w/BP
109B	1	D1A/F/BP	1	PPE Ante-Room	9" x 9" ADA Room # w/1 Slot & BP
110	1	D1A/F/BP	1	Electrical Room	9" x 9" ADA Room # w/1 Slot & BP
111	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
111A	4	D1A/BP	1	111A	3" x 9" ADA Room Number w/BP
111B	1	D1A/F/BP	1	PPE Ante Room	9" x 9" ADA Room # w/1 Slot & BP
112	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
112A	4	D1A/BP	1	112A	3" x 9" ADA Room Number w/BP

***VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST***

Loc	Dwg #	Sign Type	Qty	Message	Remarks
113	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
113A	4	D1A/BP	1	113A	3" x 9" ADA Room Number w/BP
114	1	D1A/F/BP	1	Office	9" x 9" ADA Room # w/1 Slot & BP
115	1	D1A/F/BP	1	IV and RT Storage	9" x 9" ADA Room # w/1 Slot & BP
116	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
116A	4	D1A/BP	1	116A	3" x 9" ADA Room Number w/BP
116B	1	D1A/F/BP	1	Electrical Room	9" x 9" ADA Room # w/1 Slot & BP
117	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
117A	4	D1A/BP	1	117A	3" x 9" ADA Room Number w/BP
118	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
118A	4	D1A/BP	1	118A	3" x 9" ADA Room Number w/BP
119	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
119A	4	D1A/BP	1	119A	3" x 9" ADA Room Number w/BP
120	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
120A	4	D1A/BP	1	120A	3" x 9" ADA Room Number w/BP
121	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
121A	4	D1A/BP	1	121A	3" x 9" ADA Room Number w/BP
122	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
122A	4	D1A/BP	1	122A	3" x 9" ADA Room Number w/BP
123	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
123A	4	D1A/BP	1	123A	3" x 9" ADA Room Number w/BP
124	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
124A	4	D1A/BP	1	124A	3" x 9" ADA Room Number w/BP
125	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
125A	4	D1A/BP	1	125A	3" x 9" ADA Room Number w/BP
126	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
126A	4	D1A/BP	1	126A	3" x 9" ADA Room Number w/BP

***VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST***

Loc	Dwg #	Sign Type	Qty	Message	Remarks
127	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
127A	4	D1A/BP	1	127A	3" x 9" ADA Room Number w/BP
128	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
128A	4	D1A/BP	1	128A	3" x 9" ADA Room Number w/BP
129	1	D1A/F/BP	1	Patient Room	9" x 9" ADA Room # w/1 Slot & BP
129A	4	D1A/BP	1	111A	3" x 9" ADA Room Number w/BP
129B	1	D1A/F/BP	1	PPE Ante Room	9" x 9" ADA Room # w/1 Slot & BP
130	1	D1A/F/BP	1	Gas Bottle Storage	9" x 9" ADA Room # w/1 Slot & BP
131	1	D1A/F/BP	1	Team 4	9" x 9" ADA Room # w/1 Slot & BP
132	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
132A	4	D1A/BP	1	132A	3" x 9" ADA Room Number w/BP
133	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
133A	4	D1A/BP	1	133A	3" x 9" ADA Room Number w/BP
134	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
134A	4	D1A/BP	1	134A	3" x 9" ADA Room Number w/BP
135	3	D1A/F1/E1/cP-8/BP	1	Patient Room	17-1/2" x 9" ADA Room # w/2 Slot & BP
135A	4	D1A/BP	1	135A	3" x 9" ADA Room Number w/BP
136	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
136A	4	D1A/BP	1	136A	3" x 9" ADA Room Number w/BP
137	2	D1A/F1/cP-8/BP	1	Patient Room	15-3/8" x 9" ADA Room # w/1 Slot & BP
137A	4	D1A/BP	1	137A	3" x 9" ADA Room Number w/BP
138	6	D1A/SA/BP	1	Staff Toilet	13" x 9" ADA Restroom w/BP
139	1	D1A/F/BP	1	Nourishment	9" x 9" ADA Room # w/1 Slot & BP
140	N/A	D1A/F/BP	0	Team Station	<i>No Sign</i>
140A	1	D1A/F/BP	1	Tray Cart	9" x 9" ADA Room # w/1 Slot & BP
140B	N/A	D1A/F/BP	0	Linen	<i>No Sign</i>

***VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST***

Loc	Dwg #	Sign Type	Qty	Message	Remarks
141	1	D1A/F/BP	1	General Purpose Workroom	9" x 9" ADA Room # w/1 Slot & BP
141A	1	D1A/F/BP	1	Medication	9" x 9" ADA Room # w/1 Slot & BP
142	1	D1A/F/BP	1	Tub Room	9" x 9" ADA Room # w/1 Slot & BP
143	1	D1A/F/BP	1	Exam Room	9" x 9" ADA Room # w/1 Slot & BP
144	1	D1A/F/BP	1	Electrical Room	9" x 9" ADA Room # w/1 Slot & BP
145	N/A	D1A/F/BP	0	Team Station	<i>No Sign</i>
145A	1	D1A/F/BP	1	Tray Cart	9" x 9" ADA Room # w/1 Slot & BP
145B	N/A	D1A/F/BP	0	Linen	<i>No Sign</i>
146	1	D1A/F/BP	1	Team 2	9" x 9" ADA Room # w/1 Slot & BP
147	1	D1A/F/BP	1	Staff Multipurpose Room	9" x 9" ADA Room # w/1 Slot & BP
148	1	D1A/F/BP	1	Soiled Holding	9" x 9" ADA Room # w/1 Slot & BP
149	1	D1A/F/BP	1	Team 1	9" x 9" ADA Room # w/1 Slot & BP
150	1	D1A/F/BP	1	Office	9" x 9" ADA Room # w/1 Slot & BP
151	1	D1A/F/BP	1	CSS	9" x 9" ADA Room # w/1 Slot & BP
152	1	D1A/F/BP	1	General Purpose Workroom	9" x 9" ADA Room # w/1 Slot & BP
153	1	D1A/F/BP	1	Equipment Storage	9" x 9" ADA Room # w/1 Slot & BP
154	1	D1A/F/BP	1	Nourishment	9" x 9" ADA Room # w/1 Slot & BP
155	1	D1A/F/BP	1	General Purpose Workroom	9" x 9" ADA Room # w/1 Slot & BP
156	1	D1A/F/BP	2	Housekeeping	9" x 9" ADA Room # w/1 Slot & BP
156A	1	D1A/F/BP	1	COMM/TV	9" x 9" ADA Room # w/1 Slot & BP
157	1	D1A/F/BP	1	Electrical Room	9" x 9" ADA Room # w/1 Slot & BP
158	1	D1A/F/BP	1	IT Room	9" x 9" ADA Room # w/1 Slot & BP

VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST

Loc	Dwg #	Sign Type	Qty	Message	Remarks
159	5	D1A/F1/O/BP	1	Consultation Room	9" x 8" ADA Rm # w/1 Slot, Slider & BP
160	1	D1A/F/BP	1	HSKPG Storage	9" x 9" ADA Room # w/1 Slot & BP
161	N/A	D1A/F/BP	0	Team Station	<i>No Sign</i>
162	6	D1A/SA/BP	1	Restroom Unisex	13" x 9" ADA Restroom w/BP
163	6	D1A/SA/BP	1	Restroom Unisex	13" x 9" ADA Restroom w/BP
164	1	D1A/F/BP	1	Office	9" x 9" ADA Room # w/1 Slot & BP
165	1	D1A/F/BP	1	Medication	9" x 9" ADA Room # w/1 Slot & BP
166	1	D1A/F/BP	1	On-Call	9" x 9" ADA Room # w/1 Slot & BP
166A	4	D1A/BP	1	166A	3" x 9" ADA Room Number w/BP
167	1	D1A/F/BP	1	TBD	9" x 9" ADA Room # w/1 Slot & BP
168	N/A	D1A/F/BP	0	Team Station	<i>No Sign</i>
169	6	D1A/SA/BP	1	Staff Toilet	13" x 9" ADA Restroom w/BP

VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST

Loc	Dwg #	Sign Type	Qty	Message	Remarks
Directionals					
A	20	ML-F	13	Inpatient Ward	5" x 1/4" Cut-Out Black Aluminum Letters
B	13	C4 D/F	1	<div> <div>↖ Reception</div> <div>↗ Exit to Building 1</div> </div>	<div>(a) 8" x 36" Ceiling Mounted Overhead</div> <div>(b)</div>
B.1	13	C4 S/F	1	Family Waiting	8" x 36" Ceiling Mounted Overhead
C	20	ML-F	22	Inpatient Ward Reception	4" x 1/4" Cut-Out Satin Aluminum Letters
D	12	E1/P/BP P Insert	1 1	<div>←</div> <div>Exit to Building 1 Reception</div>	<div>Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert</div>
E	8	G D/F	1	Cold Cart	8" x 12" Right Angle
F	12	E1/P/BP P Insert	1 1	<div>←</div> <div>Reception Exit to Building 1</div>	<div>Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert</div>
G	11	E1/P/BP P Insert	1 1	<div>TBD</div> <div>← Rooms 103-108 → Rooms 109-117</div>	<div>Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert</div>
H	12	E1/P/BP P Insert	1 1	<div>→</div> <div>Exit</div>	<div>Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert</div>
I	13	C4 FM	1	ICU	8" x 36" Wall Mounted Overhead
J	11	E1/P/BP P Insert	1 1	<div>ICU</div> <div>TBD</div>	<div>Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert</div>

VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST

Loc	Dwg #	Sign Type	Qty	Message	Remarks
K	11	E1/P/BP	1	TBD	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
		P Insert	1	↑ Rooms 103-113	
				← Rooms 118-137	
L	12	E1/P/BP	1	↑	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
		P Insert	1	Reception Exit to Building 1	
M	8	G D/F	1	Cold Cart	8" x 12" Right Angle
N	13	C4 D/F	1	← Elevators Reception	(a) 8" x 36" Ceiling Mounted Overhead
				Elevators Reception →	(b)
N1.1	13	C4 D/F	1	Nurse Station 1	8" x 42" Ceiling Mounted Overhead
N1.2	20	ML-F	14	Nurse Station 1	4" x 1/4" Cut-Out Black Aluminum Letters
N2.1	13	C4 D/F	1	Nurse Station 2	8" x 42" Ceiling Mounted Overhead
N2.2	20	ML-F	14	Nurse Station 2	4" x 1/4" Cut-Out Black Aluminum Letters
N3.1	13	C4 D/F	1	Nurse Station 3	8" x 42" Ceiling Mounted Overhead
N3.2	20	ML-F	14	Nurse Station 3	4" x 1/4" Cut-Out Black Aluminum Letters
N4.1	13	C4 D/F	1	Nurse Station 4	8" x 42" Ceiling Mounted Overhead
N4.2	20	ML-F	14	Nurse Station 4	4" x 1/4" Cut-Out Black Aluminum Letters
O	12	E1/P/BP	1	←	Hdr 13" x 12" Header & Pocket w/BP for
		P Insert	1	Rooms 132-137	
O.1	12	E1/P/BP	1	←	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
		P Insert	1	Exit to Building 1	
				Elevators Reception	
P	12	E1/P/BP	1	←	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
		P Insert	1	Exit to Building 1 Reception	

**VA WHITE RIVER JUNCTION
INPATIENT WARD SIGNAGE MESSAGE LIST**

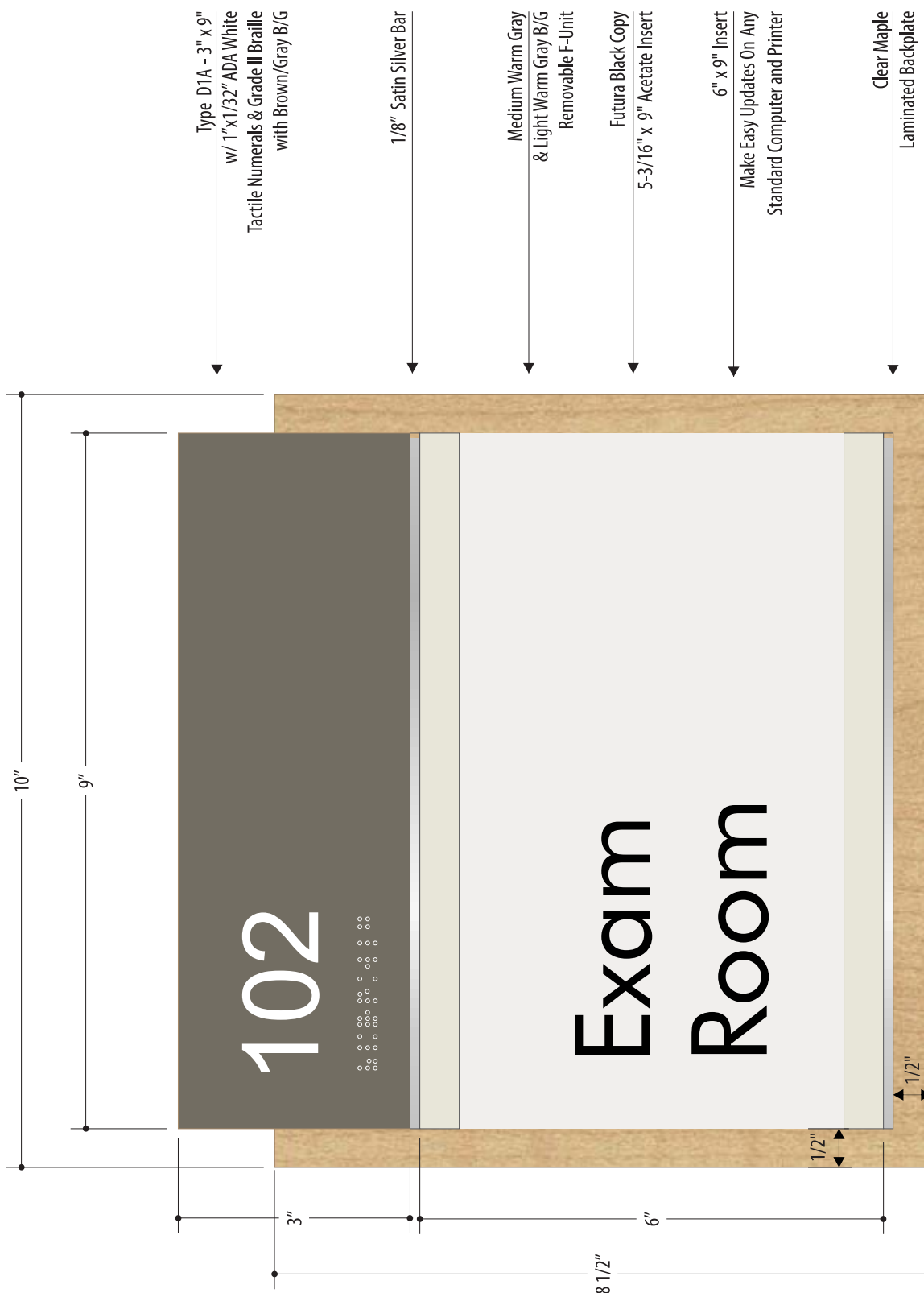
Loc	Dwg #	Sign Type	Qty	Message	Remarks
Q	12	E1/P/BP	1	➔	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
		P Insert	1	Exit to Building 1 Reception	
R	12	E1/P/BP	1	← Exit to Building 28	Hdr 13" x 12" Header & Pocket w/BP for 8-1/2" x 11" Acetate Insert
S	10	P/E/BP	1	Elevator Directory	22" x 12" Header and Pocket w/BP for 17" x 11" Acetate Insert
Life Safety					
T.1	9	Q/W	1	Authorized Personal Only (G/S)	9" x 9" Framed Regulatory Graphic
T.2	9	Q/W	1	Authorized Personal Only (G/S)	9" x 9" Framed Regulatory Graphic
T.3	9	Q/W	1	Authorized Personal Only (G/S)	9" x 9" Framed Regulatory Graphic
U.1	15	SA/W	1	STAIR 1	9" x 9" Framed ADA Stairwell ID
U.2	15	SA/W	1	STAIR 2	9" x 9" Framed ADA Stairwell ID
U.3	15	SA/W	1	STAIR 4	9" x 9" Framed ADA Stairwell ID
V.1	16	P5-NFPA	1	Stairwell ID	18" x 18" NFPA Stairwell ID
V.2	16	P5-NFPA	1	Stairwell ID	18" x 18" NFPA Stairwell ID
V.3	16	P5-NFPA	1	Stairwell ID	18" x 18" NFPA Stairwell ID
W.1	14	V/W	1	Evacuation Plan	18" x 18" Framed Evacuation Holder
W.2	14	V/W	1	Evacuation Plan	18" x 18" Framed Evacuation Holder
W.3	14	V/W	1	Evacuation Plan	18" x 18" Framed Evacuation Holder
W.4	14	V/W	1	Evacuation Plan	18" x 18" Framed Evacuation Holder
W.5	14	V/W	1	Evacuation Plan	18" x 18" Framed Evacuation Holder
	14	Artwork	1		Stylized Art Charge Per Floor
X.1	7	P5/W	1	Card Reader Access Only	9" x 9" Permanent Message
X.2	7	P5/W	1	Card Reader Access Only	9" x 9" Permanent Message
X.3	7	P5/W	1	Card Reader Access Only	9" x 9" Permanent Message
Y.1	18	E/W	1	RACE	6" x 9" Framed Race Sign
Y.2	18	E/W	1	RACE	6" x 9" Framed Race Sign
Y.3	18	E/W	1	RACE	6" x 9" Framed Race Sign
Y.4	18	E/W	1	RACE	6" x 9" Framed Race Sign
Z.1	19	G D/F	1	Fire Extinguisher	9" x 9" Right Angle Fire Equipment
Z.2	19	G D/F	1	Fire Extinguisher	9" x 9" Right Angle Fire Equipment
Z.3	19	G D/F	1	Fire Extinguisher	9" x 9" Right Angle Fire Equipment
Z.4	19	G D/F	1	Fire Extinguisher	9" x 9" Right Angle Fire Equipment

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101400.B
ROOM IDENTIFICATION SIGNAGE

APPENDIX B TO SECTION 101400, INTERIOR SIGNAGE

COVER SHEET



ROOM IDENTIFICATION SIGNAGE - 101400.B
 Appendix B to Section 101400, SIGNAGE SPECIFICATION
 September 30, 2022

VA White River Junction - Inpatient Ward

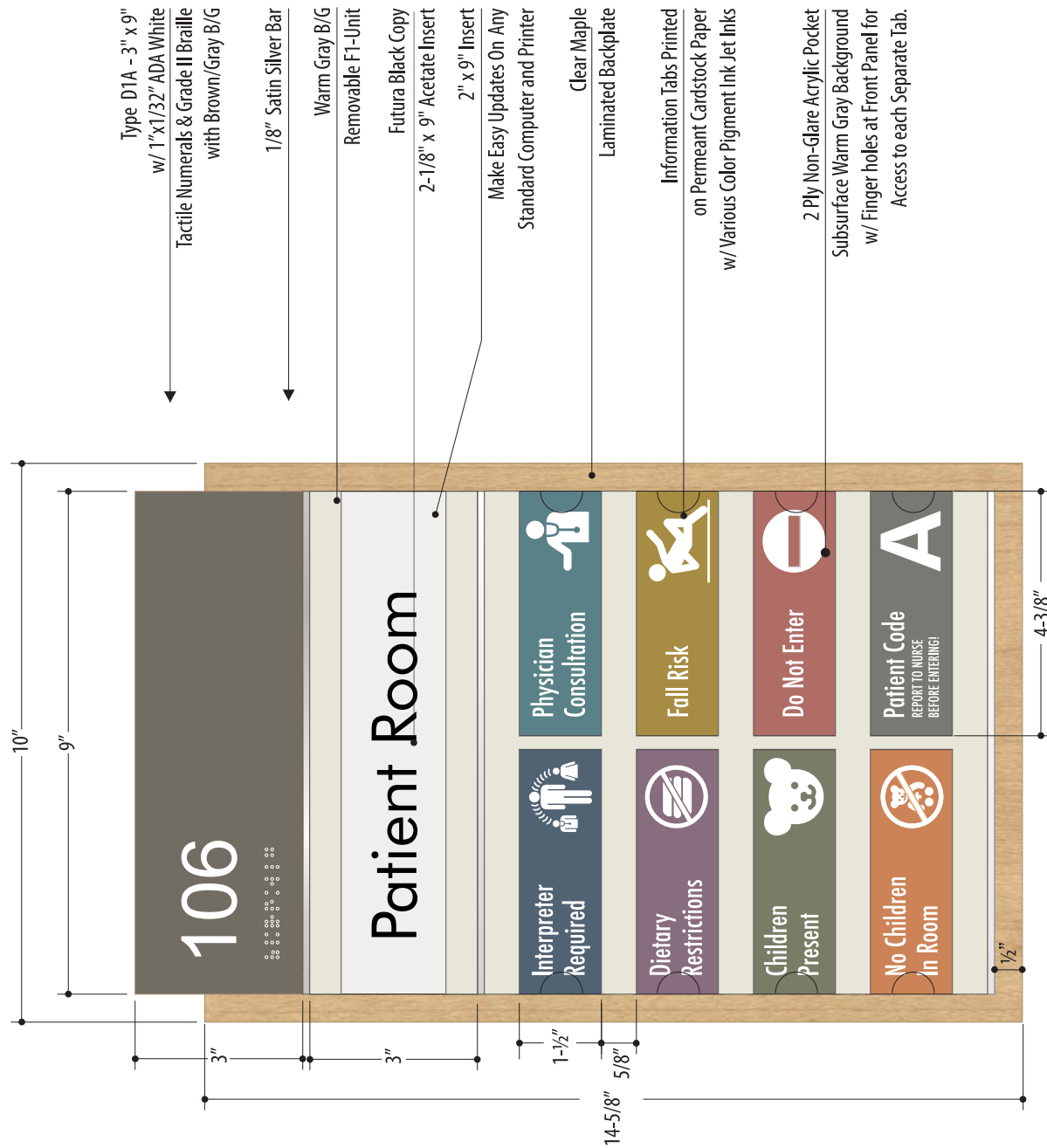
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 1

Type: D1A/F/BP



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ROOM IDENTIFICATION SIGNAGE - 101400.B

Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

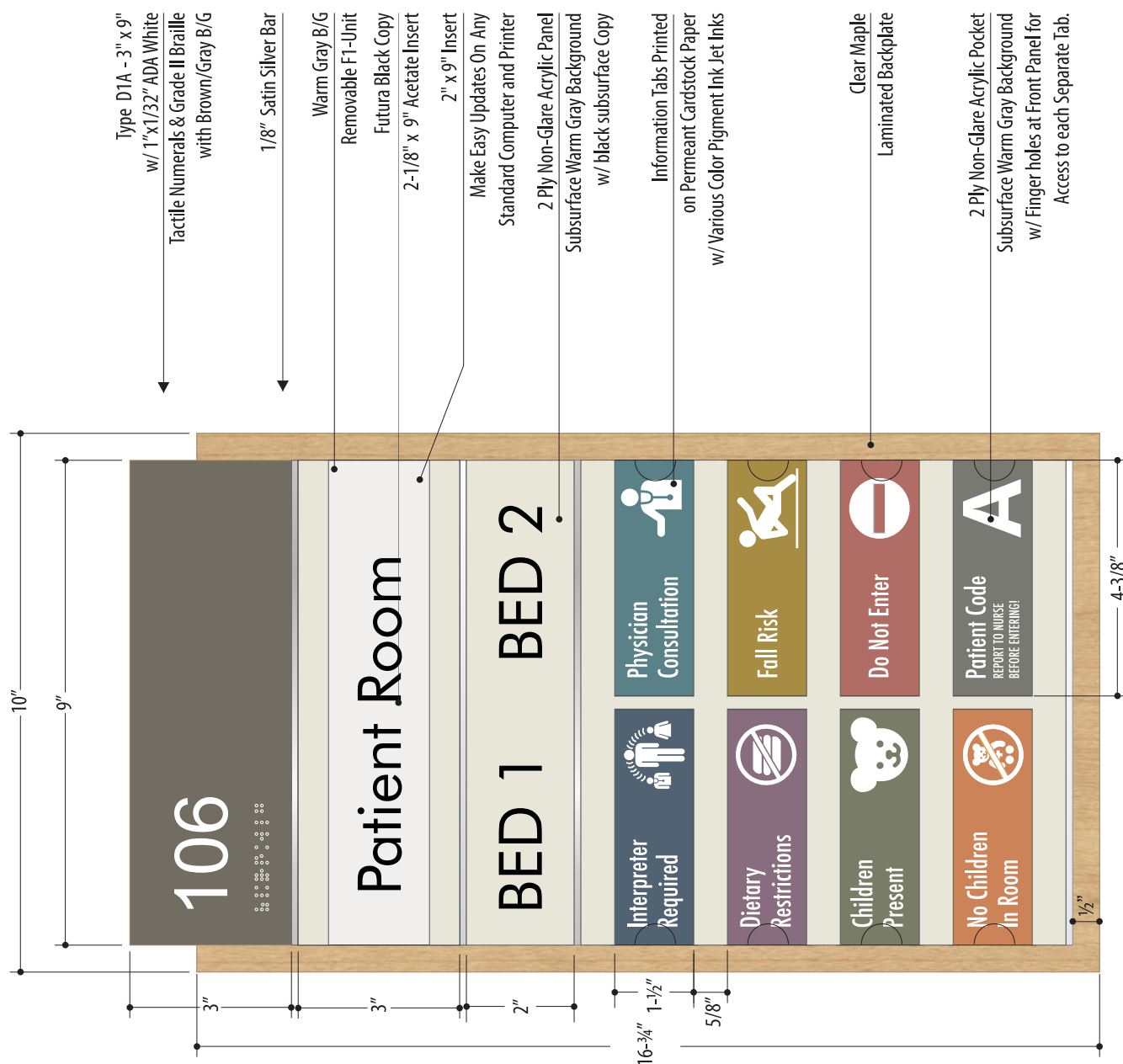
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 4

Type: D1A/F1/cP/BP



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ROOM IDENTIFICATION SIGNAGE - 101400.B

Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

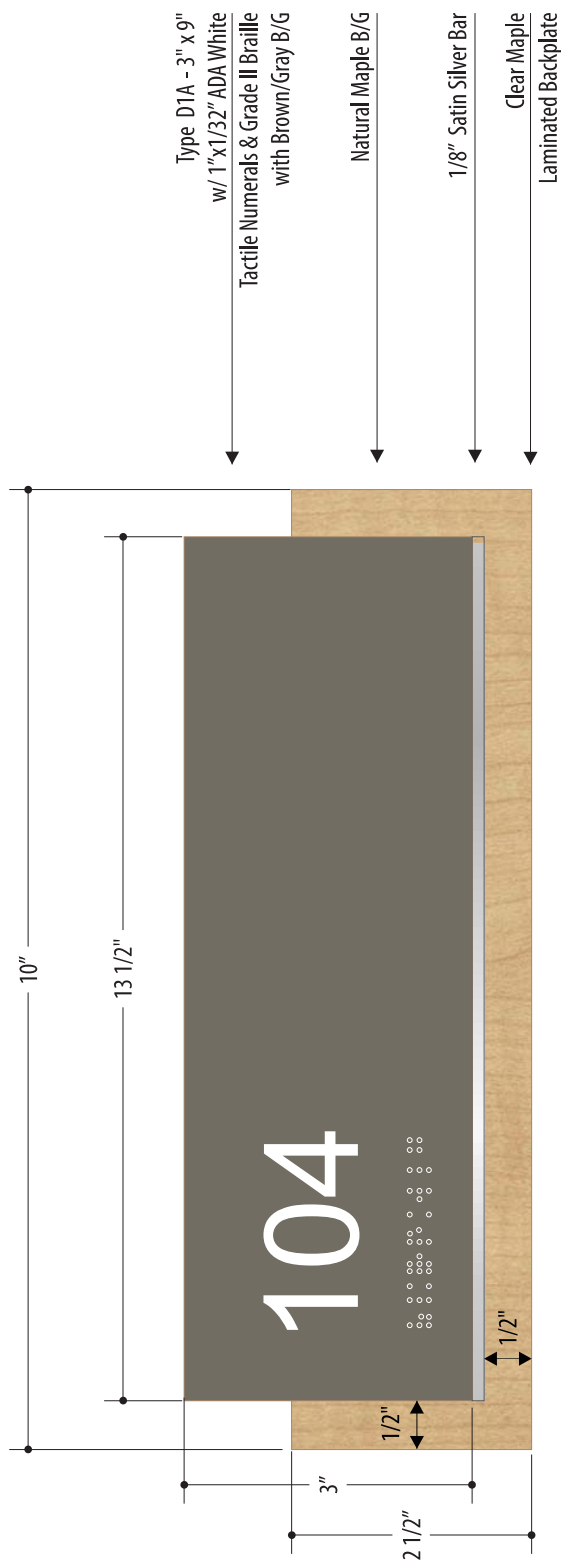
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 3

Type: D1A/F1/E1/cP/BP



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 2

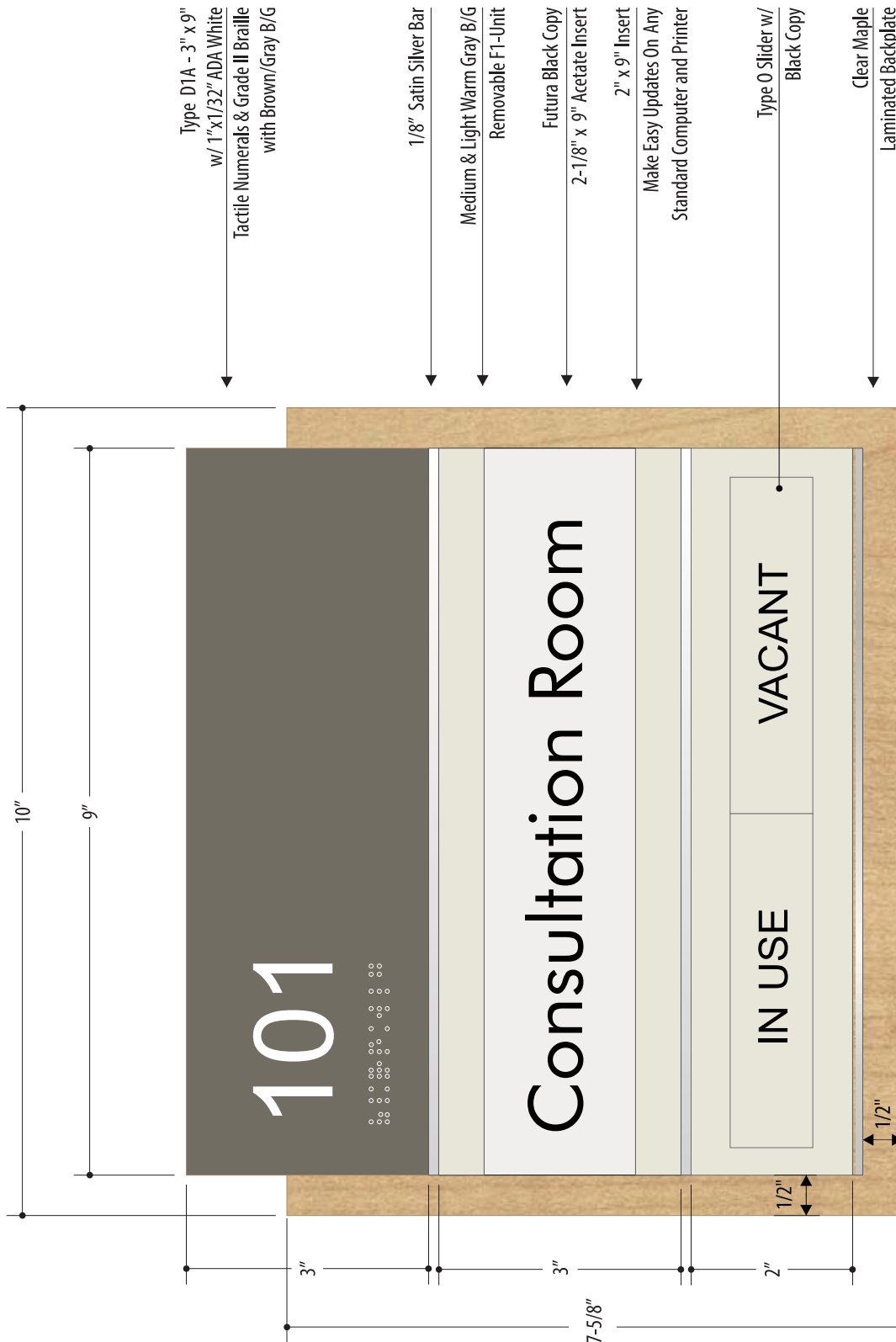
Type: D1A/BP



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VA/Rich/Dwg/Int-Signage



ROOM IDENTIFICATION SIGNAGE - 101400.B
 Appendix B to Section 101400, SIGNAGE SPECIFICATION
 September 30, 2022

VA White River Junction - Inpatient Ward

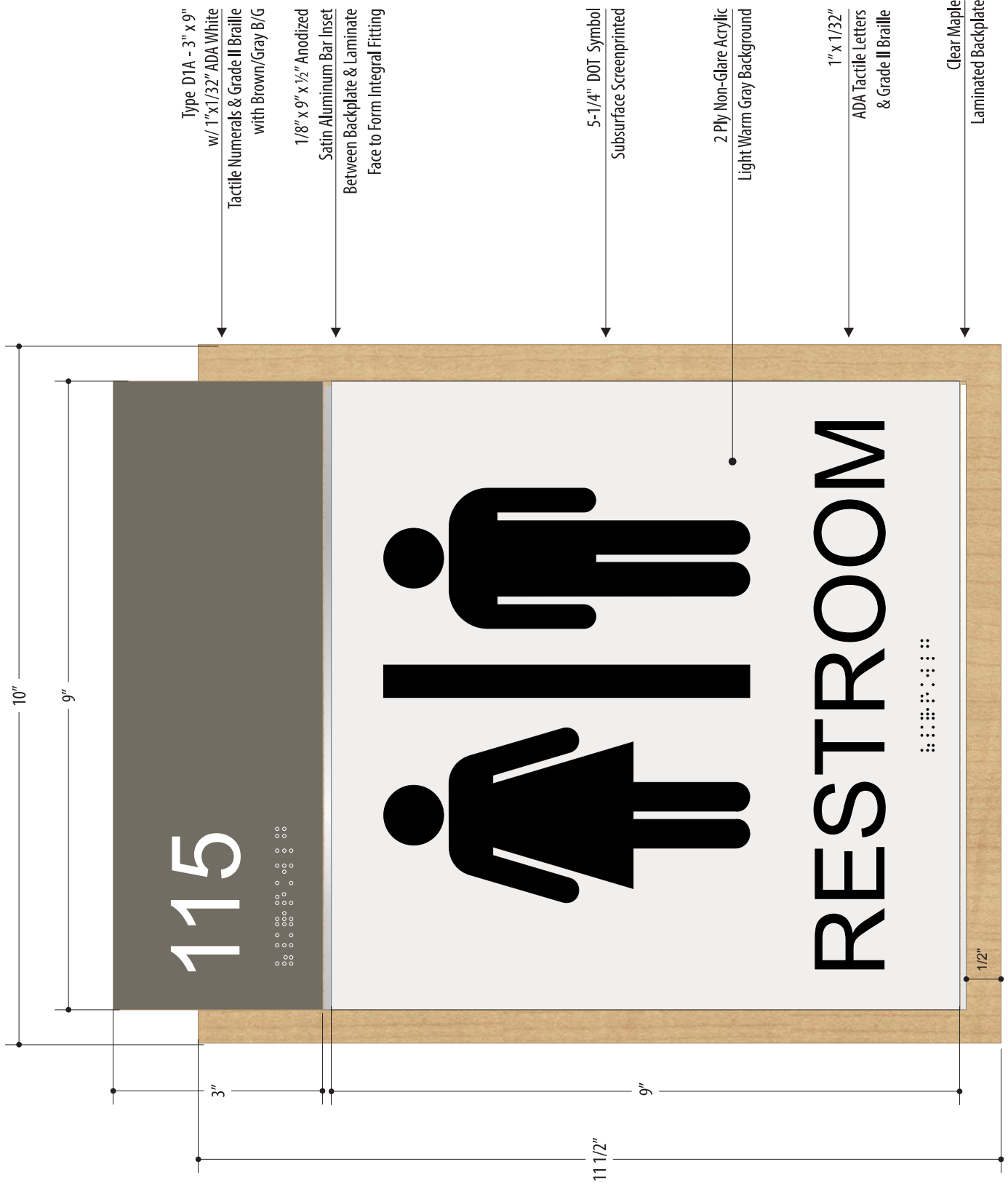
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 6

Type: D1A/F1/O/BP



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 7

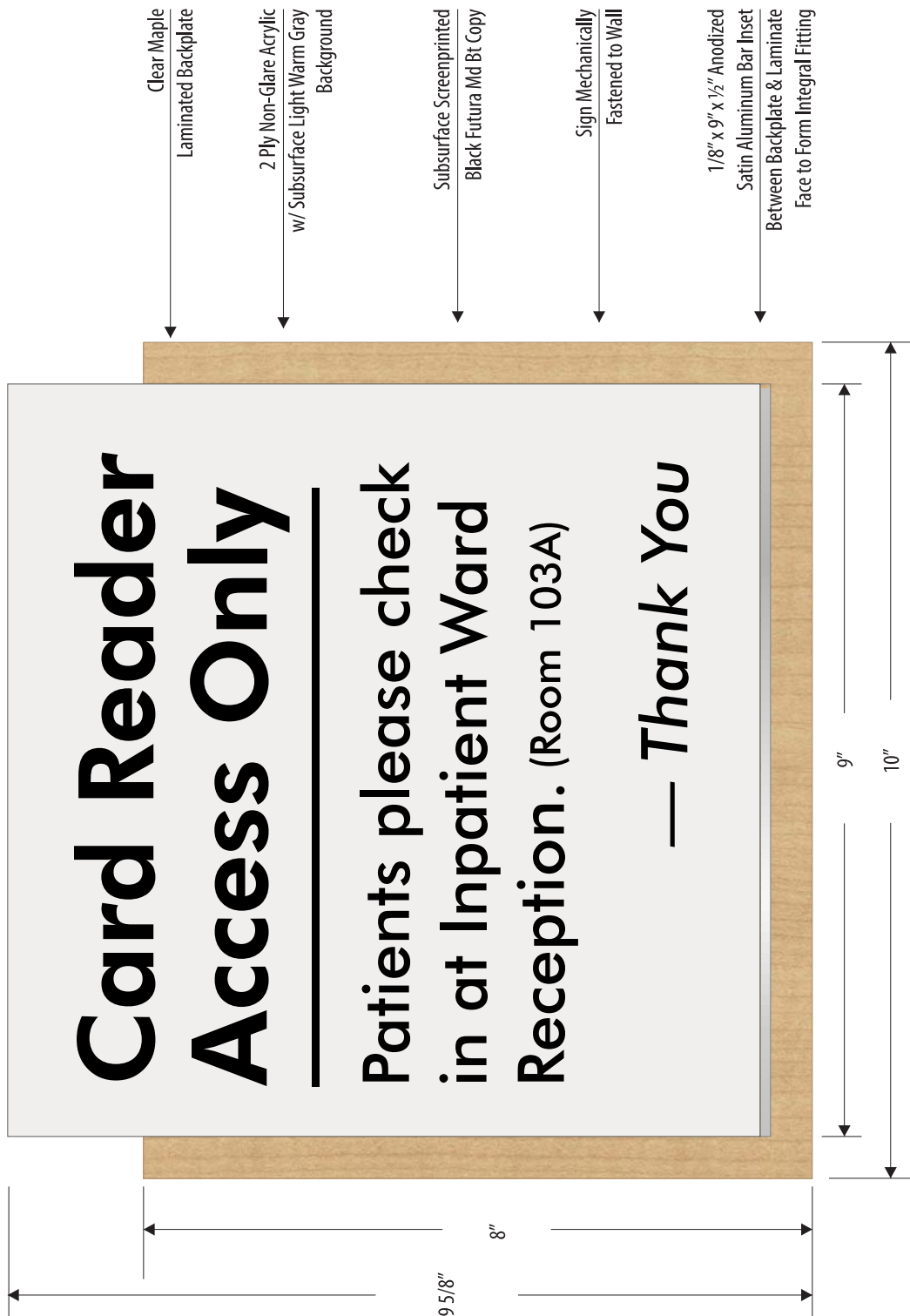
Type: D1A/SA/BP



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Permanent Subsurface

ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

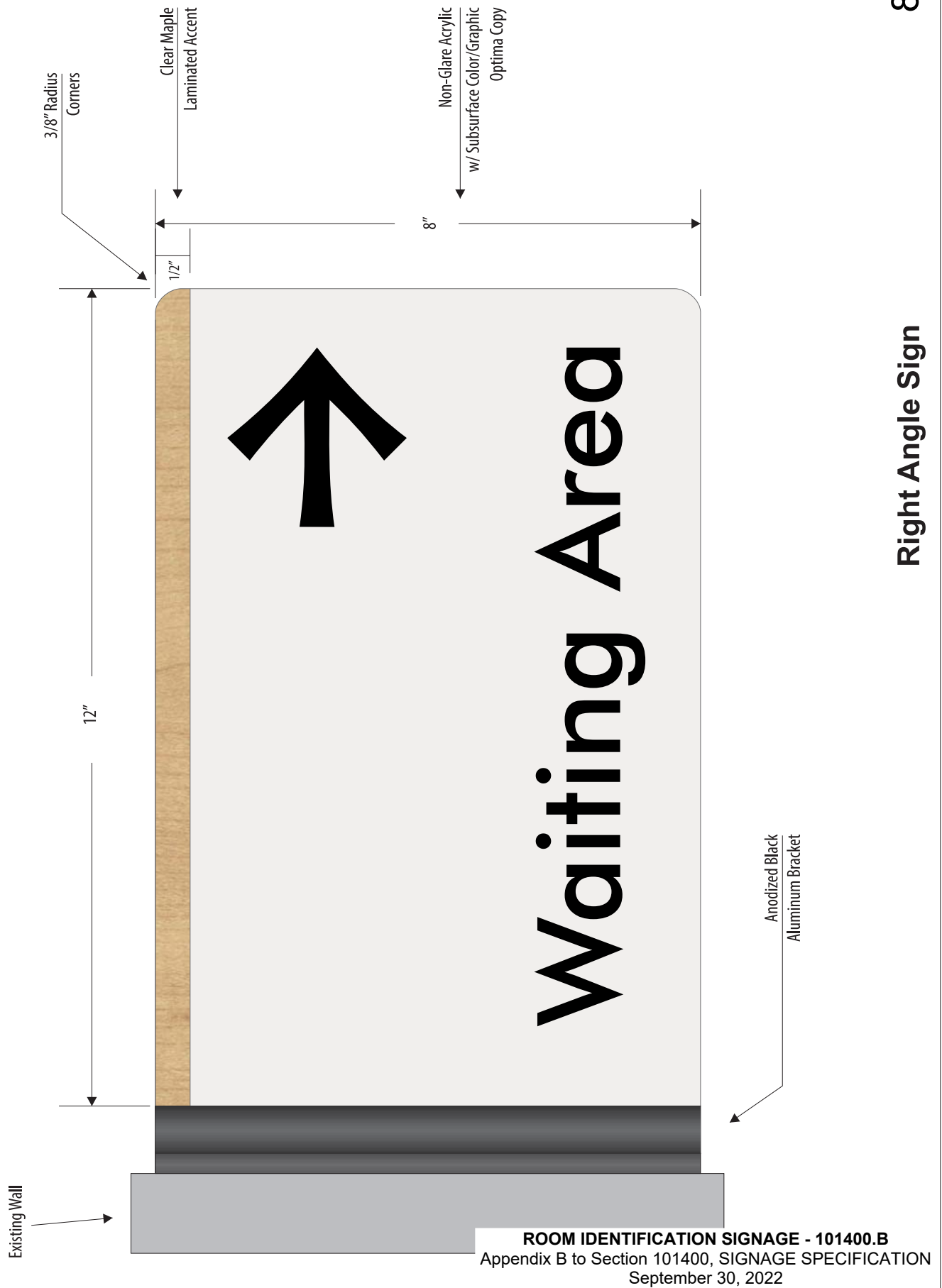
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 9

Type: P5/BP



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VA White River Junction - Inpatient Ward

Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 14

Type: G D/F Right Angle



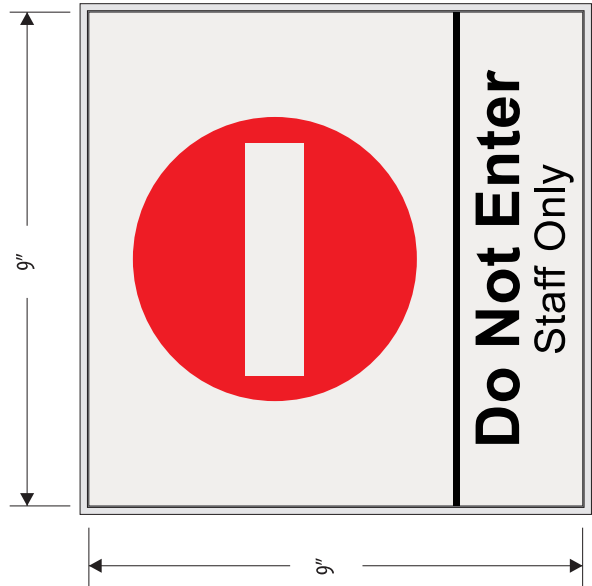
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2 Ply Non-Glare Acrylic
Light Warm Gray Background
Fire Red Graphic

Gold Aluminum
Square Frame



ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

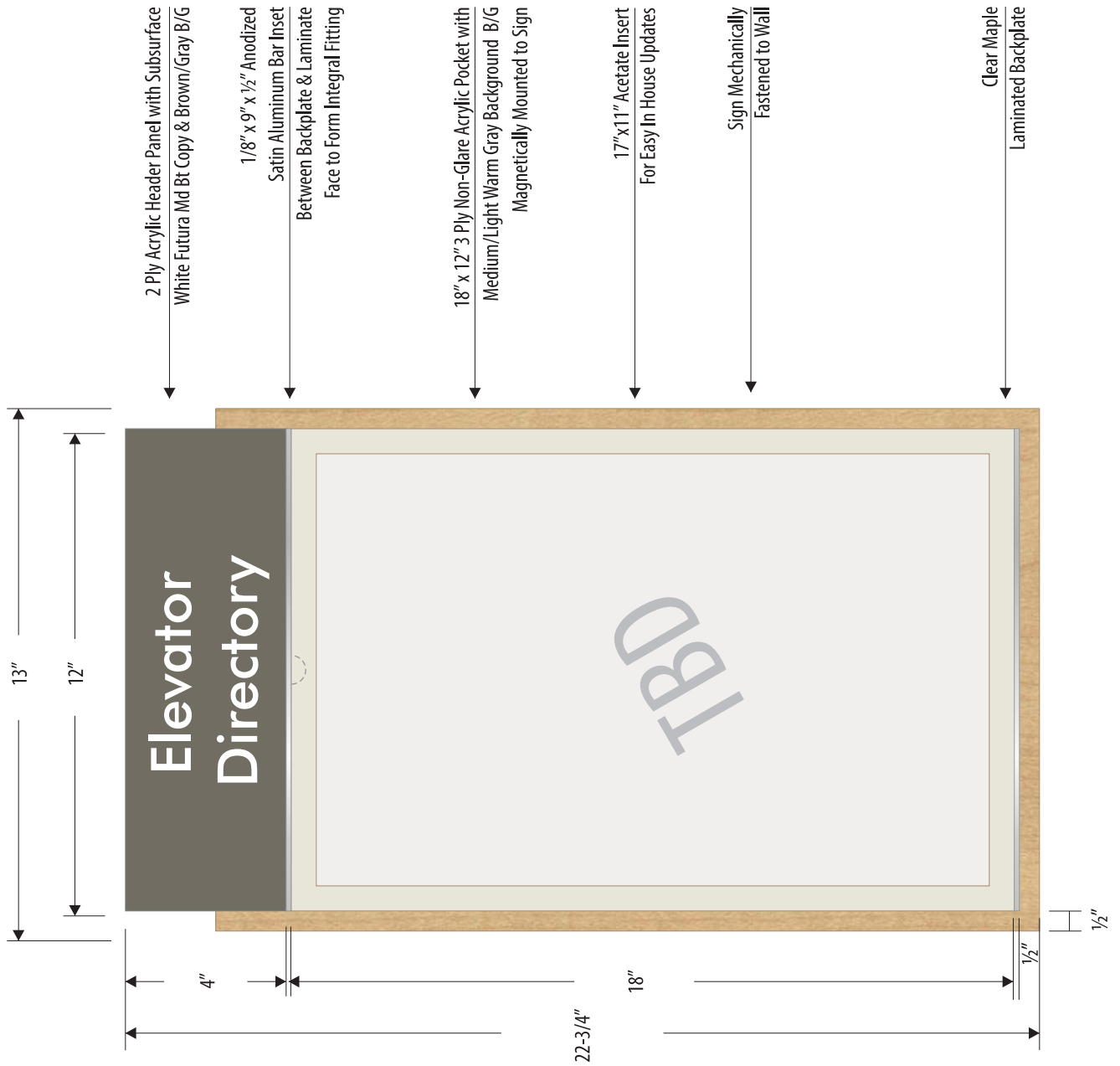
Scale: 1:3.5	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 8

Type: Q/R/S/W - Regulatory Symbol



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:4	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 11

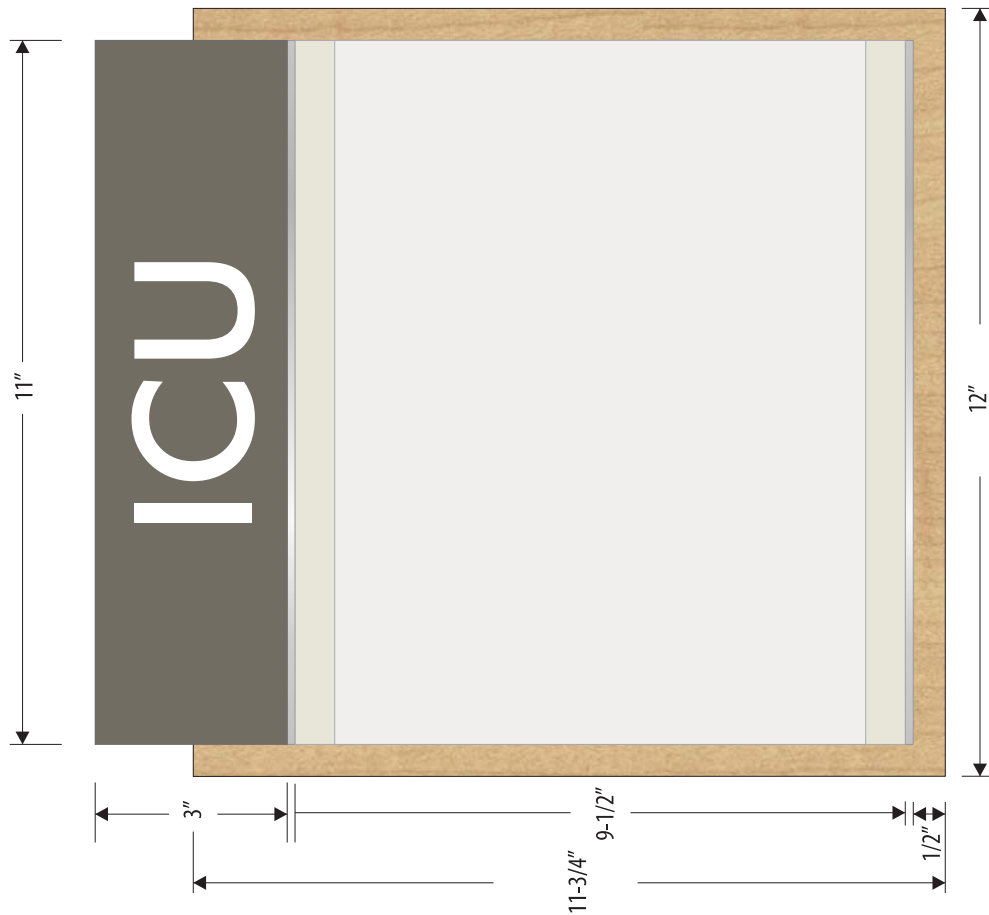
Type: cP/E/BP



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VA/Rich/Dwg/Int-Signage



2 Ply Acrylic Header Panel with Subsurface
White Arrow & Brown/Gray B/G

1/8" x 11" x 1/2" Anodized
Satin Aluminum Bar Inset
Between Backplate & Lamine
Face to Form Integral Fitting

9.5" x 11" 3 Ply Non-Glare Acrylic Pocket with
Medium/Light Warm Gray Background B/G
Magnetically Mounted to Sign

Magnetically Mounted Pocket

8.5" x 11" Acetate Insert
For Easy In House Updates

Sign Mechanically
Fastened to Wall

Clear Maple
Laminated Backplate

ROOM IDENTIFICATION SIGNAGE - 101400.B

Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:3	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 17

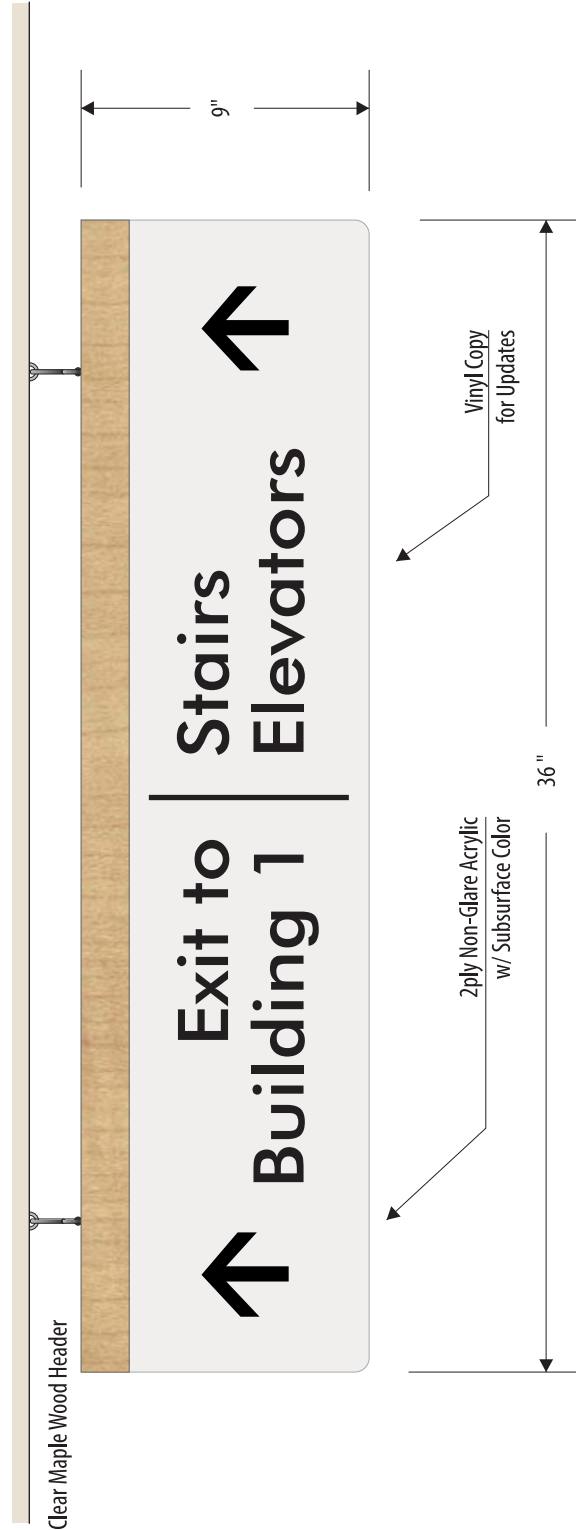
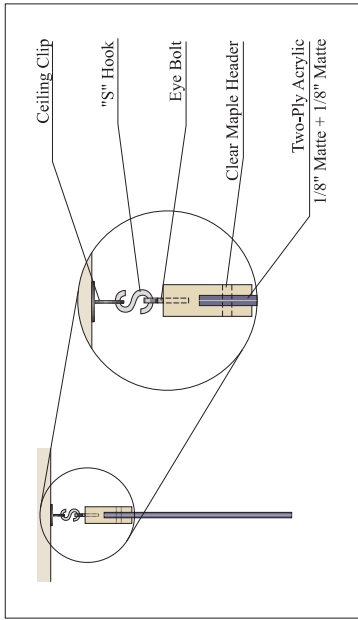
Type: cE1/P/BP



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:6	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 13

Type: C4 - D/F



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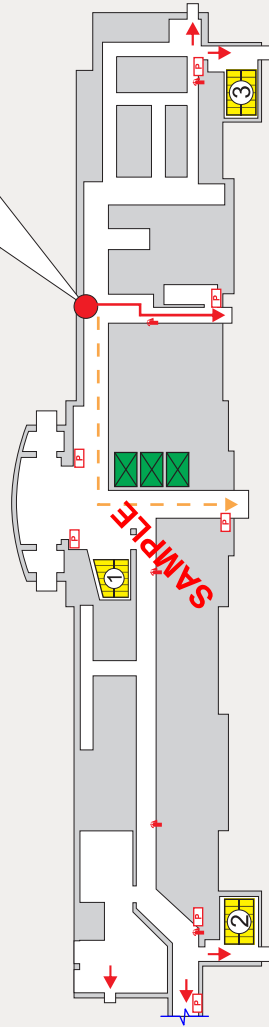
VA/Rich/Dwg/Int-Signage

Evacuation Plan

WARNING:
Do Not Use Elevators
In Case Of Fire Or Other
Electrical Emergencies.
Use Marked Exits.

First Floor Building 2

You Are Here



VA | U.S. Department
of Veterans Affairs

LEGEND

- Primary Evacuation Route
- Secondary Evacuation Route
- Egress Point
- Stairs
- Elevator
- Pull Box
- Fire Extinguisher

Fire Red B/G
Arial Bold
White Copy

Window
Accommodates
Computer Generated
Slide-In Floorplan

Magnetically Mounted Pocket

Sign Mechanically
Fastened to Wall

Satin Aluminum
Square Frame
75% Recycled Content

ROOM IDENTIFICATION SIGNAGE - 101400.B

Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

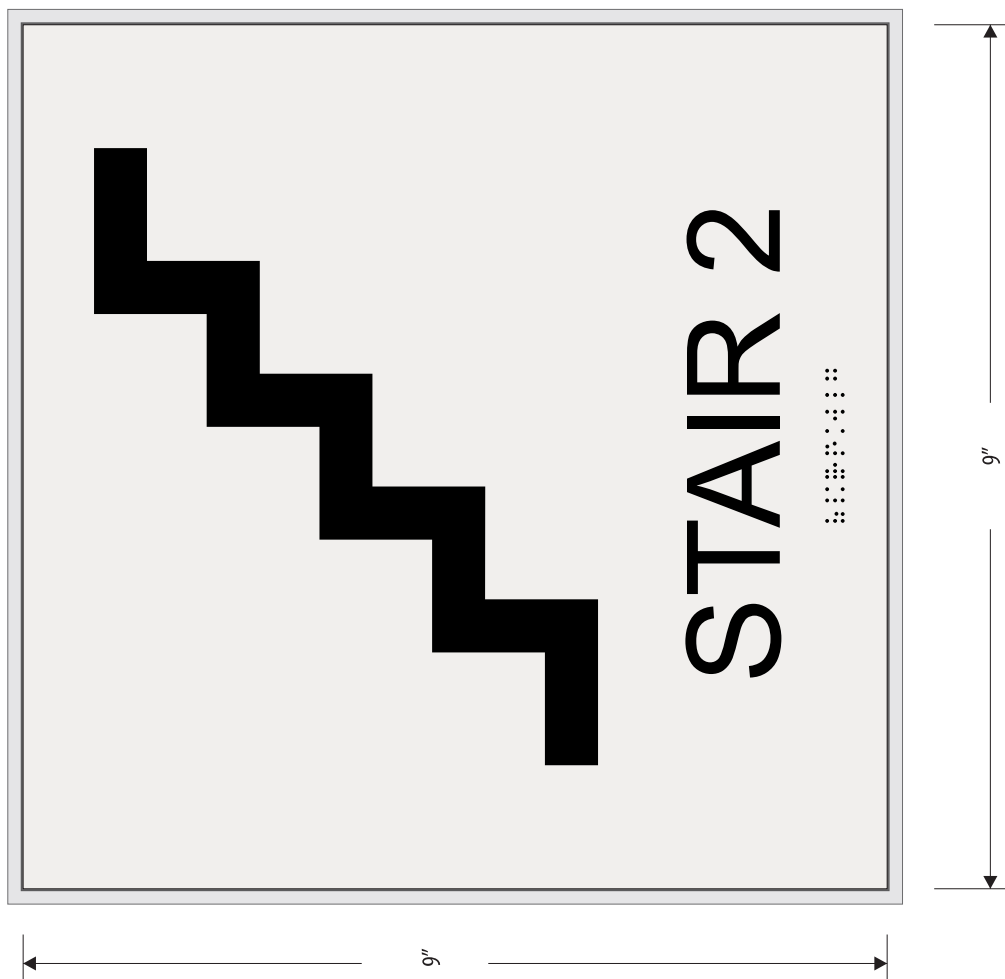
Scale: 1:3	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 19

Type: V/W



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

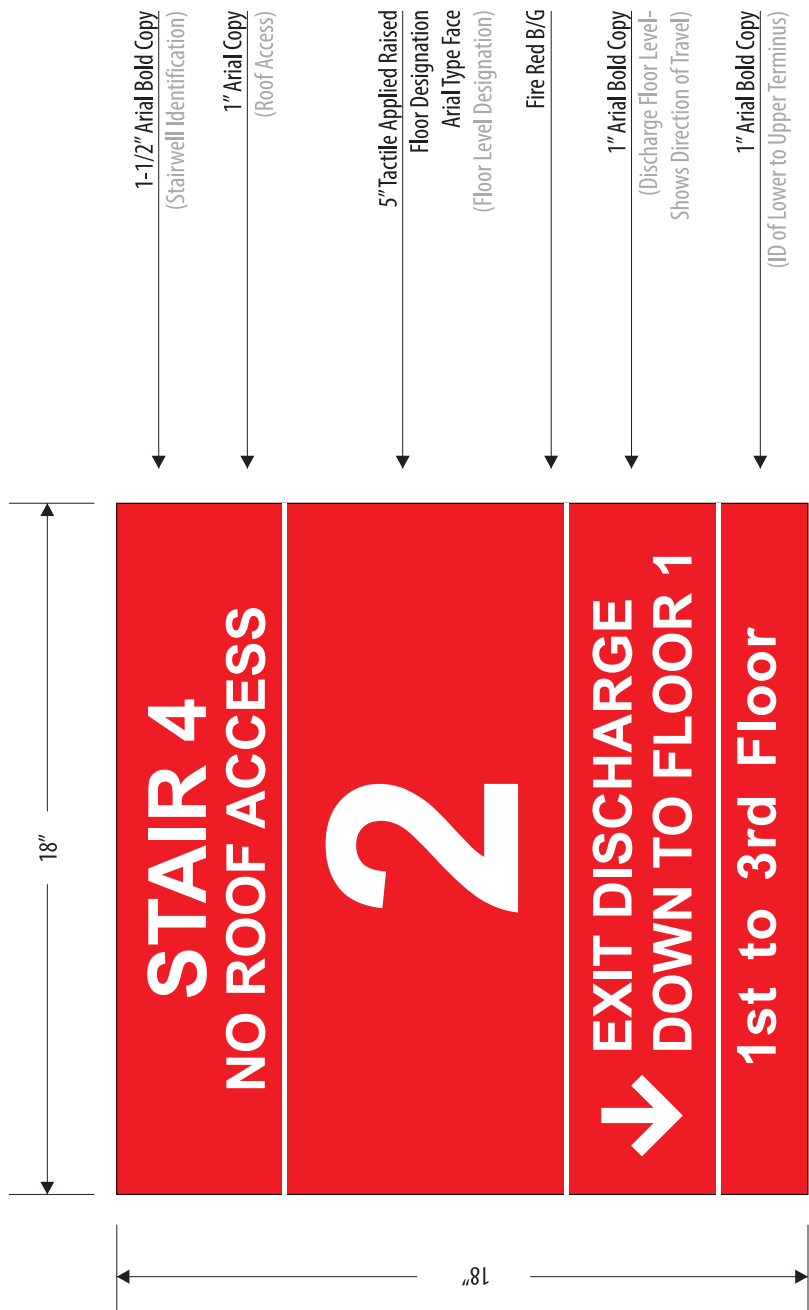
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 22

Type: E3A/W



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Scale 1:10

ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward		
Scale:1:5	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 24
Type: P5 NFPA		



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale:1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 23

Type: V3/W



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ROOM IDENTIFICATION SIGNAGE - 101400.B
Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

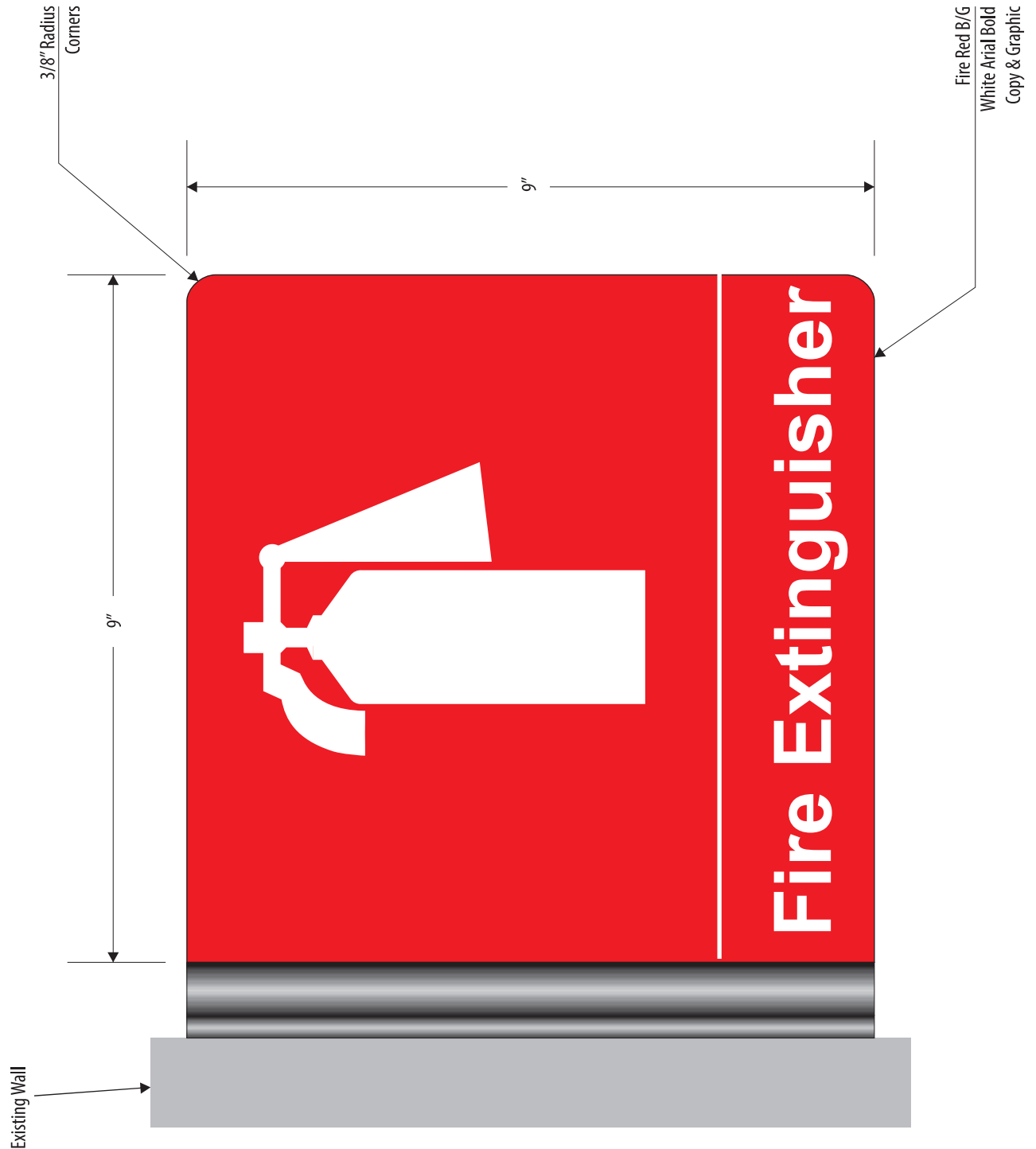
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 20

Type E/W - RACE Sign



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ROOM IDENTIFICATION SIGNAGE - 101400.B
 Appendix B to Section 101400, SIGNAGE SPECIFICATION
 September 30, 2022

VA White River Junction - Inpatient Ward

Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 21

Type: G-Right Angle D/F



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ROOM IDENTIFICATION SIGNAGE - 101400.B
 Appendix B to Section 101400, SIGNAGE
 SPECIFICATION
 September 30, 2022

VA White River Junction - Inpatient Ward		
Scale: 1:2	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 3.1.17	Page: 15
Type: ML-F		



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VA/Rich/Dwg/Int-Signage

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Sign Code Key

BP	Clear Maple Backplate
C4 D/F	Overhead Sign - Double Faced
C4 FM	Overhead Sign - Flush (Wall) Mounted
C4 S/F	Overhead Sign - Single Faced
cP	Pocket Holder for Precaution Insert
D1A	ADA Room Number
E	Permanent Message Panel - Small A
E1 (cE1)	Permanent Message Panel - Small B
E3A	ADA Stair Graphic (see SA)
F	Acrylic Pocket for 5-3/16"x9" Insert
F1	Acrylic Pocket for 2-1/8"x9" Insert
G D/F	Double Faced Right Angle
ML-F	Flat- Cut-out Aluminum Letters
O	Slider Unit (In Use Vacant)
P	Pocket Holder for Insert - Large
P Insert	Acetate Insert (8-1/2" x 11")
P5	Permanent Message Panel - Large
P5 NFPA	Stairwell Landing Sign
Q/R/S	Regulatory or Hazard Signage
SA	ADA Restroom or Stair Graphic
V	Fire Evacuation Plan
V3	Elevator Warning
W	Sign Frame

ROOM IDENTIFICATION SIGNAGE - 101400.B

Appendix B to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

VA White River Junction - Inpatient Ward

Scale:	Designer: Troy Mayer	Drawn By: MEA
Date: 1.23.17	Revised: 4.01.17	Page: 31



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VA/Rich/Dwg/Int-Signage

101400.C
DIRECTIONAL AND LIFE SAFETY SIGNAGE

APPENDIX C TO SECTION 101400, INTERIOR SIGNAGE

COVER SHEET

VA | U.S. Department of Veterans Affairs

WHITE RIVER JUNCTION, VT - WAYFINDING EXHIBIT



10101 Reunion Place
Suite 500
San Antonio, TX 78216
P 210.886.0644
waltonsignage.com

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Client: 126778 VAMC

Address: 215 MAIN ST

Location: WHITE RIVER JUNCTION, VT

Sales: TH Designer: JD

PW SM

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Revision:

R7 - Revised arrow for Sign C & D - JD
R8 - Revised copy for Sign Type B, Revised as per redlines - JD
R9 - Revised all outs and specs for all sign types - JD
R10 - Revised all outs and specs for all sign types - JD
R11 - Revised all outs, specs, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdc A.C.
All Primary electrical service to the sign and final
electrical connections shall be made by a
licensed electrician in accordance with the
agreement attached hereto. In case of variance
between the specifications of the purchase agreement
and this drawing, the drawing shall prevail.

This sign is intended to be installed in
accordance with the requirements of
the International Building Code and the
Code and/or other applicable local
codes. This includes proper
grounding and bonding of the sign.

CLIENT SIGNATURE:

PAGE SIZE 11" X 17"

JOB CODE:

X

R13 / 08/05/19

CID301745

Sheet: 1

PROJECT SYMBOLS / FONTS

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

0123456789

Myriad Pro Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz




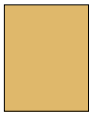
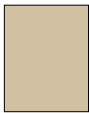






0123456789

Myriad Pro Bold

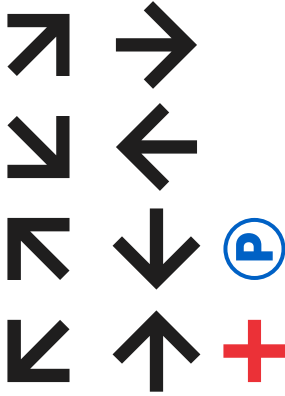
LOGO



PROJECT COLORS & MATERIALS

							
MP Brushed Aluminum	Benjamin Moore 2145-30 Brookside Moss	Benjamin Moore 1643 Franklin Lakes	Benjamin Moore HC-10 Stuart Gold	Benjamin Moore HC-44 Lenox Tan	Benjamin Moore 2124-20 Trout Gray	Benjamin Moore 2060-10 Symphony Blue	Benjamin Moore 2090-10 Grand Canyon Red
							
3m 7725-12 Black Vinyl	3m 7725-10 White Vinyl	Benjamin Moore OC-131 White Down					

SYMBOLS



WALTON

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Suite 500
San Antonio, TX 78216
P 210. 886. 0644
waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: JD PM: SM

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Revision:
R7 - Revised copy for Sign Type B, Revise as per redlines - JD
R8 - Revised call outs and specs for all sign types - JD
R9 - Revised call outs and specs for all sign types - JD
R10 - Revised call outs, specs, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdc A.C.
All Primary electrical service to the sign and final wiring shall be done by a licensed electrician.
All work is to be done in accordance with the purchase agreement attached hereto. In case of variance between the specifications of the purchase agreement and this drawing, the drawing shall prevail.

JOB CODE:

CLIENT SIGNATURE:

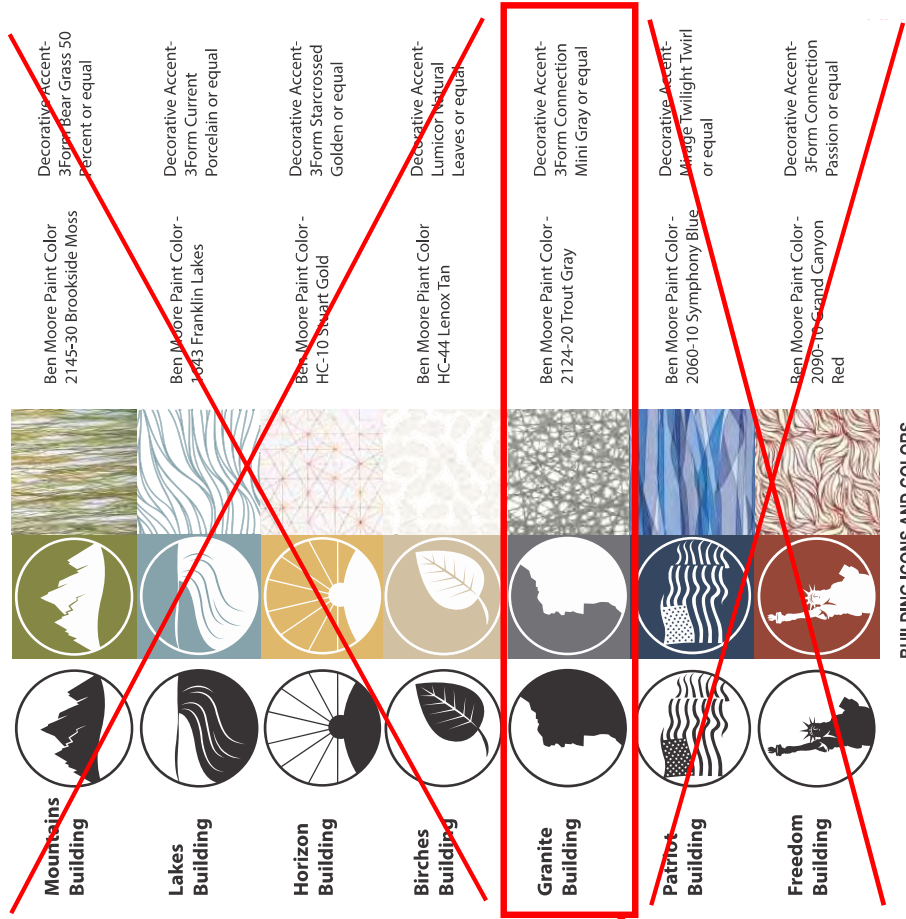
X

PAGE SIZE 11" X 17"

R13 / 08/05/19

CID301745

Sheet: 2



SCALE: NTS

Signs will be manufactured with 120 Volts A/C.

JOB CODE:

CLIENT SIGNATURE:

PAGE SIZE 11" X 17"

CID301745

Sheet: 3

MANUFACTURE AND INSTALL

TYPE B ELEVATOR DIRECTORY

MAP PANEL: 2 LAYERS OF 1/4" CLEAR ACRYLIC // HEAVY STOCK PAPER DIGITAL PRINT MAP // 3/4" DIA. STAINLESS STEEL BARREL STAND-OFFS
ATTACHMENT: FULL SIGN WIDTH 1/2" CLEATS



SCALE: 1" = 1'-0"

This sign is intended to be installed in accordance with the requirements of Article 600 of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

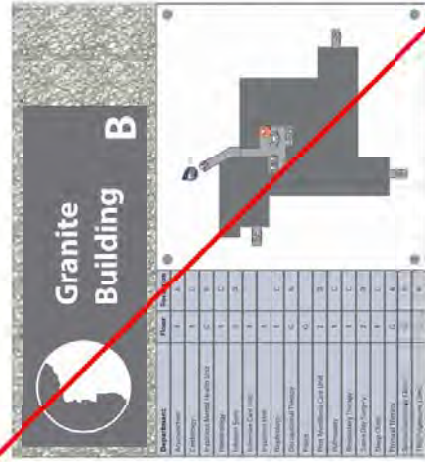
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0168-9730(199605)17:5;1-L

CID301745

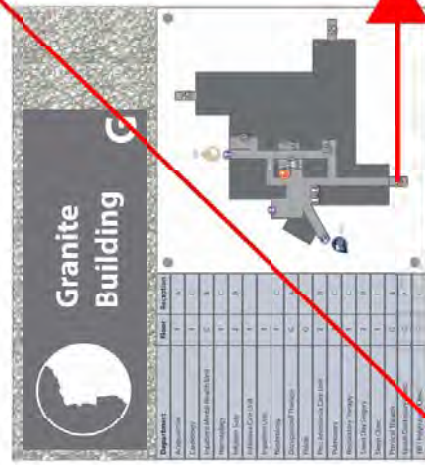
Sheet: 7

September 30, 2022

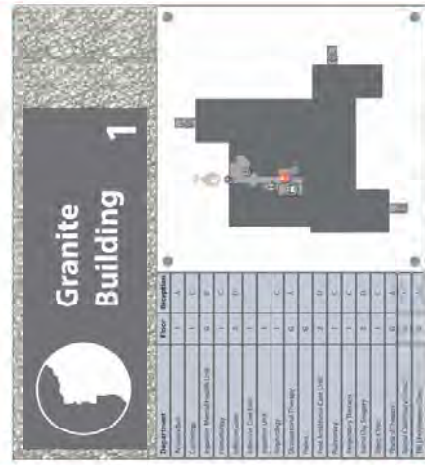
SIGN TYPE B



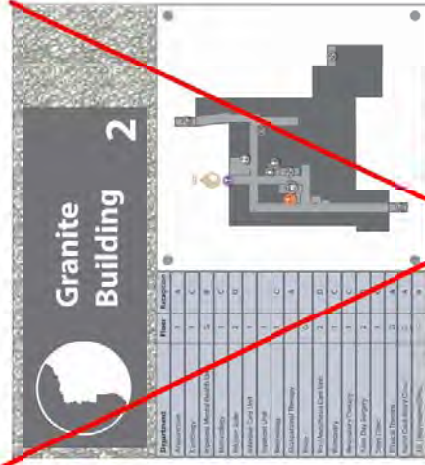
ELEVATOR DIRECTORY SIGN - FLOOR B - CODE 31B01



ELEVATOR DIRECTORY SIGN - FLOOR G - CODE 31G02



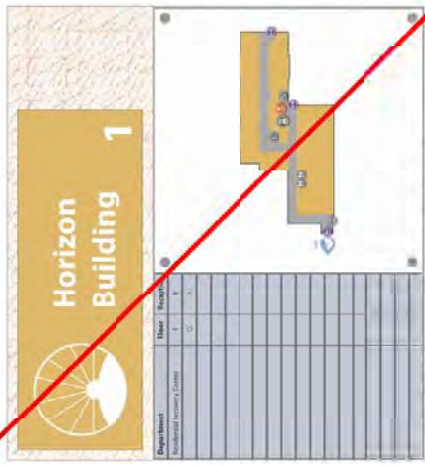
ELEVATOR DIRECTORY SIGN - FLOOR 1 - CODE 31101



ELEVATOR DIRECTORY SIGN - FLOOR 2 - CODE 31201



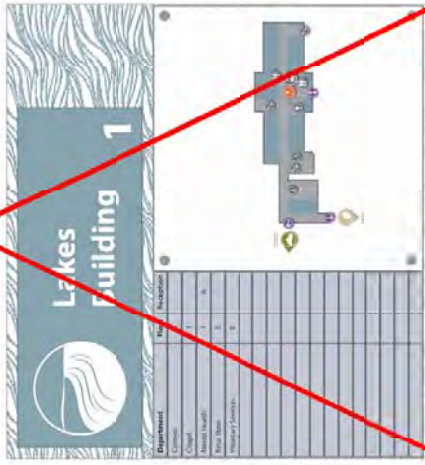
ELEVATOR DIRECTORY SIGN - FLOOR C - CODE 88C01



ELEVATOR DIRECTORY SIGN - FLOOR 1 - CODE 88103



ELEVATOR DIRECTORY SIGN - FLOOR D - CODE 08B11



ELEVATOR DIRECTORY SIGN - FLOOR 1 - CODE 08110



WALTON

10101 Reunion Place
Suite 500
San Antonio, TX 78216
P 210.886.0644
waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: JD PM: SM

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Revision:
R1 - Revises drawing for Signs C & D - JD
R2 - Revises copy for Sign Type B, Revises as per redlines - JD
R3 - Revises drawing for Sign Type B, Revises as per redlines - JD
R4 - Revises all notes and spaces for all sign types - JD
R5 - Revises all notes, spaces, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdc A.C. All Primary electrical service to the sign and final wiring shall be done by a licensed electrician. All work is to be done in accordance with the purchase agreement attached hereto. In case of variance between the specifications of the purchase agreement and this drawing, the drawing shall prevail.

This sign is intended to be installed in accordance with the requirements of the International Building Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

JOB CODE:
CLIENT SIGNATURE:
PAGE SIZE 11" X 17" X

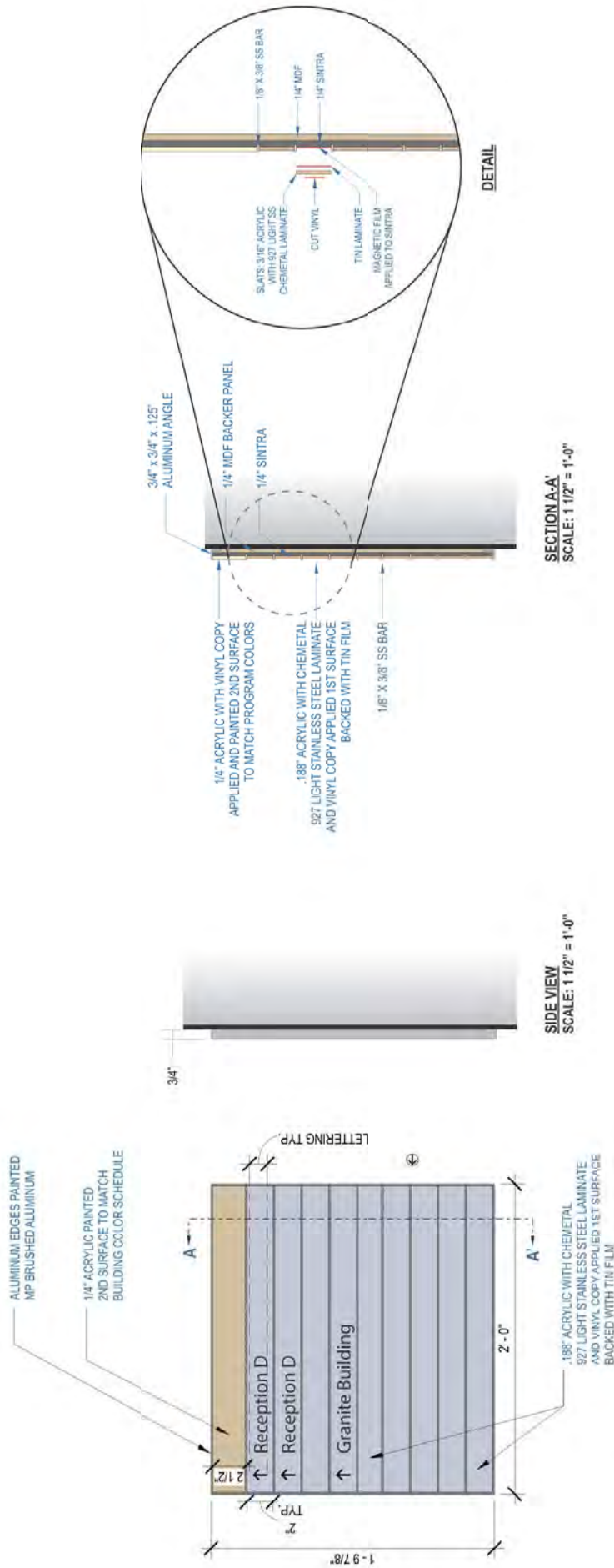
R13 / 08/05/19
CID301745
Sheet: 9

TYPE D DIRECTIONAL SIGNAGE - WALL MOUNT

SCALE: 1 1/2" = 1'-0"

MANUFACTURE AND INSTALL

BACKER PANEL: 1/4" MDF WITH 1" X 1" ANGLE ALUMINUM FRAME PAINTED MP BRUSHED ALUMINUM
HEADER PANEL: 1/4" ACRYLIC PAINTED 2ND SURFACE TO COORDINATE WITH BUILDING COLORS
DIRECTORY SLATS: .188" ACRYLIC WITH CHEMETAL 927 LIGHT SS LAMINATE AND VINYL COPY
APPLIED 1ST SURFACE AND BACKED WITH TIN LAMINATE
ATTACHMENT: MECHANICALLY FASTENED TO WALL AS PER WALL CONDITION



SECTION A-A
SCALE: 1 1/2" = 1'-0"

SIDE VIEW
SCALE: 1 1/2" = 1'-0"

DIRECTIONAL FRONT VIEW
SCALE: 1 1/2" = 1'-0"

10101 Reunion Place
Suite 500
San Antonio, TX 78216
p 210.886.0644
williamsignage.com

Client: 126776 WMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: PM SM

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Revision:
R1 - Review drawn by Signs C & G - JD
R2 - Review copy for Sign Type B - Review as per notes - JD
R3 - Review as per notes - JD
R4 - Review as per notes - JD
R5 - Review as per notes for all sign types - JD
R6 - Review as per notes for all sign types - JD
R7 - Review as per notes for all sign types - JD

Signs will be manufactured with 120 Vols A.C. All Primary electrical service to the sign and final connection thereof, is the responsibility of the buyer. Contractor shall provide all necessary electrical equipment and materials. This includes proper grounding and bonding of the sign. and this drawing, the drawing shall prevail.

1031202
This sign is intended to be installed in accordance with the requirements of Article 600 of the National Electrical Code and the applicable local codes. This includes proper grounding and bonding of the sign.

R13 / 08/05/19
CID301745
Sheet: 15

SIGN TYPE D - WALL MOUNT

← Reception D
← Reception E
← Granite Building

BIRCHES BLDG - CODE 01202

← Intensive Care Unit
← Stairs

GRANITE BLDG - CODE 31108

← Reception A
← Reception B
← Elevators / Stairs
← Restrooms
← Exit

HORIZON BLDG - CODE 88107

→ Patriot Building
← Stairs
← Restrooms
→ Exit / Parking Ⓟ

GRANITE BLDG - CODE 31B02

← Reception D
← Birches Building

GRANITE BLDG - CODE 31202

↑ Canteen
↑ Retail Store
↑ Elevators / Stairs
↓ Exit / Parking Ⓟ
→ Birches Building
↑ Horizon Building

LAKES BLDG - CODE 08B01

← Reception A
← Exit / Parking Ⓟ
← Birches Building

GRANITE BLDG - CODE 31G03

→ Reception D
← Restrooms
← Elevators / Stairs

GRANITE BLDG - CODE 31206

← Canteen
← Retail Store
← Elevators / Stairs
← Exit / Parking Ⓟ
← Horizon Building
→ Mountains Building
↑ Birches Building

LAKES BLDG - CODE 08B04

← Exit / Parking Ⓟ
← Patriot Building

GRANITE BLDG - CODE 31G10

← Elevators / Stairs
← Lakes Building

HORIZON BLDG - CODE 88G03

↑ Chapel
↑ Reception A
← Elevators / Stairs
← Restrooms
→ Exit / Parking Ⓟ
→ Birches Building
→ Granite Building
← Horizon Building

LAKES BLDG - CODE 08101

← Reception C
← Birches Building
← Restrooms
→ Stairs
→ Intensive Care Unit

GRANITE BLDG - CODE 31102

← Reception B
→ Elevators / Stairs
← Restrooms
← Exit / Parking Ⓟ
← Lakes Building
→ Reception A

HORIZON BLDG - CODE 88106

→ Chapel
→ Reception A
→ Elevators / Stairs
→ Restrooms
↓ Exit / Parking Ⓟ
→ Horizon Building
← Mountains Building
↓ Birches Building

LAKES BLDG - CODE 08104



Client: 126778 VAMC

Address: 215 MAIN ST

Location: WHITE RIVER JUNCTION, VT

Sales: TH

Designer: JD

PM: SM

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Revision:

R1 - Reviewer: [blank] Date: [blank]

R2 - Reviewer: [blank] Date: [blank]

R3 - Reviewer: [blank] Date: [blank]

R4 - Reviewer: [blank] Date: [blank]

R5 - Reviewer: [blank] Date: [blank]

Signs will be manufactured with 120 Vdc A.C. All Primary electrical service to the sign and final wiring shall be done in accordance with the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

Signs will be installed in accordance with the requirements of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

Signs will be installed in accordance with the requirements of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

R13 / 08/05/19

CID301745

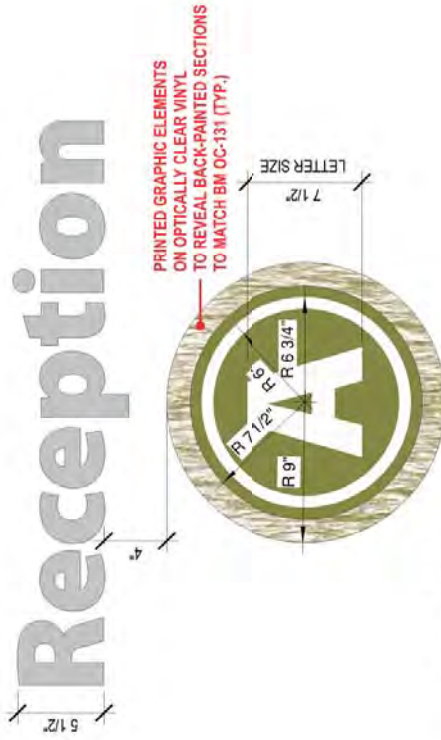
Sheet: 16

TYPE E - E-2 | RECEPTION ID

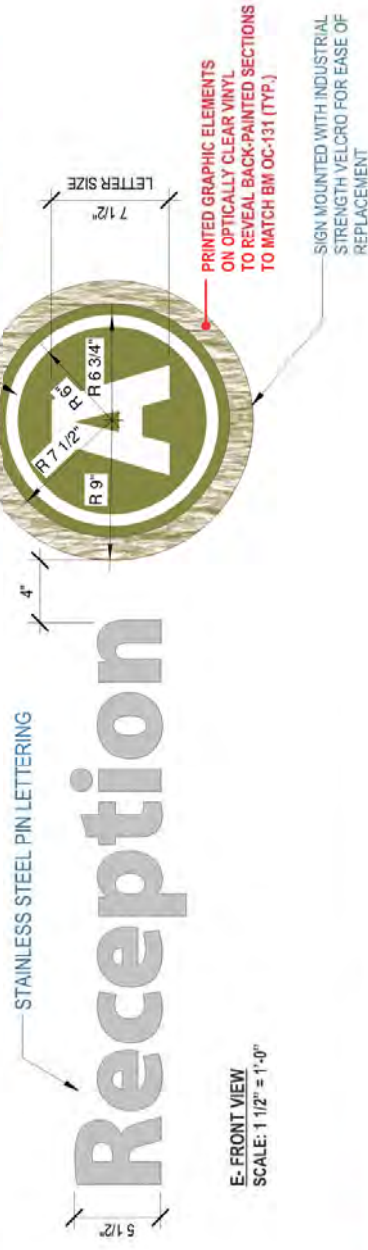
MANUFACTURE AND INSTALL

SCALE: 1 1/2" = 1'-0"

LETTERS : 1/4" THK STAINLESS STEEL LETTERS // PIN MOUNTED FLUSH TO FASCIA
BACK PANEL : 1/8" THK SATIN ACRYLIC // 2ND SURFACE GRAPHICS TO COORDINATE WITH BUILDING COLOR SCHEME
MAIN PANEL : 1/4" THK SATIN ACRYLIC // 2ND SURFACE PAINT AND GRAPHICS TO COORDINATE WITH BUILDING COLOR SCHEME
MOUNTING : INDUSTRIAL STRENGTH VELCRO // EASE OF CHANGEABILITY



E-2 FRONT VIEW
SCALE: 1 1/2" = 1'-0"



E-2 FRONT VIEW
SCALE: 1 1/2" = 1'-0"



END VIEW, TYP



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Client: 126778 WANC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: JD PM: SM

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Revision:
R1: Review and revise Signs C & D - JD
R2: Review and revise Signs C & D - JD
R3: Review and revise Signs C & D - JD
R4: Review and revise Signs C & D - JD
R5: Review and revise Signs C & D - JD
R6: Review and revise Signs C & D - JD

Signs will be manufactured with 120 VOLT A.C. All Primary electrical service to the sign and final connection thereof, is the responsibility of the buyer. Contractor shall be responsible for obtaining all necessary permits and approvals from the local authority having jurisdiction. This includes proper grounding and bonding of the sign and this drawing, the drawing shall prevail.

JOB DATE:

This sign is intended to be installed in accordance with the requirements of Article 600 of the National Electrical Code (NEC) and the National Fire Protection Association (NFPA) codes. This includes proper grounding and bonding of the sign and this drawing, the drawing shall prevail.

PAGE SIZE 11" X 17" X

R13 / 08/05/19
CID301745

Sheet: 19

The image displays a grid of 12 'Reception' signs, each featuring a circular logo with a letter (A, B, C, D, E, F) and the word 'Reception' below it. The signs are arranged in a 4x3 grid. The central sign, labeled 'C' and 'GRANITE BLDG - CODE 31G15', is highlighted with a red border and a red arrow pointing to it. A red line with a red dot points to the central sign with the text: 'THESE TWO SIGNS IN GRANITE BUILDING REDUCED IN SIZE DUE TO LOCATION RESTRAINTS'. The other signs are crossed out with red diagonal lines. The signs are labeled as follows:

- Top row (crossed out): Reception A (MOUNTAINS BLDG - CODE 39G04), Reception B (MOUNTAINS BLDG - CODE 39I06), Reception C (MOUNTAINS BLDG - CODE 39I04), Reception D (MOUNTAINS BLDG - CODE 39I10)
- Second row (crossed out): Reception A (HORIZON BLDG - CODE 88G05), Reception B (HORIZON BLDG - CODE 88I05), Reception A (LAKES BLDG - CODE 08I08), Reception C (LAKES BLDG - CODE 08I08)
- Third row (crossed out): Reception A (GRANITE BLDG - CODE 31G05), Reception B (GRANITE BLDG - CODE 31G15), Reception C (GRANITE BLDG - CODE 31I05), Reception D (GRANITE BLDG - CODE 31I10)
- Bottom row (crossed out): Reception C (BIRCHES BLDG - CODE 01I05), Reception D (BIRCHES BLDG - CODE 01I204), Reception E (BIRCHES BLDG - CODE 01I206), Reception F (BIRCHES BLDG - CODE 01I303, 01I308)

THESE TWO SIGNS IN
GRANITE BUILDING
REDUCED IN SIZE DUE
TO LOCATION RESTRAINTS

[illegible]

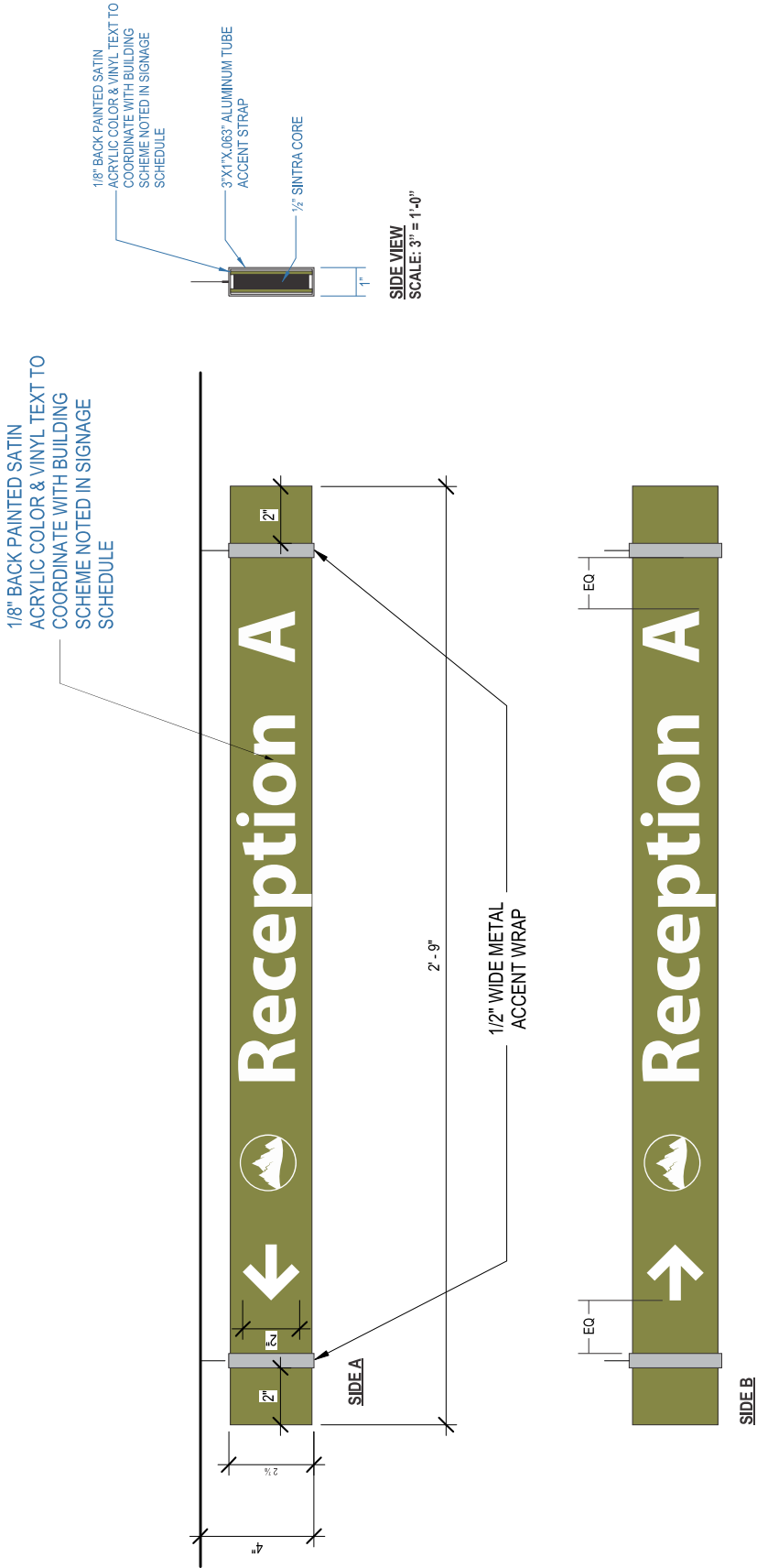
TYPE L | RECEPTION SIGN - CEILING MOUNT


MANUFACTURE AND INSTALL

SCALE: 3" = 1'-0"

HEADER PANEL : 1/8" THK SATIN ACRYLIC // VINYL TEXT // PAINTED 2ND SURFACE TO COORDINATE WITH BUILDING COLOR SCHEME

MOUNTING : STAINLESS STEEL AIRCRAFT CABLE TO CEILING ABOVE





10101 Reunion Place
Suite 500
San Antonio, TX 78216
P 210.886.0644
waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH
Designer: JD
PWL SM

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Revision:
R1 - Revises copy for Sign Type B. Revises as per redlines. • JD
R2 - Revises call outs and specs for Sign Type B. Revises as per redlines. • JD
R3 - Revises call outs and specs for Sign Type B. Revises as per redlines. • JD
R4 - Revises call outs and specs for Sign Type B. Revises as per redlines. • JD
R5 - Revises call outs and specs for Sign Type B. Revises as per redlines. • JD

This sign is intended to be installed in accordance with the requirements of the International Building Code and other applicable local codes. This includes proper grounding and bonding of the sign.

PAGE SIZE 11" X 17" X

JOB CODE:

CLIENT SIGNATURE:

R13 | 08/05/19

CID301745

Sheet: 27



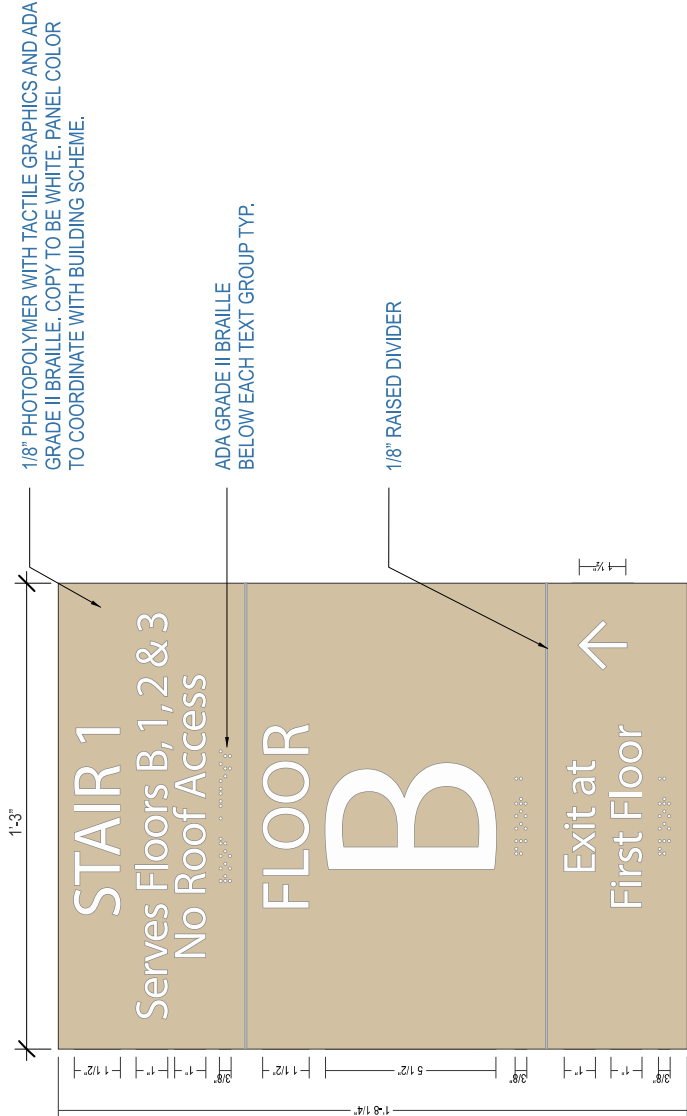
R13 / 08/05/19

TYPE S | STAIRWELL SIGNAGE

SCALE: 3" = 1'-0"

MANUFACTURE AND INSTALL

PANEL : 1/8" PHOTOPOLYMER PANEL WITH 1/32" RAISED, WHITE COPY AND ACCOMPANYING ADA GRADE II BRAILLE. PAINTED TO COORDINATE WITH BUILDING COLOR SCHEME
ATTACHMENT: VHB TAPE & SILICONE



W WALTON
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Suite 500
San Antonio, TX 78216
P 210.886.0644
waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: JLD
PJM _SM

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Revision:
R7 - Revises arrow for Sign C & D - JD
R6 - Revises copy for Sign Type B, Revises as per redlines - JD
R5 - Revises call outs and spaces for Sign Types - JD
R4 - Revises call outs and spaces for Sign Types, Adds size and section view - JD
R3 - Revises call outs, spaces, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdc A.C.
All Primary electrical service to the sign and final wiring shall be done in accordance with the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.
All work is to be done in accordance with the purchase agreement attached hereto. In case of variance between the specifications of the purchase agreement and this drawing, the drawing shall prevail.

JOB CODE:

R13 / 08/05/19

CID301745

Sheet: 36

CLIENT SIGNATURE:

PAGE SIZE 11" X 17" X

DIRECTIONAL & LIFE SAFETY SIGNAGE - 101400.C

Appendix C to Section 101400, SIGNAGE SPECIFICATION

September 30, 2022

The diagram illustrates a building layout with three main structures: Granite Bldg, Lakes Bldg, and Horizon Bldg. Each building has multiple floors and stairs. A red box highlights the central area where the buildings meet, indicating a common area or entrance. A red arrow points to this central area. A red 'X' is drawn over the entire diagram, indicating that the current layout is not approved.

Granite Bldg:

- STAIR 1: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 2: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 3: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 4: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor

Lakes Bldg:


- STAIR 1: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 2: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 3: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 4: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor

Horizon Bldg:

- STAIR 1: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 2: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 3: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 4: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor

Central Area:

- STAIR 1: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 2: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 3: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor
- STAIR 4: Serves Floors B, G, 1 & 2; No Roof Access
- FLOOR B
- Exit at Ground Floor



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San Antonio, TX 78216
P 210.888.0644
waltonusa.com

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Client: 126778 WAMC

Address: 215 MAIN ST

Location: WHITE RIVER JUNCTION, VT

Sales: TH _____

Designer: JD _____

PM: SM _____

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Revision:

R7 - Review arrows for Signs & D - JD	R7 - Review arrows for Signs & D - JD
R8 - Review copy for Sign, Type B, Review as per notes - JD	R8 - Review as per notes - JD
R9 - Review as per notes and specs for all types, add side and section views - JD	R9 - Review as per notes and specs for all types, add side and section views - JD
R24 - Review all data, specs, spot, color changes per notes - JD	R24 - Review all data, specs, spot, color changes per notes - JD

Job Code: _____

This sign is intended to be installed in accordance with the requirements of Article 610 of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

CLIENT SIGNATURE: _____

DATE: _____

Sheet: 38

TYPE T | ELEVATOR DOOR WRAP

MANUFACTURE AND INSTALL

SCALE: 3/4" = 1'-0"

DIGITAL PRINT : DIGITALLY PRINTED OPAQUE VINYL APPLIED FIRST SURFACE. FIELD VERIFY DIMENSIONS
APPLICATION : APPLIED TO ELEVATOR DOORS AS PER SCHEDULE.

SIGN TYPE T
EXAMPLE



ADD GRAPHIC VINYL WRAP TO EXISTING
ELEVATOR DOORS. IMAGE TO
COORDINATE WITH SIGNAGE SCHEDULE.
VERIFY SIZES IN FIELD. ALL GRAPHICS TO
BE PROVIDED.



WALTON

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waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST

Location: WHITE RIVER JUNCTION, VT
Designer: JD
Sales: TH
PWL SM

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Revision:
R7 - Revises arrow for Signs C & D - JD
R8 - Revises copy for Sign Type B, Revises as per redlines - JD
R9 - Revises copy for Sign Type A, Revises as per redlines - JD
R10 - Revises call outs and sizes for Sign types - JD
R11 - Revises call outs and sizes for Sign types - JD
R12 - Revises call outs, specs, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdc A.C.
All Primary electrical service to the sign and final
electrical service to the sign shall be in accordance
with the National Electrical Code and/or other applicable local
codes. This includes proper
grounding and bonding of the sign.
This work is to be done in accordance with the purchase
agreement attached hereto. In case of variance
between the specifications of the purchase agreement
and this drawing, the drawing shall prevail.

JOB CODE:

CLIENT SIGNATURE:

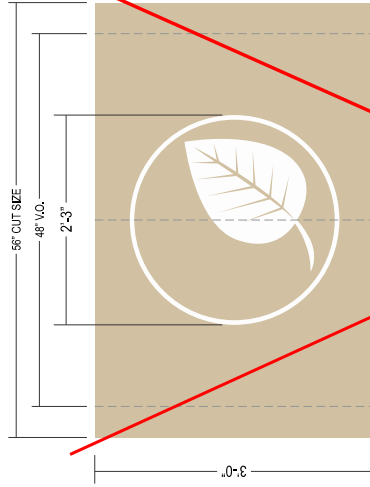
PAGE SIZE 11" X 17"

R13 / 08/05/19

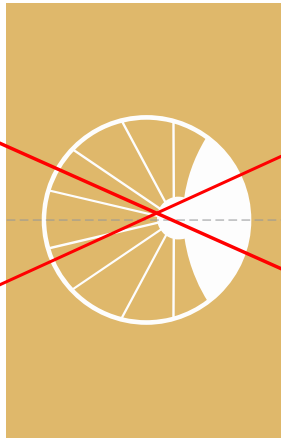
CID301745

Sheet: 40

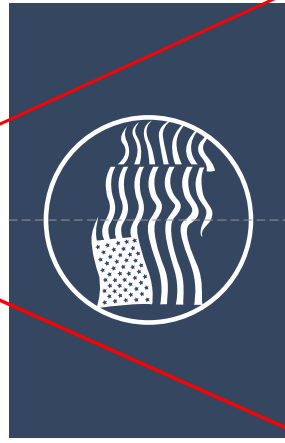
SIGN TYPE T - SCALE 3/4" = 1'-0"



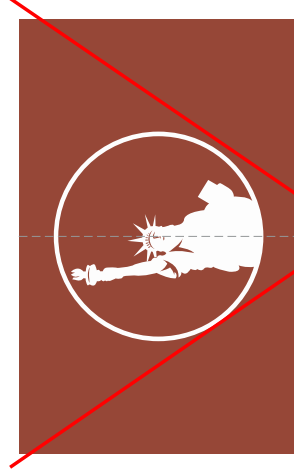
CODE 01B10, 01112, 01208, 01304



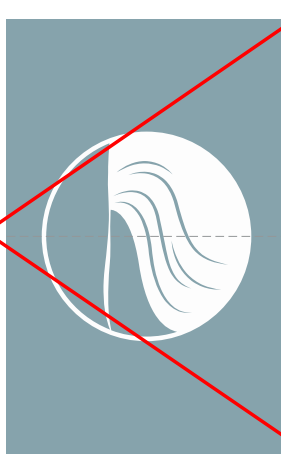
CODE 88G06, 88110



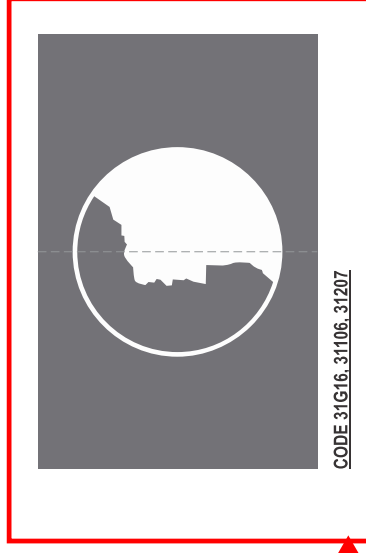
CODE 28G07, 28104, 28207



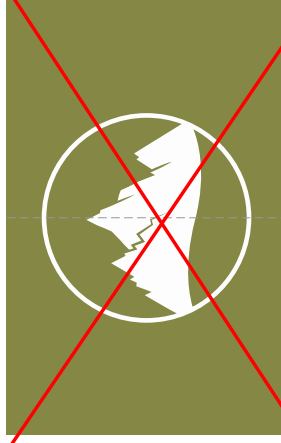
CODE 44G07, 44102, 44204



CODE 08B12, 08114, 08203



CODE 31G16, 31106, 31207



CODE 39G06, 39113, 39209, 39303



10101 Reunion Place
Suite 500
San Antonio, TX 78216
P 210.886.0644
waltonsignage.com

Client: 126778 VAMC
Address: 215 MAIN ST
Location: WHITE RIVER JUNCTION, VT
Sales: TH Designer: JD
Sales: PM SM

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Revision:
R7 - Revises arrow for Signs C & D - JD
R8 - Revises copy for Sign Type B, Revises as per redlines - JD
R9 - Revises copy for Sign Type A, Revises as per redlines - JD
R10 - Revises all notes and issues for all sign types - JD
R11 - Revises all notes, specs, copy changes as per redlines - JD

Signs will be manufactured with 120 Vdts A.C.
All Primary electrical service to the sign and final
grounding and bonding of the sign.
All work is to be done in accordance with the purchase
agreement attached hereto. In case of variance
between the specifications of the purchase agreement
and this drawing, the drawing shall prevail.

JOB CODE

This sign is intended to be installed in
accordance with the requirements of
the International Building Code and
Code and/or other applicable local
codes. This includes proper
grounding and bonding of the sign.

CLIENT SIGNATURE:

PAGE SIZE 11" X 17" X

R13 / 08/05/19

CID301745

Sheet: 41



WALTON

Sign Operations, Care and Maintenance Manual

All LED and Non-illuminated Signs

Operating Instructions for Walton Signage Ltd.

Care and Maintenance Recommendations for our signs

Thank you for choosing Walton Signage to satisfy your signage needs & requirements. We do hope that our signage will serve you in the highest regard for years to come. To help ensure prolonged life and quality performance for your new signs we have provided easy to follow maintenance instructions.

The following list will guide you with tips to assist you in caring for your signage. Incompatible cleaning material can cause structural and/or surface damage. Please contact your provider for any additional information regarding these recommendations.

Proper Care and Maintenance for LED Sign Faces and Molded Polycarbonate Frames

- Hand wash using lukewarm water and mild soap
- Use a clean, soft, non-abrasive, grit-free cloth or sponge to loosen heavy dirt or grime
- To remove residue rinse with clean water and cloth
- Prevent water spotting by drying with a soft cloth
- Use a mild automobile polish to minimize scratched and minor abrasions (*test small area first*)

Never Do/Use the Following Items

- Abrasive or highly alkaline cleaner
- Aromatic or halogenated solvents
- Scrub brushes, steel wool or other abrasive materials
- Squeegees, razorblades or other sharp instruments to remove deposits or spots
- Clean in direct sunlight or at high temperatures
- Power washing equipment

Proper Care and Maintenance for Stainless Steel Surfaces

- Stainless steel cleaner is generally recommended for scratched or stained surfaces (*testing cleaners in a small area is recommended*) soap or mild detergent with warm water can also be used
- Consider using a microfiber cloth because it absorbs water well and does not scratch the surface.
- It's best to wipe the cloth in the direction of the stainless steel grain
- To avoid water spots and stains thoroughly rinse with warm water and dry the surface

Never Use the Following Items

- Chlorine bleach, products containing chloride and ANY cleaning product not made specifically for stainless steel
- Steel wool, brushes or very abrasive scrubbing pads

Proper Care and Maintenance for Painted Metal (Aluminum) Sign Frames, Surfaces, Mounting and non- illuminated I-Bars

- Lukewarm water and mild soap (*always perform a test cleaning on small area first*)
- Keep all cloths, brushes and sponges free of grit and rinse frequently
- Use a clean, soft, non-abrasive, grit-free cloth or sponge to loosen heavy dirt or grime
- Avoid temperature extremes (*heat accelerates chemical reactions/lower temperatures may make solutions less effective*)

Never Do/Use the Following Items

- Over-cleaning or excessive rubbing
- Allow run-down, drips or splashes of cleaners (*rinse these off as quickly as possible, never allow any solutions to dry on the painted surface*)
- Industrial strength cleaners of higher concentrations
- Paint removers, aggressive alkaline, acid or abrasive cleaners
- Abrasive cleaners, brushed, soiled cloths/sponges, steel wool

Proper Care and Maintenance for Vinyl Lettering

- Use clean, non-abrasive cloth to gently dust
- If heavily soiled you may use a mild soap and water mixture
- Blot-dry completely
- To avoid peeling take extra caution near edges and corners

Never Do/Use the Following Items for Care and Maintenance

- Scrub surface with an abrasive pad or tool
- Detergents containing abrasives or ammonia

Proper Care and Maintenance for Acrylic

- Use clean, non-abrasive cloth to gently dust
- If heavily soiled you may use a mild soap and warm water mixture use light pressure
- Rinse with clean water and blot-dry completely

Never Do/Use the Following Items for Care and Maintenance

- Scrub surface with an abrasive pad or tool
- Window cleaning sprays, kitchen scouring compounds or solvents such as acetone, gasoline, benzene, alcohol, carbon tetrachloride, or lacquer thinner. These can scratch the sheet's surface and or weaken the sheet causing small surface cracks called, "crazing."

LIMITED WARRANTY TERMS AND CONDITIONS

1. **LIMITED WARRANTY:** For a period of one year from the date of completion of the Work, Seller warrants all new materials or services provided under this Agreement to be at time of completion free from defects of material or workmanship and in conformity with the drawings and specifications approved by the Parties. This Limited Warranty will be valid provided Buyer is not delinquent in remittance of payments due to Seller or otherwise in default under the terms of this Agreement. Under this Limited Warranty, Seller agrees to replace or, at its option, repair any products or parts which are defective in material or workmanship. Seller's obligation is limited to replacement or repair, and in no event will Seller be liable for consequential, incidental, indirect, special or punitive damages, and any applicable damages will be limited to the actual, direct damages incurred by Buyer. **THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO OTHER WARRANTIES.** Seller's warranty obligations extend only to defects for which Buyer will have given Seller written notice during the one year limited warranty period. Buyer is **NOT** authorized to make independent arrangements for warranty work. All warranty work on the Display will (1) be arranged for or subcontracted by Seller, or (2) be performed by Seller's employees and/or representatives. If Buyer does not permit Seller to inspect and arrange for the repair on any warranty work required under this Agreement or if Buyer makes independent arrangements for such repair work, Buyer will be solely responsible for the cost of such repairs and, in such event, Seller hereby **EXCLUDES ALL WARRANTIES**, express and/or implied, and Buyer will be deemed to have purchased the Display "AS IS" and "WITH ALL FAULTS", **WAIVING ALL WARRANTIES HEREUNDER.**



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DIRECTIONAL & LIFE SAFETY SIGNAGE - 101400.C
Appendix C to Section 101400, SIGNAGE SPECIFICATION
September 30, 2022

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SECTION 102133
CUBICAL CURTAINS AND TRACK

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install the following:
 - 1. Suspended cubicle curtain track and guides.
 - 2. Track suspension components and accessories.
- B. Furnish the following products to be installed under the designated Sections:
 - 1. Above ceiling anchor devices to support curtain track, installed by Section 055000 - METAL FABRICATIONS.
- C. Curtains to be furnished by Owner and installed by Owner.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 061000 - ROUGH CARPENTRY: Wood blocking for curtain track.
- D. Section 092900 - GYPSUM BOARD: Suspended gypsum board ceiling system to support track.
- E. Section 095100 - ACOUSTICAL CEILINGS: Suspended acoustical tile ceiling system to support track.
- F. Section 117313 – PATIENT LIFTS: Coordinate with lift track locations and clearance requirements of patient lifts.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section.
 - 1. NFPA Publication 701 - Standard Methods of Fire Tests for Flame-resistance Textiles and Films.
 - 2. UL Publication 214 - Standard for Tests for Flame Propagation of Fabrics and Films.

1.4 PERFORMANCE REQUIREMENTS

- A. Fire performance characteristics; shade material tested in accordance with NFPA 701- Vertical Burn Test, rated "FR".

1.5 SUBMITTALS

- A. Product Literature: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.
 - 1. Provide additional information required for vane materials, including: Size limitations, fire resistance information.

2. Note on submittals any deviations from specified requirements and the reasons thereof.
 - B. Maintenance Information: Maintenance data and recommended cleaning materials, and cleaning and stain removal methods.
 - C. Warranty: Provide sample copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.
 - D. Certification of compliance with current building code and environmental regulations: Manufacturer shall certify that materials proposed for use comply with applicable building code and environmental regulations.
 - E. Shop drawings: Include complete installation details.
 - F. Selection samples:
 1. Track: 35 inch long, in full size, with carriers, all required spring and radius clip sizes and all required end cap types.
 2. Provide additional samples, of size requested by Architect, to aid in the Architect's selection.
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Do not deliver curtains and drapes to the project until all concrete, masonry, plaster and other wet work has been completed and is dry.
 - B. Deliver curtains, drapes and track to site in labeled protective packages, uniquely identified for each intended location.
 - C. Store materials in manner recommended by curtains and drapes manufacturer, inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.
 - D. Maintain ambient temperature between 60 and 85 degrees Fahrenheit, and a relative humidity between 20 and 50 percent for a period starting 24 hours before installation of curtains and drapes, and maintain until Owner's Final Acceptance.
- 1.7 FIELD MEASUREMENTS
- A. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
 - B. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. Regulatory Requirements:
 1. Conform to applicable codes for flame/spread rating of 25 for curtains when tested in accordance with ASTM E 84. Provide certificate of compliance from authority having jurisdiction.

2.2 PERFORMANCE/DESIGN CRITERIA

- A. Capacities:

1. Track: To support vertical test load of 50 pounds without visible deflection of track or damage to supports. Size track to support moving loads.
2. Size track to support moving loads, sufficiently rigid to resist visible deflection and without permanent set.

2.3 CURTAIN SUPPORT TRACK

- A. Basis-of-Design Product: Inpro Formatrac Bendable Cubicle Track. Continuously extruded bendable track produced from ABS with aluminum core (3105-H2).
 1. Dimensions: Height 1.375 inch x width 0.450 inch x continuous lengths as required for application.
 2. Track bends: 8 inch minimum radius.
 3. White smooth finish.
 4. Carrier: Thermoplastic carrier with aluminum hook.
 5. Fixed End Cap: Thermoplastic end caps that allow the curtain to remain attached at end. Color to match track.
 6. Swivel End Cap: Thermoplastic variable angle end cap that allows the track to attach to the wall at any angle.
 7. Spring and Radius Clips: Steel/aluminum clips to hold track secure to ceiling, sized per ceiling grid size in curved or 90 degree bends. Color to match track.
- B. Provide curtain support track at
 1. Patient Rooms and Other Locations where privacy curtains are required.
 - a. Curved and linear, ceiling mounted.
 2. Bathrooms and Other Locations where shower curtains are required.
 - a. Curved, wall-mounted, swing away type to accommodate movement of patient lift system.

2.4 CUBICLE AND SHOWER CURTAINS

- A. Cubicle curtains shall meet the following criteria:
 1. Curtains: OFOI.
 2. Curtain shall be in accordance with NFPA 13 8.6.5.2.2.1.
- B. Shower curtains shall meet the following criteria:
 1. Curtain: OFOI

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and above ceiling supports and verify that they are in proper condition to receive the work of this Section. Verify field measurements are as shown on shop drawings.
- B. Beginning of installation means acceptance of existing surfaces, supports and project conditions.

3.2 INSTALLATION

- A. Install units to comply with manufacturer's instructions for type of mountings and operations required. Provide units plumb and true, securely anchored in place with recommended hardware and accessories to provide smooth, easy operation.

3.3 TOLERANCES

- A. Maximum variation of gap at window opening perimeter: 1/4 inch.
- B. Maximum offset from level: 1/8 inch.

3.4 ADJUSTING

- A. Adjust units for smooth operation. Replace any units or components which do not operate smoothly and without hindrance.

END OF SECTION

SECTION 102600
WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Corner guards.
 - 2. Chair rails.
 - 3. Hand rails.
 - 4. Bumper rails.

1.2 RELATED REQUIREMENTS:

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 06100 - ROUGH CARPENTRY: In-wall wood blocking.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details. Show handrail design and support spacing required to withstand structural loads.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.
- D. Product certificates.
- E. Material certificates.
- F. Sample warranty.
- G. Maintenance data.

1.4 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

- B. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1

2.2 WALL PROTECTION

- A. Corner Guards - Surface Mounted: High impact vinyl with extruded aluminum full height retainer and integral impact absorbing device.
 - 1. Basis of Design: Refer to Sheet 31-ID-104.
- B. Chair Rails: Factory-fabricated high impact vinyl, with preformed end caps and internal and external corners:
 - 1. Basis of Design: Refer to Sheet 31-ID-104.
- C. Hand Rails: High impact vinyl.
 - 1. Basis of Design: Refer to Sheet 31-ID-104.
 - 2. Provide brushed finished, stainless steel brackets, that shall not protrude from the profile of the handrail.
- D. Bumper rails: High impact vinyl with extruded aluminum full height retainer and integral impact absorbing device.
 - 1. Basis of Design: Refer to Sheet 31-ID-104

2.3 PLASTIC MATERIALS

- A. For Chair Rails, Corner Guards, Handrails and Bumper rails: PVC-Free Thermoplastic:
 - 1. Fire performance characteristics: Provide UL classified and labeled wall protection systems conforming with NFPA class A fire rating. Comply with ASTM E 84, Class 1, surface burning characteristics:
 - a. Flame spread: 25 or less.
 - b. Smoke developed: 450 or less.
 - 2. Self-extinguishing: CC1 classification in accordance with the applicable provisions of ASTM D 635.
 - 3. Impact strength: Provide assembled wall protection systems that have an impact strength of 30.2 ft.-lbs./inch of thickness as tested in accordance with the procedures specified in ASTM D 256, Impact Resistance of Plastics.
 - 4. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D 1308.
 - 5. Color match: Provide wall protection system components that are color matched with a Delta E difference no greater than 1.0 using the Hunter (Lab) Scale.
 - 6. Aluminum: Extruded, 6063-T5 aluminum, mill finish, in accordance with ASTM B 221.
 - a. Thickness: .080" thick for bumper rails and handrails.
 - b. Thickness: .070" thick for corner guards.
 - 7. Caps, inside and outside corners, brackets: Injected molded thermoplastic.
- B. Attachment Hardware: Appropriate to component and substrate.
- C. Adhesive: As recommended by manufacturer.

2.4 FABRICATION

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm) apart.
 - 3. Adjust end and top caps as required to ensure tight seams.

END OF SECTION

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**SECTION 102813
TOILET ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install toilet accessories.
- B. Furnish and install protection padding for exposed piping.
- C. Furnish concealed anchorage devices for handicap handrails for installation under Section 061000 - ROUGH CARPENTRY.
- D. Furnish toilet and bath accessory templates, to locate anchorage reinforcement, to trades responsible.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 061000 - ROUGH CARPENTRY:
 - 1. Wood blocking.
 - 2. Installation of concealed anchorage devices for grab bars in toilet rooms, this Section 102813 - TOILET ACCESSORIES.
- D. Section 092900 - GYPSUM BOARD: Gypsum board partitions and metal framing.
- E. Section 093000 - TILING: Tiled walls as substrate for toilet accessories.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014219 – REFERENCE STANDARDS.
 - 1. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.

1.4 SUBMITTALS

- A. Submit the following under provisions of Section 013323 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, for each item furnished hereunder.
 - 2. Schedule: Complete schedule, indicating types, quantity, and model numbers of accessories for each location in which the accessories will be installed.
 - 3. Selection samples: Sample color chips indicating each manufacturer's full range of colors available for selection by Architect.
 - 4. Verification samples: Complete units, as requested by Architect.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable codes and accessibility regulations, and comply with ANSI A 117.1 for installation of work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name, identification of manufacturer or supplier and item identification number corresponding with approved schedule.

- B. Store materials inside, under cover, and in manner to keep them dry, protected from weather, surface contamination, corrosion and damage from construction traffic and other causes.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- B. Coordinate the work of this Section with placement of internal wall reinforcement.

1.8 WARRANTY

- A. Deliver to the Owner upon completion of the work of this Section, applicable manufacturer's standard warranties.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES

- A. Mirrors; Roll-formed angle framed, size(s) as scheduled or otherwise indicated on Drawings, having the following features:
 - 1. Frame: one piece 3/4" by 3/4" inch type 304 18 gage stainless steel roll formed frame, with continuous integral stiffener on all sides. Corners shall be heliarc welded, ground and polished smooth.
 - a. Exposed finish: Brushed satin
 - 2. Back: Mirror back shall be protected by full-size, shock-absorbing, water-resistant, non-abrasive 1/8" (3-mm) thick polyethylene padding. Galvanized steel backing shall have integral brackets for concealed mounting.
 - 3. Mirror glass: 1/4 inch thick clear glass, ASTM C 1048 with Class 1 clear, quality q3 glazing select, conforming to ANSI Z97.1, with Class 1, standard commercial quality, electro-copper back-plating protected by a corrosion-resistant zinc-coating.
 - a. Mirror corrosion resistant backing shall have minimum 15 year warranty.
 - 4. Acceptable models:
 - a. Bobrick model N°. B-290, (Basis of Design).
 - b. A&J model N°. U700-VC.
 - c. ASI model N°. 0600.
 - d. Bradley model N°. 780.
- B. Grab bars; Bariatric, vertical, horizontal and other configurations as indicated on the Drawings:
 - 1. Fed. Spec WW-P-541/8B, Type IV, bars, surface mounted, Class 2, grab bars and ASTM F446.
 - 2. Fabricate of either stainless steel or nylon coated steel, except use only one type throughout the project:
 - a. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.
 - 3. Bars:
 - a. Fabricate from 38 mm (1-1/2 inch) outside diameter tubing.
 - 1) Stainless steel, minimum 1.2 mm (0.0478 inch) thick.
 - b. Fabricate in one continuous piece with ends turned toward walls.
 - c. Continuous weld intermediate support to the grab bar.
 - 4. Flange for Concealed Mounting:
 - a. Minimum of 2.65 mm (0.1046 inch) thick, approximately 75 mm (3 inch) diameter by 13 mm (1/2 inch) deep, with provisions for not less than three set screws for securing flange to back plate.

- b. Insert grab bar through center of the flange and continuously weld perimeter of grab bar flush to back side of flange.
 - 5. Acceptable manufacturers:
 - a. Bobrick.
 - b. A&J.
 - c. ASI.
 - d. Bradley.
 - 6. Back Plates:
 - a. Minimum 2.65 mm (0.1046 inch) thick metal.
 - b. Fabricate in one piece, approximately 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.
- C. Recessed toilet tissue dispenser, satin finish.
 - 1. ASI model N°. 74022-S.
 - 2. Bobrick model N°. B-6977.
 - 3. Bradley model N°. 5124.
- D. Coat/robe hooks: Surface mounted bright polished finish stainless steel double robe hook, fabricated from 22 gage type 304 stainless steel, protrudes from wall nominally 1-7/8 inches.
 - 1. Bobrick model N°. B-7672, (Basis of Design).
 - 2. A&J model N°. UX112.
 - 3. ASI model N°. 7345-B.
 - 4. Coat/robe hook Locations:
 - a. Provide one hook on the toilet side of all doors to all patients toilet rooms, staff toilets and public toilets.
 - b. Provide one hook on the bath side of all doors to all patients bathrooms.
- E. Shower curtain rods:
 - 1. Stainless steel tubing, ASTM A569, minimum 1.27 mm (0.050 inch) wall thickness, 32 mm (1 1/4 inch) outside diameter.
 - 2. Flanges, stainless steel rings, 66 mm (2 5/8 inch) minimum outside diameter, with 2 holes opposite each other for 6 mm (1/4 inch) stainless steel fastening bolts. Provide a set screw within the curvature of each flange for securing the rod.
 - 3. Intermediate support for rods over 1800 mm (six feet) long. Provide adjustable ceiling flanges with set screws, tubular hangers and stirrups.
- F. Mop and broom holders: Surface mounted, nominal 34 inch long stainless steel unit with 18 gage 8 inch deep continuous shelf, 4 stainless hooks and 3 mop/broom holders, anti-slip spring loaded, rubber cam mop holders, capable of holding 7/8 to 1-1/4 inch diameter handles.
 - 1. A&J model N°. UJ45A.
 - 2. ASI model N°. 1308-3.
 - 3. Bobrick model N°. B-239-34.
 - 4. Bradley model N°. 9933.
- G. Shower seat, folding type with cushion shall have a frame constructed of type-304, satin finish stainless steel. Seat cushion shall be 1-1/2 inches thick foam padding mounted on 1/2 inch thick plywood and covered in water-resistant reinforced vinyl fabric. Seat shall be able to lock in upright position when not in use and comply with ADA Accessibility Guidelines (ADAAG). Seat supports shall not come into contact with floor. Provide left or right hand seat.
 - 1. Acceptable models, or approved equal:
 - a. A&J model N°. U933-1AR or u933-1AL, as indicated.
 - b. ASI model N°. 8205R or 8205L as indicated.

- c. Bobrick model N°. B517 or B518, as indicated.
- H. Swing away type grab bars: handed as indicated or as otherwise required for field conditions encountered.
 - 1. Bobrick model N°. B-4993.
 - 2. Bradley model N°. 8170-158.
- I. Narcotics cabinet:
 - 1. Surface mounted double door cabinet (doors each keyed different), nominal size: 15 inches high, 11 inches wide by 8 inches deep with 2 adjustable shelves.
 - 2. Finish: Manufacturer's standard baked enamel or powder coat, in manufacturer's standard color as selected by Architect.
 - 3. Acceptable models:
 - a. Beam / Omnimed Inc., Moorestown NJ., model 182150 "Economy Narcotic Cabinet".
 - b. Harloff Company, Colorado Springs, CO., model 2702.
 - c. Lakeside Healthcare Products, West Milwaukee WI, model 3822MAW.
 - d. United Metal Fabricators (UMF) Johnstown PA., model 7781.
- J. Owner Furnished-Contractor Install items, (including but not limited to the following):
 - 1. Paper towel dispenser.
 - 2. Soap dispenser.
 - 3. Recessed toilet paper dispenser.
 - 4. Hand Sanitizer.
 - 5. Glove box.
 - 6. Shower curtain.

2.2 ADA PIPING PROTECTION

- A. Specified Product (Basis of Design): IPS Corporation, Collierville, TN., product "Soft Guard Plus".
- B. Description: 1/8 inch thick pliable PVC Shell finish Soft Guard Plus on all drainage piping including hot and cold water valve and supplies under lavatories to comply with ADA and UPC standards. Covers shall be secured by custom fit, tamper-resistant snap-to-lock fasteners.
 - 1. Complies with ICC/ANSI A117.1 (sec 606.6).
 - 2. PVC Base Insulation Material, Class A rated complying with 25 Flame Spread/450 Smoke Index (tested under ASTM E-84).

2.3 LOCKS

- A. General: All locks shall be keyed alike. Provide four (4) keys, for lockable accessories, to the Owner.

2.4 INSTALLATION ACCESSORIES

- A. Fasteners, screws, and bolts: Type 304 stainless, tamperproof.
- B. Baby Changing Station mounting hardware: Provide each changing station with fasteners and other hardware of type and size recommended by manufacturer for type of installation and substrate for complete secure installation.
- C. Expansion shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.5 FABRICATION

- A. Welding, AWS D10.4.
- B. Provide steel anchors and components required for secure installation.

- C. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion, scratches or dents. Weld and grind smooth joints of fabricated components.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop assemble components and package complete with anchors and fittings. Hot dip galvanize exposed and painted ferrous metal and fastening devices. Provide steel anchor plates, adapters, and anchor components for installation.
- F. Hot-dip galvanized steel, except stainless steel, anchors and fastening devices.
- G. Shop assemble accessories and package with all components, anchors, fittings, fasteners and keys.
- H. Key items alike.
- I. Provide templates and rough-in measurements as required.
- J. Round and deburr edges of sheets to remove sharp edges.
- K. Provide steel anchors and components required for secure installation.

2.6 FACTORY FINISHING

- A. In accordance with NAAMM AMP 500 series.
- B. Ferrous metals: Clean and treat, spray apply one coat of baked-on rust and moisture-resistant primer, followed by two coats of baked-on synthetic enamel, in selected colors. Ensure that finish coating is uniform in color intensity and degree of gloss, throughout.
- C. Chrome/Nickel Plating: ASTM 456, Type SC2, satin finish.
- D. Stainless steel: NAAMM AMP 503, Number 4 satin finish, except as otherwise specified above under the Article entitled "Toilet Accessories".
- E. Nylon Coated Steel: Nylon coating powder formulated for a fluidized bonding process to steel to provide a hard smooth, medium gloss finish, not less than 0.3 mm (0.012-inch) thick, rated as self-extinguishing when tested in accordance with ASTM D635.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide templates and rough-in measurements as required. Deliver inserts and rough-in frames to site at appropriate times for building-in by other trades
- B. Coordinate with trades responsible for providing receiving surfaces on which accessories will be installed.
- C. Exact locations of accessories within each room or area shall be as directed by the Architect.

3.2 INSTALLATION

- A. Perform installation work in accordance with the approved shop drawings and the manufacturer's installation instructions.
- B. Install toilet accessories absolutely level and in true line, securely and rigidly anchored with theft proof fasteners of the size and type most appropriate for the specific receiving surface, concealing the fasteners as far as practicable.

3.3 ADJUSTING

- A. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.4 CLEANING

- A. Remove all protective films and coverings from accessories, and clean and polish each piece. Remove all rubbish, packing materials, and debris, caused by the work of this Section.

END OF SECTION

SECTION 104413
FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install:
 - 1. Fire extinguisher cabinets and brackets.
 - 2. Fire extinguishers.

1.2 RELATED REQUIREMENTS

- A. Section 061000 - ROUGH CARPENTRY: Wood rough-in framing and blocking.
- B. Section 092216 - NON-STRUCTURAL METAL FRAMING: Framed wall openings
- C. Section 092900 - GYPSUM BOARD: Gypsum wallboard finishes.
- D. Section 099100 - PAINTING: Field applied coatings.
- E. Division 21 - FIRE SUPPRESSION: Fire hose connections and related cabinets and accessories.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
 - 1. NFPA 10 – Standard for Portable Fire Extinguishers, 2013 Edition.

1.4 SUBMITTALS

- A. Submit the following under provisions of Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:
 - 1. Literature: Manufacturer's product data sheets, indicating: fabrication specifications, finishes, dimensions of cabinet and rough opening, and installation instructions.
 - 2. Shop drawings: Details showing unit dimensions, methods of construction, attachment clips and brackets; and complete installation details.
 - 3. Selection samples: Samples indicating metal finishes available for selection by the Project Engineer/VA-COR and the Architect.
 - a. Provide additional samples as requested by the Project Engineer/VA-COR and the Architect to facilitate initial selection of colors and finishes
 - 4. Verification samples: Fire extinguisher cabinet in specified size, finishes, and door type, if requested by the Project Engineer/VA-COR and the Architect.

1.5 REGULATORY REQUIREMENTS

- A. Obtain certificate of compliance from authority having jurisdiction indicating approval of fire extinguisher cabinets and their installed locations.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver cabinets or extinguishers to the site, until all specified submittals have been submitted to, and approved by, the COR and the Architect. Deliver materials in manufacturer's original, unopened, undamaged packaging with identification labels intact.

- B. Store cabinets and extinguishers in their original packaging inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

1.7 QUALITY ASSURANCE

- A. Fire-rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of wall where they are installed.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FMG.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS CABINETS AND BRACKETS

- A. Fire extinguisher cabinets:
 - 1. Cabinet trim style: Flat trim, Semi-recessed cabinet, rolled-Edge Trim with 2-1/2 inch backbend depth.
 - 2. Door and trim: Cold-rolled steel with factory applied white thermally fused polyester coating, acceptable to receive a field applied recoating.
 - a. Vertical duo design with clear tempered float glass.
 - b. Handles: Red door handles having raised letters "FIRE". Non-locking.
 - c. Lettering: Factory furnished decals for field application, as directed by the Project Engineer/VA-COR and the Architect.
 - 1) Pattern: Vertical reading.
 - 2) Color: Red, White or Black, as selected by the Project Engineer/VA-COR and the Architect.
 - 3. Cabinet construction: 18 gage cold-rolled steel with factory applied white baked acrylic enamel finish.
 - 4. Acceptable cabinet models (for 10 pound extinguishers):
 - a. Non-rated cabinets
 - 1) JL Industries "Ambassador Series", model number 1015.
 - 2) Larsen "Architectural Series", model number 2409-R2.
 - 3) Potter-Roemer, "Alta Series", model number 7020.
 - b. One hour fire-resistant-rated cabinets
 - 1) JL Industries "Ambassador Series", model number 1015-FX.
 - 2) Larsen "Architectural Series", model number FS-2409-R2.
 - 3) Potter-Roemer, "Alta Series", model number FRC-7020.
- B. Wall mounting Bracket: 16 gage steel surface mounted bracket, with red glossy polyester thermo-set coating, equal to the following. Provide with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface, letter size, style as required by code, location as selected by the COR and the Architect.

1. JL Industries, model number "MB-810".
2. Larsen model number 864.
3. Potter-Roemer, model number 3903.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
- B. Valves: Manufacturer's Standard.
- C. Handles and Levers: Manufacturer's Standard.
- D. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- E. Multipurpose Dry-Chemical Type in Steel Container: Extinguisher unit containing a fluidized and siliconized monoammonium phosphate powder, nonconductive and nontoxic.
 1. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal replaceable with valve stem seal, visual pressure gage, pull pin and upright squeeze grip.
 2. Finish: Factory powder-coated; Red.
 3. Effectiveness (Rating): Class A, B, and C fires.
 4. Model Identification and UL Rating: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.
- B. Verify that prepared openings are ready to receive extinguisher cabinets.
- C. Beginning of installation means acceptance of project conditions.
- D. Examine fire extinguishers for proper charging and tagging.
 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
 2. Provide tags for fire extinguishers in format required by authorities having jurisdiction.

3.2 INSTALLATION FIRE CABINETS

- A. Install fire extinguisher cabinets in accordance with manufacturer's instructions in locations indicated, and as additionally directed by regulatory authority having jurisdiction.
 1. Provide fire extinguisher cabinets in locations as indicated on the Drawings.
- B. Do not commence installation of fire extinguisher cabinets until immediately adjacent surfaces have been completely installed and finished.
- C. Install cabinets absolutely level and in true line, with units securely anchored to the surrounding construction. Fit trim pieces accurately and tight to adjacent construction.
 1. Maximum variation from plumb and level: 1/8 inch.
 2. Maximum offset from true dimensional alignment: 1/4 inch.

3.3 INSTALLATION FIRE EXTINGUISHERS

- A. Place extinguishers in cabinets.
- B. Install brackets at locations where fire extinguishers are not indicated to be in cabinets.
 - 1. Secure rigidly in place.
 - 2. Mount extinguishers on brackets.
- C. Mount brackets at height so handle of extinguisher is at 36 inches above floor is mounting height not indicated in Drawings.

3.4 CLEANING AND ADJUSTMENT

- A. Upon completion of the work of this Section in any given area, remove tools, and all packaging and debris from the work area; leave area in broom-clean condition.
- B. After adjacent work is complete:
 - 1. Test each door and latching device, and make adjustments required to ensure a bind-free operation and proper latching.
 - 2. Remove all tape and other packing materials from fire extinguisher cabinets .
 - 3. Thoroughly clean and polish all exterior and interior surfaces of extinguisher cabinets, take care to remove dirt from corners. Clean metal and glass surfaces with mild cleaning agents as recommended by manufacturer.
 - 4. Touch-up all scratches and other surface defects, using same materials and colors as shop finish.

END OF SECTION

SECTION 113100 RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide residential appliances, including the following:
 - 1. Refrigerator/freezers.
 - 2. Undercounter refrigerators.
 - 3. Ice makers.
 - 4. Microwave.

1.2 SUBMITTALS

- A. Submit the following:
 - 1. Literature: Manufacturer's product data sheets and specifications, for each product installed and furnished hereunder clearly indicating configurations, sizes, materials, finishes, locations, utility connections and locations. Include information on accessories and options.
 - 2. Manufacturer's installation instructions: Indicate special procedures, perimeter conditions and conditions requiring special attention.
 - 3. Manufacturer's certificates: Certify that Products provided under this Section meet or exceed UL and specified requirements.
 - 4. Manufacturer's sample warranties.
 - 5. Shop drawings for coordination: Provide dimensioned locations for utility connections.
 - 6. Manufacturer's warranties: Include coverage of installed equipment.
 - 7. Maintenance Data: Include lubrication and periodic maintenance requirement schedules.

1.3 REGULATORY REQUIREMENTS

- A. Products requiring electrical connections: Listed and classified by UL, as suitable for the purpose specified and indicated.
- B. Provide and install the work of this Section in conformance with all applicable federal, state and municipal codes, laws and regulations regarding utilities, health, fire protection and safety.

1.4 QUALITY ASSURANCE

- A. Certification labels: Provide residential equipment which complies with standards and bears certification labels as follows:
 - 1. Energy ratings: Provide energy guide labels with energy cost analysis (annual operating costs) and energy information as required by Federal Trade Commission.
 - 2. UL standards: Provide residential equipment with UL labels.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store all materials in original packaging in protected interior location.
- B. Coordinate schedule of construction, size of access and route to place of installation to prevent delay of installation due to physical impediments. Any work involving the demolition and reconstruction of partitions, walls, floors, roofing, windows or doors to place and install the work of this Section shall be performed at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Provide products of same manufacturer for each type of residential appliance required. To greatest extent possible, provide equipment by single manufacturer for entire project.

1. In kitchens, provide appliances with matching color and style. When equipment is by more than one manufacturer, provide units matching

2.2 EQUIPMENT

- A. Undercounter icemaker: nominal 39 inches high by nominal 30 inches and 30 inches deep. One door unit, equal to Scotsman, model N°. SCE275A-1A.
- B. Undercounter refrigerator/freezer: 34-1/8 inches high by nominal 24 inches wide by nominal 23 inches deep (less handle) One door unit, equal to U-Line Corporation: 2075R.
- C. Convection/Microwave oven: equal to General Electric "Profile Spacemaker Series" Model JVM1490SH, with stainless steel body and touch control.
- D. Refrigerator/Freezer: 28 inch wide by 28 inch deep (less handle) Two door unit with freezer on top, equal to General Electric Model: TBX14SM.
 1. Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories.

2.3 FINISHES

- A. Finish Colors: Provide manufacturer's standard colors as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify the Contractor, and copy to Architect, in writing of any conditions detrimental to the proper and timely completion of the work, and do not proceed with the work until said conditions are corrected.
- B. Verify clearances required for equipment.
- C. Verify ventilation outlets, service connections, and supports are correct and in required location.
- D. Verify that electric power is available and of the correct characteristics.
- E. Beginning of installation means acceptance of existing site conditions.

3.2 INSTALLATION

- A. Install each product in accordance with manufacturers' instructions.
 1. Maximum variation for installed equipment, from true position of 1/16 inch in 8 feet for plumb and level and a maximum of 1/32 inch offsets in adjoining surfaces intended to be flush.
- B. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- C. Anchor equipment using devices appropriate for equipment, substrate and expected usage.

3.3 ADJUSTING

- A. Adjust work under provisions of Section 01 73 00 - EXECUTION.
- B. Adjust equipment to ensure proper working order and conditions.
- C. Remove and replace equipment creating excessive noise, or vibration.
- D. After installation is completed, insure that operating parts work freely and fit neatly. Adjust hardware and catches as required. Repair or replace damaged parts dents, buckles, abrasions, scraps or other damage affecting the appearance or serviceability.

3.4 CLEANING

- A. Wash and clean appliances.
- B. Clean and polish glass, plastic, hardware and accessories, fixtures and fittings.
- C. Remove protective coverings from prefinished work just prior to Owner's acceptance of facility.

END OF SECTION

SECTION 117313
PATIENT LIFTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Refer to Schedule herein below:

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- C. Section 055000 - METAL FABRICATIONS: Supplemental support system connecting lifts to building structure, as indicated.
- D. Division 26 - ELECTRICAL: Electrical supply to patient lifts.

1.3 SUBMITTALS

- A. Submit the following:
1. Literature: Manufacturer's product data sheets and specifications, for each product installed and furnished hereunder clearly indicating configurations, sizes, materials, finishes, locations, utility connections and locations. Include information on accessories and options.
 2. Manufacturer's installation instructions: Indicate special procedures, perimeter conditions and conditions requiring special attention.
 3. Manufacturer's certificates: Certify that Products provided under this Section meet or exceed UL and specified requirements.
 4. Manufacturer's sample warranties.
 5. Shop drawings for coordination: Provide dimensioned locations for utility connections.
 6. Manufacturer's Literature and Data:
 7. Individual Room layouts showing location of lift system installation shall be approved before proceeding with installation of lifts.
 8. Manufacturer's Checklist for after installation inspection.

1.4 REGULATORY REQUIREMENTS

- A. Products requiring electrical connections: Listed and classified by UL, as suitable for the purpose specified and indicated.
- B. Provide and install the work of this Section in conformance with all applicable federal, state and municipal codes, laws and regulations regarding utilities, health, fire protection and safety.

1.5 QUALITY ASSURANCE

- A. Certification for compliance is required for Ceiling Mounted Patient Lift Systems. Certifications shall be provided by an independent third party who will conduct testing to ensure that the ceiling lift and charging system are safe and in compliance with ISO 10535 & UL 60601-1

- B. Inspection of equipment after installation is required prior to use for patient movement. Inspection shall be in accordance with manufacturer's installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07).
- C. Certification labels: Provide equipment which complies with standards and bears certification labels as follows:
 - 1. Energy ratings: Provide energy guide labels with energy cost analysis (annual operating costs) and energy information as required by Federal Trade Commission.
 - 2. UL standards: Provide residential equipment with UL labels.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by the basic designation only.
- B. International Organization for Standardization (IOS):
 - 1. 10535-06 Hoist for the Transfer of Disabled Persons-Requirements and Test Methods.
- C. Underwriters Laboratories (UL):
 - 1. 60601-1(2003): Medical Electrical Equipment: General Requirements for Safety.
 - 2. 94-2013: UL Standards for Safety Test for Flammability of Plastic Materials for Parts in Devices and Appliances-Fifth Edition.
- D. International Electromagnetic Commission (IEC): 801-2(1991)
- E. Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment-Part 2: Electromagnetic Discharge Requirements Patient Safety Alert AL14-07.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store all materials in original packaging in protected interior location.
- B. Coordinate schedule of construction, size of access and route to place of installation to prevent delay of installation due to physical impediments. Any work involving the demolition and reconstruction of partitions, walls, floors, roofing, windows or doors to place and install the work of this Section shall be performed at no additional cost to the Owner.

1.8 WARRANTY

- A. Provide manufacturer's standard warranties under the provisions of 019999 – PROJECT CLOSEOUT.

PART 2 - PRODUCTS

2.1 LIFT SCHEDULE

- A. GENERAL
 - 1. The ceiling-mounted patient lift system shall be designed, manufactured, shipped, handled, and installed by SureHands Lift & Care Systems and its agents. The removal of existing systems and the delivery and installation of new systems shall be phased to accommodate the progression of the project and these activities shall be identified in the Contractor's project schedule. The division of responsibility shall be as follows:
- B. GROUND FLOOR
 - 1. Ground Floor patient lift systems located in the Swing Nursing Unit will be furnished and installed by SureHands under an existing purchase order between SureHands and the

VAMC. The contractor shall accommodate this work within the Phase 1 project schedule and shall extend full site access to SureHands during normal working hours. The contractor shall coordinate the trades to ensure a smooth and professional progression of the work. The contractor shall coordinate the location of one electrical outlet in each patient room with SureHands, final location approved by VAMC, for convenient recharging of freestanding patient lift motor. The contractor shall have no other obligation to SureHands.

C. FIRST FLOOR

1. Removal and disposal of the existing patient lift systems and associated structural support shall be by SureHands working directly for the Contractor. The Contractor shall carry the associated costs within their contract.
2. The structural support for the new ceiling-mounted patient lift systems shall be Contractor Furnished & Installed. The materials and labor shall be provided by SureHands working directly for the Contractor. The Contractor shall carry the associated costs within their contract.
3. The new ceiling-mounted patient lift systems shall be Contractor Furnished & Installed. All work shall be by SureHands working directly for the Contractor. The contractor shall carry the associated costs within their contract.
4. Refer to the layout documents, Appendix B – Lift System Drawings, prepared by SureHands Lift & Care Systems. The lift systems indicated on the architect's reflected ceiling plan and elsewhere within the project drawings are illustrated in Good Faith by the Architect for general reference & coordination but are not guaranteed to be the final layout.
5. The VAMC may require a special breakdown of Lift System labor, materials and operational equipment costs for budgeting and approval purposes. The Contractor and SureHands shall work with the VAMC to provide the requested information.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify the Contractor, and copy to Architect, in writing of any conditions detrimental to the proper and timely completion of the work, and do not proceed with the work until said conditions are corrected.
- B. Verify clearances required for equipment.
- C. Verify ventilation outlets, service connections, and supports are correct and in required location.
- D. Verify that electric power is available and of the correct characteristics.
- E. Beginning of installation means acceptance of existing onsite conditions.

3.2 INSTALLATION

- A. Install ceiling mounted patient lift system as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.
- B. If the distance in between the suspended ceiling and anchors is more than 18 inches consult with manufacturer to determine if lateral braces will be required.

3.3 Instruction and personnel training

- A. Training shall be provided for the required personnel to educate them on proper operation and maintenance for the lift system equipment.

3.4 TEST

- A. Conduct performance test, in the presence of the Owner, Architect and a manufacturer's field representative, to show that the patient lift system equipment and control devices operate properly and in accordance with design and specification requirements.

3.5 INSPECTION

- A. Inspection of installed ceiling mounted patient lift systems shall be conducted in accordance with the manufacturer's installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07) prior to use for patient movement.

3.6 ADJUSTING

- A. Adjust work under provisions of Section 017300 - EXECUTION.
- B. Adjust equipment to ensure proper working order and conditions.
- C. Remove and replace equipment creating excessive noise, or vibration.
- D. After installation is completed, insure that operating parts work freely and fit neatly. Adjust hardware and catches as required. Repair or replace damaged parts dents, buckles, abrasions, scrapes or other damage affecting the appearance or serviceability.

3.7 CLEANING

- A. At completion of each work day, remove tools and all crating boxes, coverings, rubbish and debris from the work area; leave area in broom-clean condition.
- B. Upon completion of the work of this Section, remove tools and all crating boxes, coverings, rubbish and debris from the work area; leave area in broom-clean condition.
- C. Wash and clean appliances.
- D. Clean and polish glass, plastic, hardware and accessories, fixtures and fittings.
- E. Remove protective coverings from prefinished work just prior to Owner's acceptance of facility.

3.8 ATTACHMENTS

- A. APPENDIX A, 117313.A: STRUCTURAL CERTIFICATION
- B. APPENDIX B, 117313.B: LIFT SYSTEM DRAWINGS

END OF SECTION

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117313.A
STRUCTURAL CERTIFICATION

APPENDIX A TO SECTION 117313, PATIENT LIFTS

COVER SHEET

The H.L. Turner Group Inc.

27 Locke Road Concord, NH 03301 t: 603.228.1122 hltturner.com

APPENDIX 117313-A: STRUCTURAL CERTIFICATION
PATIENT CEILING-MOUNTED LIFT SYSTEM

August 29, 2022

Mr. Shane Thompson
Sure Hands Lift & Care Systems
982 Route 1
Pine Island, NY 10969

SUBJECT: Structural Review of Track System Support
Sure Hands Lift & Care System
VA Hospital Project 405-13-104
Inpatient Ward Renovation Building 31
White River Junction, Vermont

Dear Mr. Thompson:

We have reviewed the proposed layout and location for the Sure Hands Lift and Care Systems "H" track and single rail layout for the Inpatient Ward Renovation for Building 31 at the VA Hospital in White River Junction, Vermont. We reviewed the track locations annotated on the Reflected Ceiling Plan, Drawing No. 31-AS-501, prepared by e4h architects, dated May 1, 2019. As requested, we have reviewed and updated our previous analysis work done for Building 31 at the VA Hospital in White River Junction, which involved the support of the Sure Hands Lift and Care System Track for the Sure Hands Ceiling Lift. The track support system, originally designed for 660 pounds, was upgraded back in 2009 through 2012, to carry a maximum concentrated load of 990 pounds, which includes equipment and live load. This current review, completed in accordance with the current State of Vermont Building Code – IBC 2015 requirements, is for the 990-pound maximum load.

In all cases, the existing Sure Hands track support system consists of horizontal double (or in a few cases triple) struts such as Superstrut Type G-5812-A, with ½-inch threaded rods that extend down to a Sure Hands Lift & Care system supplied support plate and track. The superstruts are either hung from or supported on the flanges of the existing framing members (wide flange beams or steel bar joists), and are held in place with superstrut beam clamps. In past analysis work performed in 2009, 2010, and 2011, no structural upgrades were required to support the 990-pound load for many of the rooms and framing systems analyzed. In some cases, minor upgrades were required. This certification is based on the fact that all upgrades recommended between 2009 and 2011 were completed as required.

A summary of the analysis and recommendations for each area is as follows:

Building 31 – Room 150

The horizontal double strut Sure Hands track support is hung directly from the bottom chord of the main truss on the “D” line. In 2009, it was determined that no upgrades or modifications were needed in this room to support the 990-pound loading.

Current analysis and review indicate no additional work is required in this room.

Building 31 – Room 178

The horizontal double struts supporting the Sure Hands track for the personnel lift span between the existing T-12 floor trusses. Back in 2009, it was recommended that to support the 990-pound load the double struts were to be strengthened by adding a third piece of 1-5/8 strut material on top of the existing double strut. In addition, for any threaded hanger rods that exceed 12 inches in length from the double strut to the top of the track support plate, it was recommended that a diagonal brace be added to prevent side-sway.

Current analysis and review indicate no additional work is required in this room.

Building 31 – ICU Room 7

In 2009, it was determined the floor trusses are more than sufficient to support the 990-pound load from the Sure Hands personnel lift, and the double strut track supports are more than sufficient to support this same load without further reinforcement; however, it was recommended that sway bracing be added.

Current analysis and review indicate no additional work is required in this room.

Building 31 – Basement

The areas of the basement that were reviewed back in 2010 include the area encompassed by grid lines A to B/2.6 to 3, B to C/2 to 2.3, B to B.5/4.7 to 5, B to B.5/5 to 5.2, and B to B.5/5.2 to 6. The framing from which the supports are hung consists of W14 and W18 wide flange beams.

We previously reviewed load cases where the Sure Hands track runs perpendicular to the framing as well as parallel to the framing. In the worst-case scenario, with the 990-pound load suspended directly from the midpoint of the beam, both the W14 and the W18 are adequate to support the 990-pound loaded lift system in addition to carrying the floor dead load and live load. The analysis was for a single 990-pound load; multiple loads on a given beam were not considered.

In all cases but one, the existing horizontal double strut secured with the U510 clips to the bottom flange of the beam is adequate to support the Sure Hands track hanger bracket with no additional upgrades or modifications. However, a concentrated load at the midspan of the double strut (based on a span of 6'-2") imparts a bending moment that exceeds the capacity of the double strut by about 38%. It was recommended in 2010 that the double strut be strengthened by adding a third piece of 1-5/8" strut material on top of the existing double strut, similar to what was recommended previously for Room 178. Therefore, for cases where the Sure Hands track runs parallel to the wide flange beams and the center of the load falls within 19" on either side of the center of the 6'-2" span, the recommendation stands; the double strut must be reinforced with a third section of strut material as described above.

It was also recommended that in cases where the threaded rods exceed 12 inches in length, from the double strut to the top of the track support plate, a diagonal brace should be added to prevent side-sway.

Current analysis and review indicate no additional work is required in this room.

Current Inpatient Renovation

Based on this current review of the track support system, we certify the Sure Hands single rail and "H" track is capable of carrying a total load of 990 pounds, applied anywhere along the track, provided the support system is installed per the previously described and approved details. This includes installation details (including all previous recommendations) described above for each of the specific rooms mentioned above and for rooms with similar installation layouts. This analysis is for a single 990-pound load on any given support point.

If you have any questions, please do not hesitate to contact me by email at pbecht@hlturner.com or on my cell phone at (603) 738-0040.

THE H.L. TURNER GROUP INC.



Paul M. Becht, PE, Principal
Senior Structural Engineer



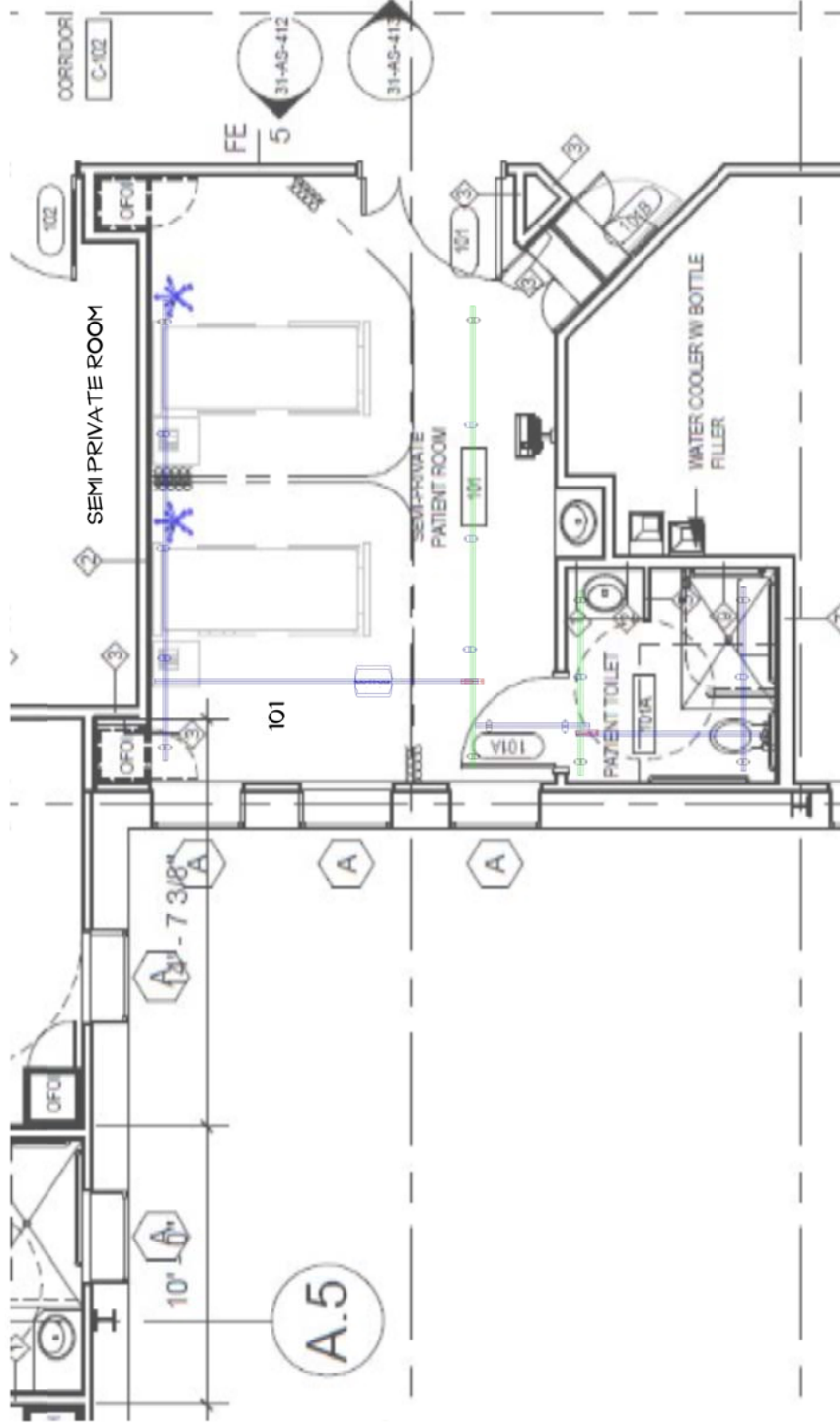
Gerard R. Blanchette, PE, NCEES, LEED® AP
President || Principal



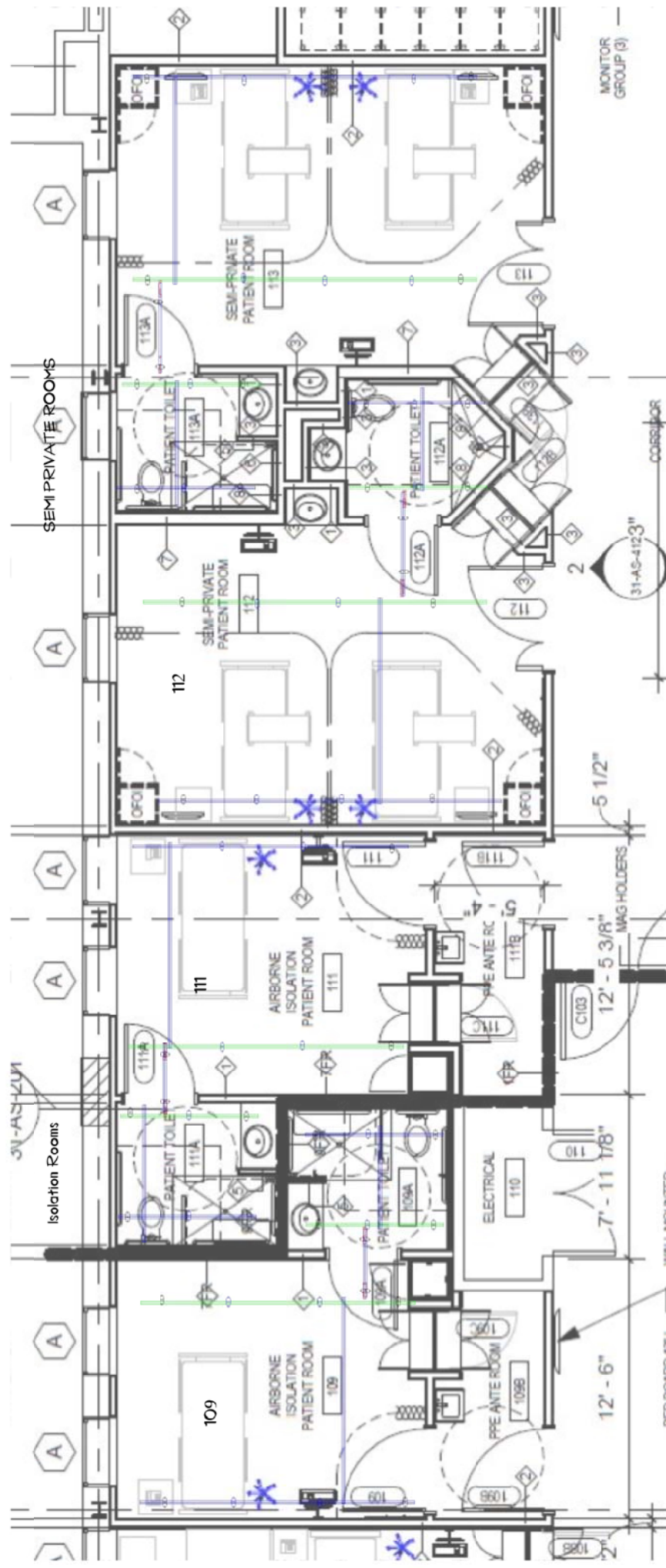
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LIFT SYSTEM DRAWINGS

APPENDIX B TO SECTION 117313, PATIENT LIFTS

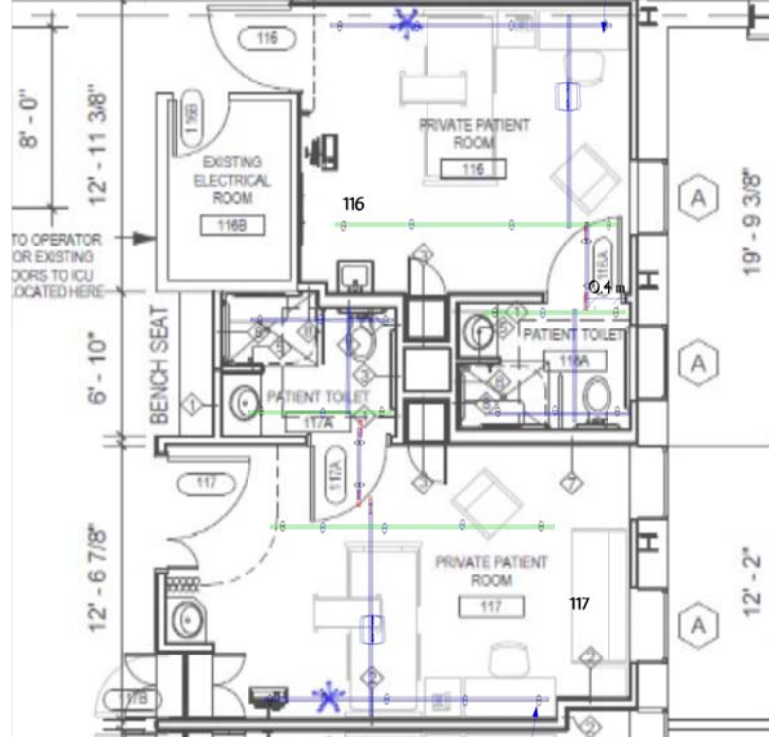
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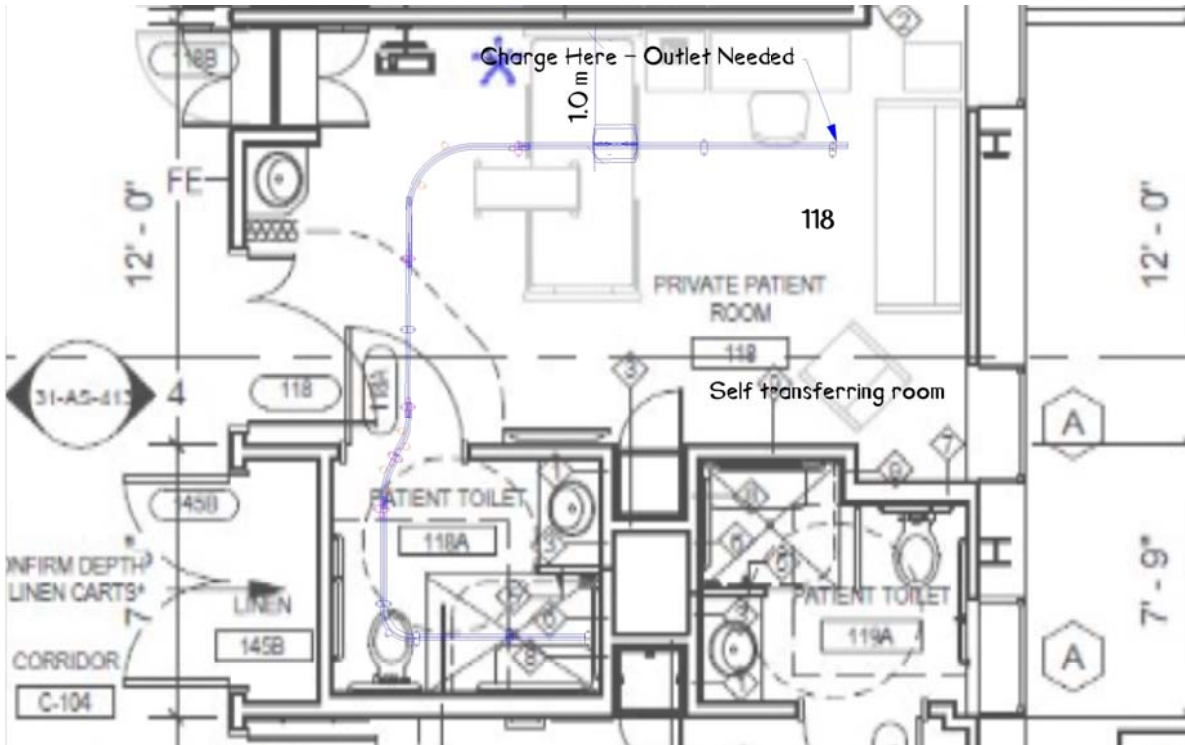
APPENDIX 117313-B:
PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT



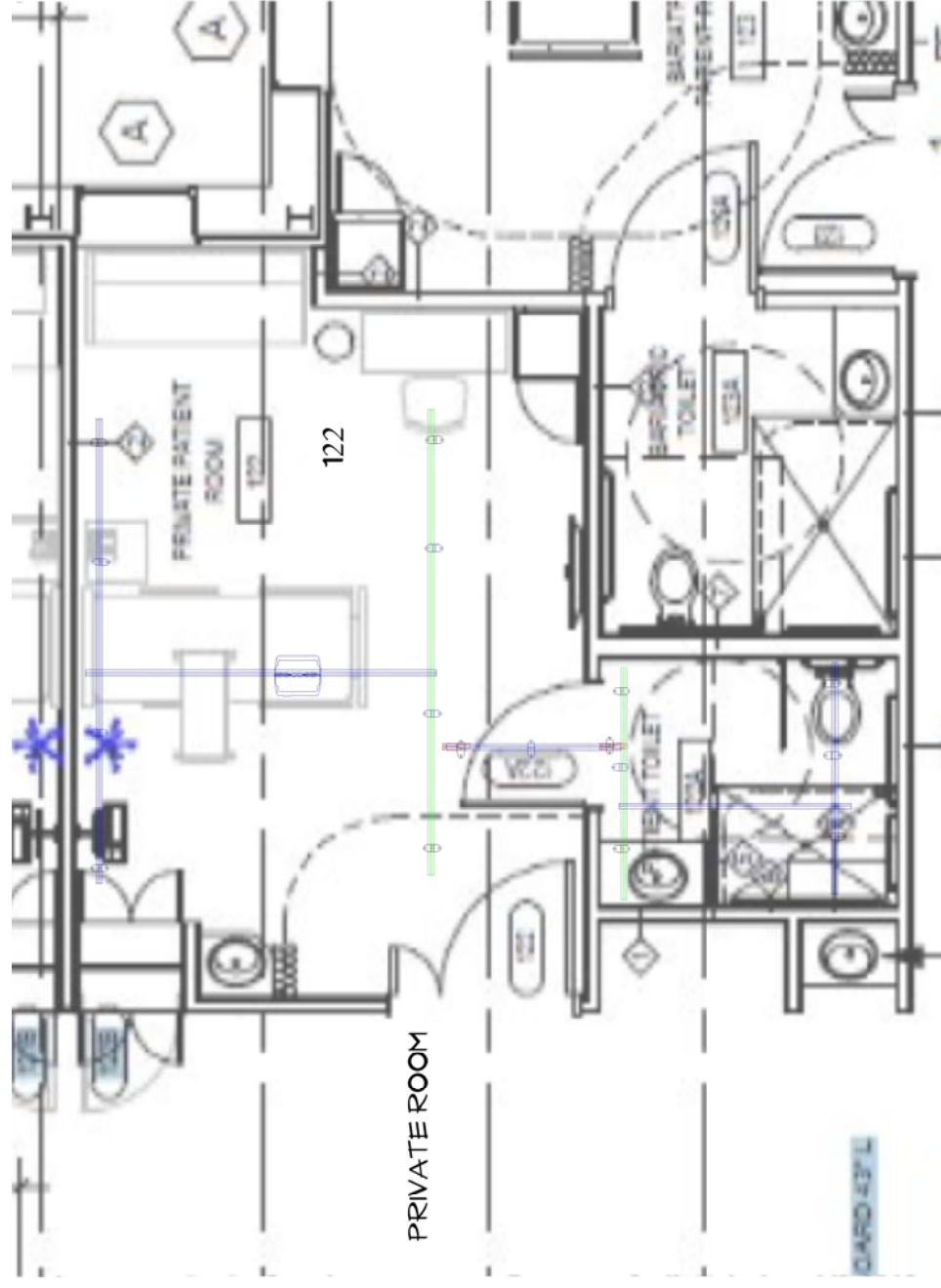
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PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT



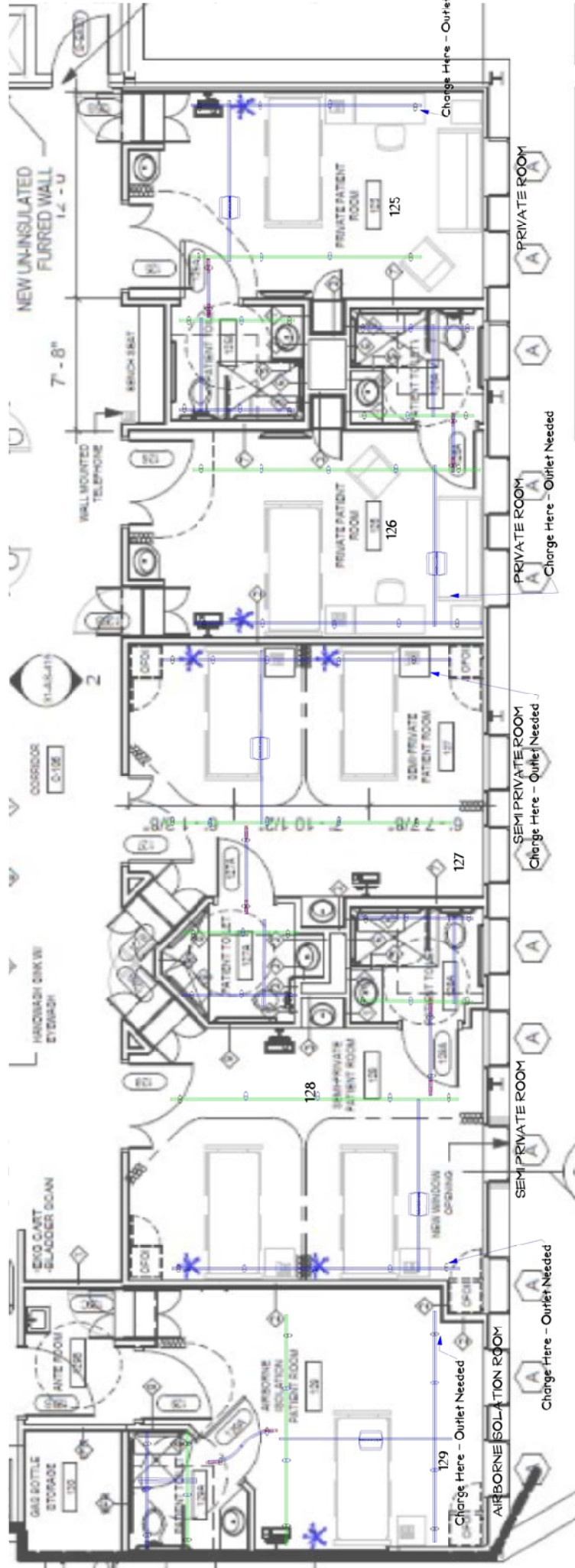
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PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**



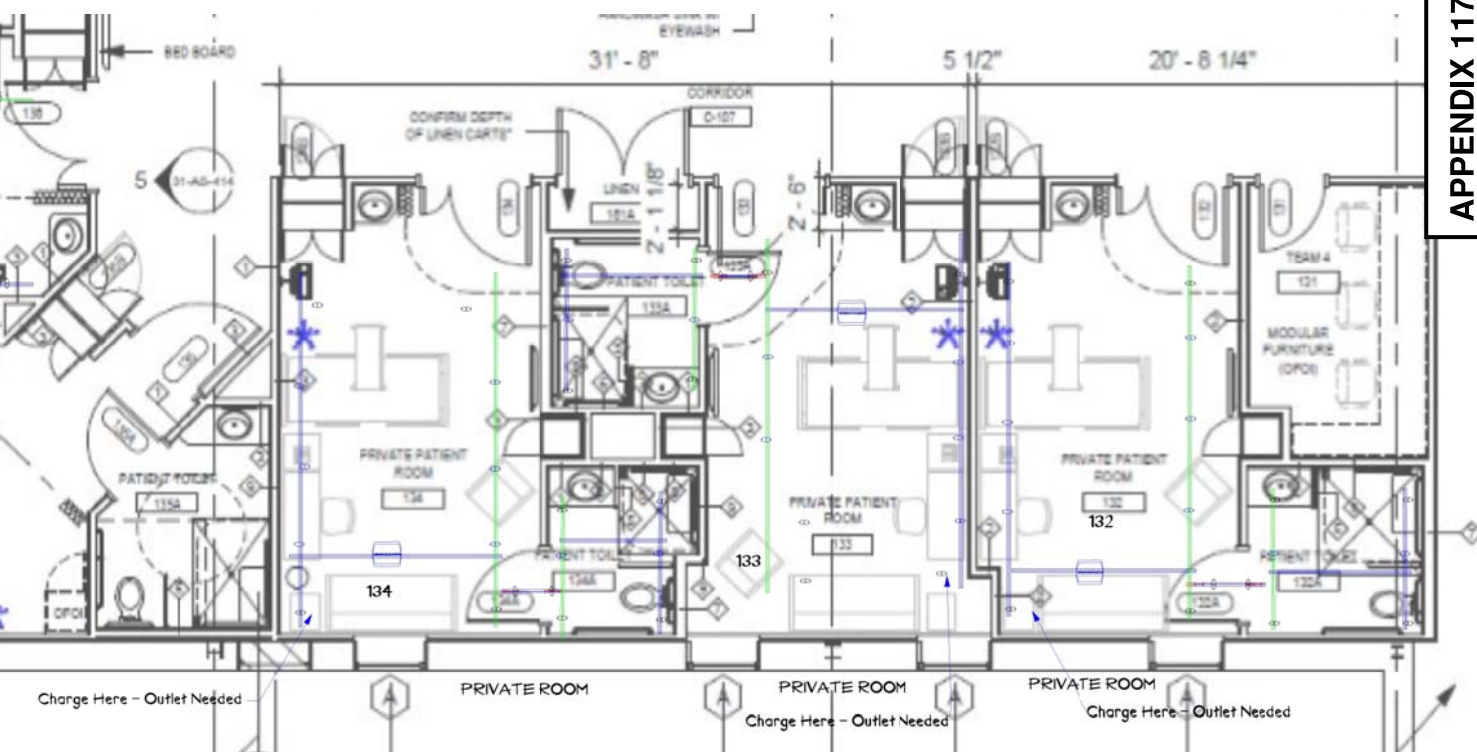
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PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**



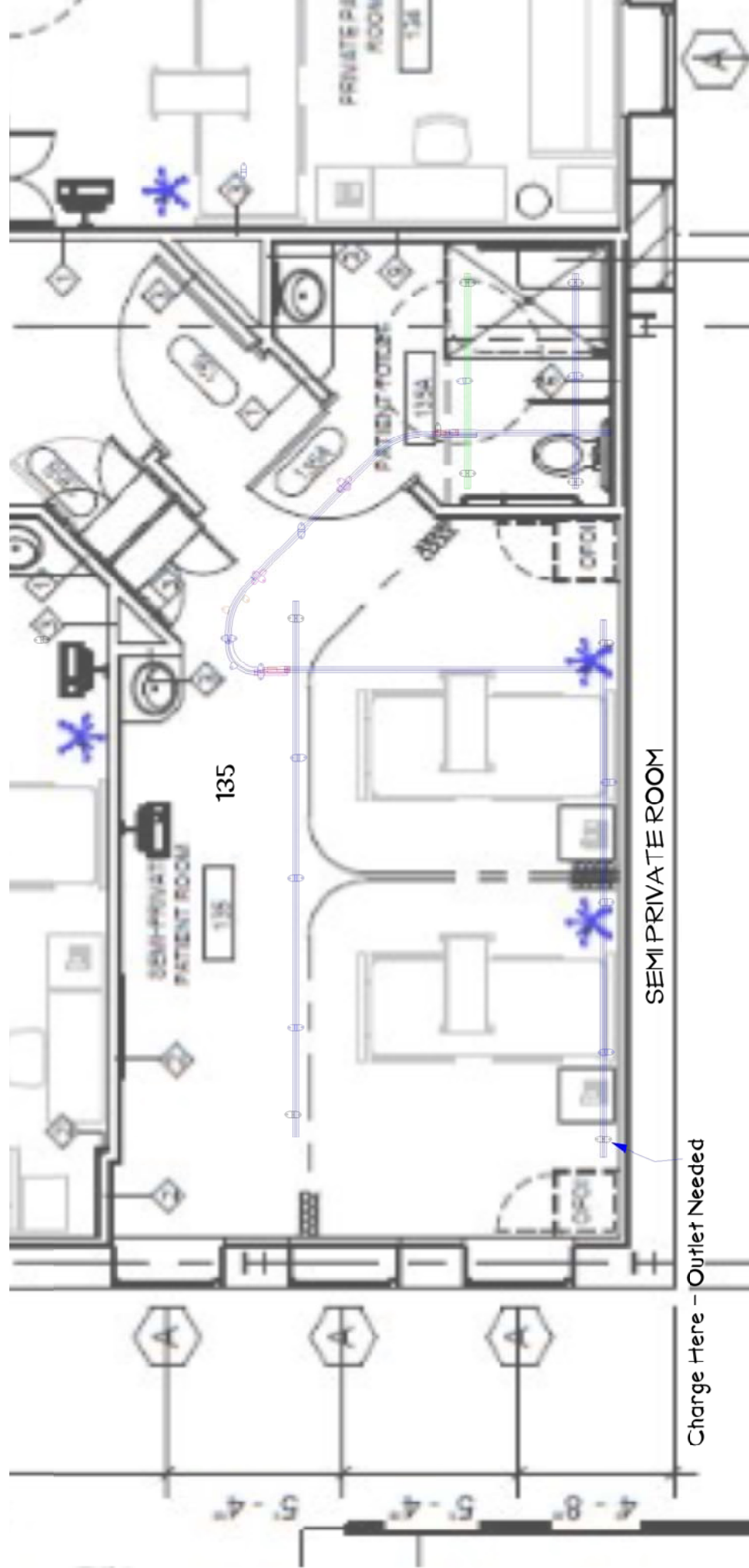
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PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**



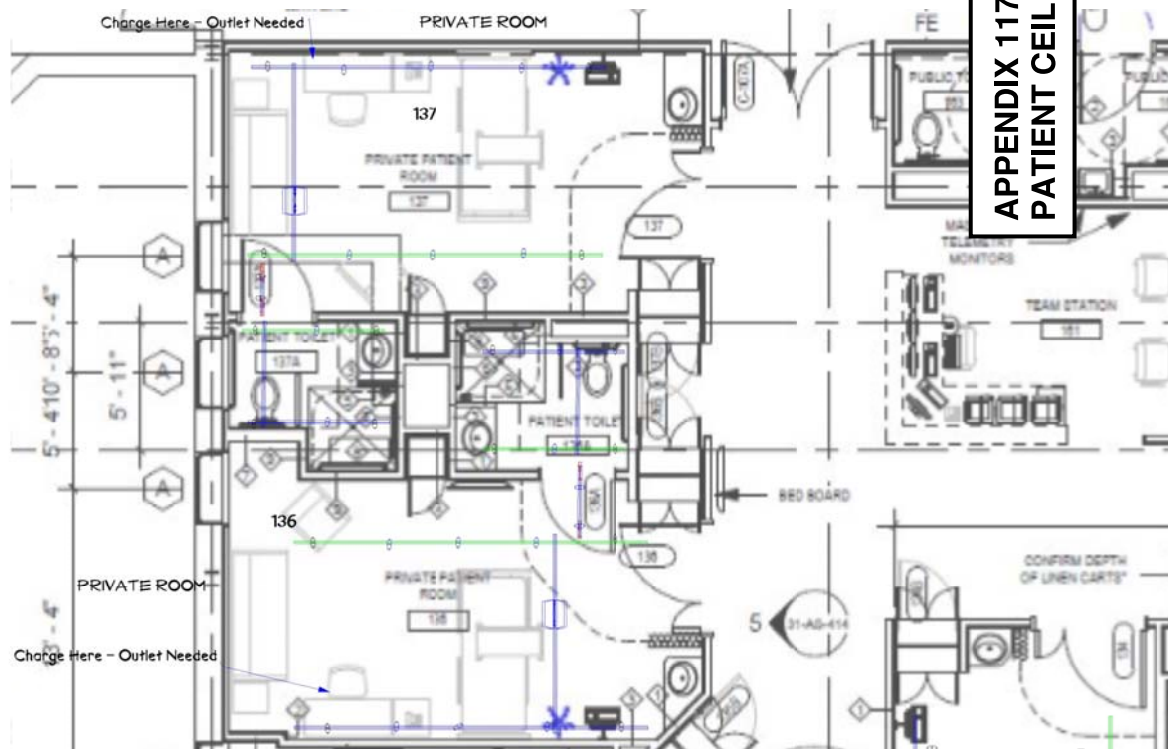
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PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**

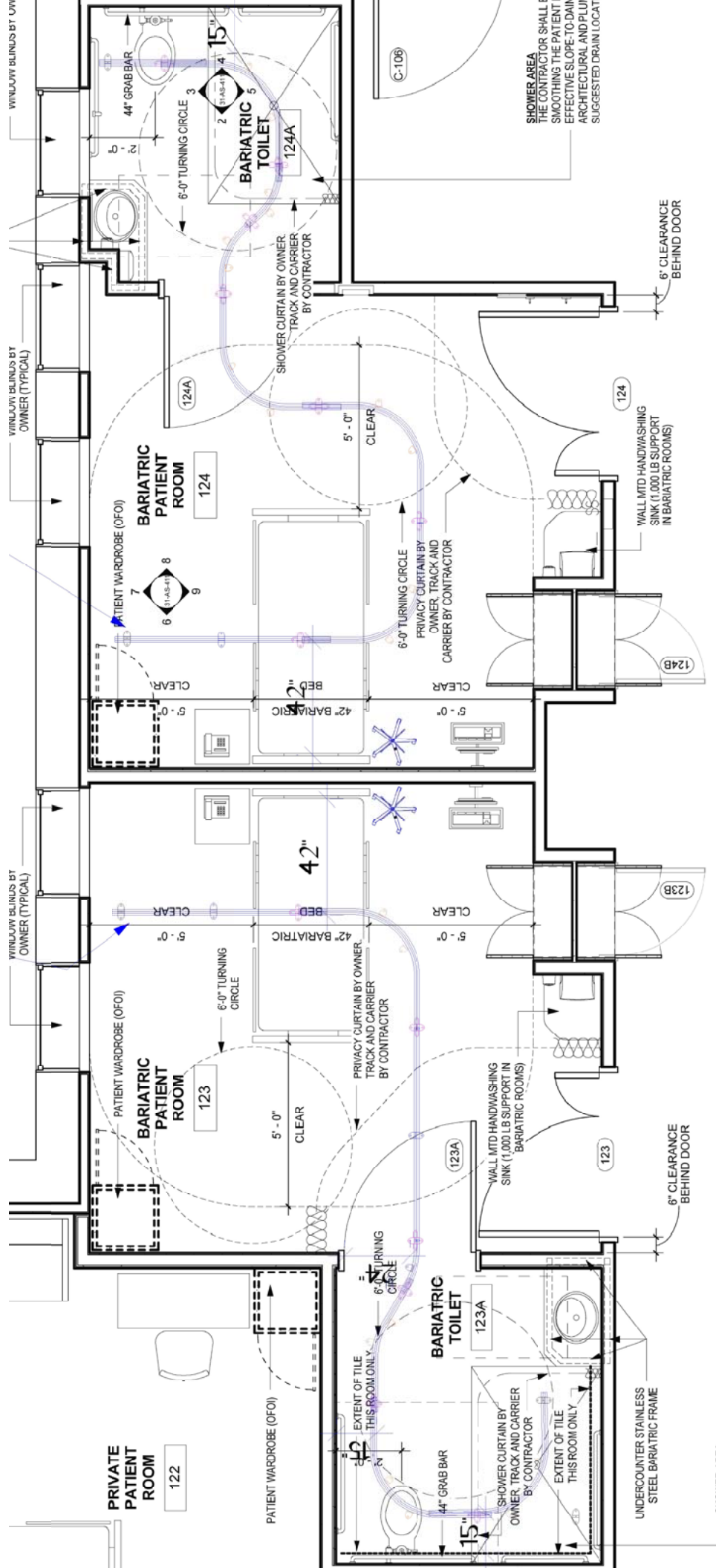


**APPENDIX 117313-B:
PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**



**APPENDIX 117313-B:
PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**





**APPENDIX 117313-B:
PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT**



APPENDIX 117313-B:
PATIENT CEILING-MOUNTED LIFT SYSTEM LAYOUT

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SECTION 122400
WINDOW SHADE SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Manually-operated, dual window shades and accessories for sun/glare/heat control and room darkening.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.
- B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.
- C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.
- D. Section 061000 - ROUGH CARPENTRY: Concealed wood blocking for attachment of headrail brackets.

1.3 REFERENCE STANDARDS

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

1.4 SUBMITTALS

- A. See Section 013323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, for submittal procedures.
- B. Product Data: Manufacturer's catalog data, product descriptions, installation instructions, detail sheets, and specifications for each type of system specified.
- C. Samples for Selection: Manufacturer's color chart or sample set.
- D. Shop Drawings: Prepared specifically for this project; show dimensions and interface with other products.
 - 1. Room schedule including field-verified dimensions of each opening to receive window shade systems.
 - 2. Indicate System Series, operator, fabric selection, and mounting type.
 - 3. Indicate control type.
 - 4. Wiring diagrams.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Data: Include data on operating hardware, cleaning instructions, and inspection procedures related to preventative maintenance.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging, dry, undamaged, with seals and labels intact.
- B. Individually package and mark shades with room number and opening number.
- C. Inspect the materials upon delivery to assure that specified products have been received.
- D. Store and handle shades to prevent damage to fabrics, finishes, and operators prior to installation.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.
- B. Verify that field measurements are as indicated on shop drawings.

1.8 WARRANTY

- A. Warranty: Manufacturer's standard ten year warranty for all components.

1.9 EXTRA MATERIALS

- A. Provide one additional shade of each type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Manual operating, chain drive, sunscreen roller shades in areas indicated.
 - 1. Basis-of-Design Product: MechoShade Systems, LLC: Mecho/5 System
- B. Roller shades translucent privacy fabric shall be Alkenz 4000 Series.
- C. Roller shades blackout fabric shall be Alkenz 4000 Series
 - 1. Refer to the Drawings for additionally information.

2.2 SHADE CLOTH

- A. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E 84.
- B. Solar /Privacy Fabric, PVC-Free; fabricated from thermoplastic olefin (TPO) for both core yarn and jacket, woven in a 2 by 2 non-directional dense basketweave, meeting the following minimal requirements:
 - 1. Minimum thickness: 0.030 inch (0.762 mm).
 - 2. Flame retardant treated certified in conformance with NFPA 701, UL 214.
 - 3. Maximum open in weave: 3 percent.
 - 4. Color: As selected by Architect.
 - 5. percent UV test 200 sun-fade hours with no change, 500 sun-fade hours with 5 change.
 - 6. Seamless up to 126 inch width.
 - 7. Hem pocket: Provide hem pocket, heat sealed or sewn with bottom weight enclosed.
 - 8. Fabric warranty: Manufacturer's standard 10 year limited warranty.
- C. Fabric for Room Darkening, Blackout; Spinnaker 4-ply, 12 mil laminated fiberglass room darkening fabric; washable, flame retardant, white color outside.

1. Fabric: 4 ply lamination (3 ply vinyl and 1 ply fiberglass)
2. Weight: 13.6 oz/yard²
3. Fabric Thickness: 0.33 mm
4. Visual translucent: Opaque (0%)
5. Color: Selected from manufacturer's standard color p

2.3 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
 2. Shade Band and Shade Roller Attachment:
 - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
 - b. Manual Shades: Minimum roller tube size 1.55 inch diameter.
 - d. Provide for positive mechanical engagement with drive/brake mechanism.
 - e. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
 - f. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.

2.4 SHADE FABRICATION

- A. Fabricate units to completely fill openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
1. Concealed hemtube.
- C. Provide battens in standard shades as required assuring proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

2.5 COMPONENTS

- A. Access and Material Requirements:
1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.

2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
- C. Manual Operated Chain Drive Hardware and Brackets:
1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
 4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
 5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
 6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
 7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
 8. Drive Bracket / Brake Assembly:
 - a. Drive Bracket shall be fully integrated with all shade accessories, including, but not limited to: fascia, room darkening side/sill channels, center supports and connectors for multi-banded shades.
 - b. Drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
 - c. The brake shall be an over-running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - e. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- D. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.
- E. Rollers: Sized as required for installation indicated.

1. Material: 20 gage steel.
- F. Mounting Brackets: Stamped steel, custom fabricated as required for mounting indicated.
- I. Intermediate Brackets: UHMW plastic twist-locks into carrier bracket, allowing continuous roller operation with multiple shades.
- K. Top Roller Box and End Caps: Four-sided, interlocking box and cover custom-extruded of 6063-T5 aluminum, 0.062 inch minimum wall; electrostatic finish.
 1. Size: To fit shade installation.
 2. End Caps: 16 gage steel, electrostatic finish, incorporating mounting brackets.
- L. Side Channels: Custom extruded of 6063-T5 aluminum, 0.062 inch (1.57 mm) minimum wall.
 1. Size: 1-1/2 inches (38.1 mm) wide.

PART 3 - EXECUTION

3.2 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that openings are ready to receive the work.
- C. Ensure structural blocking and supports are correctly placed.

3.3 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.4 INSTALLATION

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions.
- C. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.5 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.6 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

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SECTION 130541
SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS

PART 1 – GENERAL

1.1 DESCRIPTION:

- A. Provide seismic restraint in accordance with the requirements of this section in order to maintain the integrity of nonstructural components of the building so that they remain safe and functional in case of seismic event.
- B. The design to resist seismic load shall be based on Seismic Design **B** Categories per section 4.0 of the VA Seismic Design Requirements (H-18-8) dated May 2022 (<http://www.cfm.va.gov/til/etc/seismic.pdf>) for Inpatient as “**Critical**” requirements.
- C. Definitions: Non-structural building components are components or systems that are not part of the building’s structural system whether inside or outside, above or below grade. Non-structural components of buildings include:
 - 1. Architectural Elements: Facades that are not part of the structural system and its shear resistant elements; cornices and other architectural projections and parapets that do not function structurally; glazing; nonbearing partitions; suspended ceilings; stairs isolated from the basic structure; cabinets; bookshelves; medical equipment; and storage racks.
 - 2. Electrical Elements: Power and lighting systems; substations; switchgear and switchboards; auxiliary engine-generator sets; transfer switches; motor control centers; motor generators; selector and controller panels; fire protection and alarm systems; special life support systems; and telephone and communication systems.
 - 3. Mechanical Elements: Heating, ventilating, and air-conditioning systems; medical gas systems; plumbing systems; sprinkler systems; pneumatic systems; boiler equipment and components.
 - 4. Transportation Elements: Mechanical, electrical and structural elements for transport systems, i.e., elevators and dumbwaiters, including hoisting equipment and counterweights.

1.2 RELATED WORK: (NOT USED)

1.3 QUALITY CONTROL:

- A. Shop-Drawing Preparation:
 - 1. Have seismic-force-restraint shop drawings and calculations prepared by a professional structural engineer experienced in the area of seismic force restraints. The professional structural engineer shall be registered in the state where the project is located.
 - 2. Submit design tables and information used for the design-force levels, stamped and signed by a professional structural engineer registered in the State where project is located.
- B. Coordination:
 - 1. Do not install seismic restraints until seismic restraint submittals are approved by the Resident Engineer.
 - 2. Coordinate and install trapezes or other multi-pipe hanger systems prior to pipe installation.
- C. Seismic Certification:

In structures assigned to IBC Seismic Design Category C, D, E, or F, permanent equipments and components are to have Special Seismic Certification in accordance with requirements of section 13.2.2 of ASCE 7 except for equipment that are considered rugged as listed in section 2.2

OSHPD code application notice CAN No. 2-1708A.5, and shall comply with section 13.2.6 of ASCE 7.

1.4 SUBMITTALS:

- A. Submit a coordinated set of equipment anchorage drawings prior to installation including:
 - 1. Description, layout, and location of items to be anchored or braced with anchorage or brace points noted and dimensioned.
 - 2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, welds etc. clearly identified and specified.
 - 3. Numerical value of design seismic brace loads.
 - 4. For expansion bolts, include design load and capacity if different from those specified.
- B. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:
 - 1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plan.
 - 2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
 - 3. Pipe contents.
 - 4. Structural framing.
 - 5. Location of all gravity load pipe supports and spacing requirements.
 - 6. Numerical value of gravity load reactions.
 - 7. Location of all seismic bracing.
 - 8. Numerical value of applied seismic brace loads.
 - 9. Type of connection (Vertical support, vertical support with seismic brace etc.).
 - 10. Seismic brace reaction type (tension or compression). Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.
- C. Submit prior to installation, bracing drawings for seismic protection of suspended ductwork and suspended electrical and communication cables, include:
 - 1. Details illustrating all support and bracing components, methods of connection, and specific anchors to be used.
 - 2. Numerical value of applied gravity and seismic loads and seismic loads acting on support and bracing components.
 - 3. Maximum spacing of hangers and bracing.
 - 4. Seal of registered structural engineer responsible for design.
- D. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.
- E. Submit for concrete anchors, the appropriate ICBC evaluation reports, OSHPD pre-approvals, or lab test reports verifying compliance with OSHPD Interpretation of Regulations 28-6.

1.5 APPLICABLE PUBLICATIONS:

- A. The Publications listed below (including amendments, addenda revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.

- B. American Concrete Institute (ACI):
 - 355.2-07 Qualification for Post-Installed Mechanical Anchors in Concrete and Commentary
- C. American Institute of Steel Construction (AISC):
 - Load and Resistance Factor Design, Volume 1, Second Edition.
- D. American Society for Testing and Materials (ASTM):
 - A36/A36M-08 Standard Specification for Carbon Structural Steel.
 - A53/A53M-10 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - A307-10 Standard Specification for Carbon Steel Bolts and Studs; 60,000 PSI Tensile Strength.
 - A325-10 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - A325M-09 Standard Specification for High-Strength Bolts for Structural Steel Joints [Metric].
 - A490-10 Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
 - A490M-10 Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric].
 - A500/A500M-10 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - A501-07 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 - A615/A615M-09 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - A992/A992M-06 Standard Specification for Steel for Structural Shapes for Use in Building Framing.
 - A996/A996M-09 Standard Specification for Rail-Steel and Axel-Steel Deformed Bars for Concrete Reinforcement.
 - E488-96(R2003) Standard Test Method for Strength of Anchors in Concrete and Masonry Elements.
- E. American Society of Civil Engineers (ASCE 7) Latest Edition.
- F. International Building Code (IBC) Latest Edition.
- G. VA Seismic Design Requirements, H-18-8, August 2013.
- H. National Uniform Seismic Installation Guidelines (NUSIG).
- I. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - Seismic Restraint Manual - Guidelines for Mechanical Systems, 1998 Edition and Addendum.

1.6 REGULATORY REQUIREMENT:

- A. IBC Latest Edition.
- B. Exceptions: The seismic restraint of the following items may be omitted:

1. Equipment weighing less than 400 pounds, which is supported directly on the floor or roof.
2. Equipment weighing less than 20 pounds, which is suspended from the roof or floor or hung from a wall.
3. Gas and medical piping less than 2 1/2 inches inside diameter.
4. Piping in boiler plants and equipment rooms less than 1 1/4 inches inside diameter.
5. All other piping less than 2 1/2 inches inside diameter, except for automatic fire suppression systems.
6. All piping suspended by individual hangers, 12 inches or less in length from the top of pipe to the bottom of the support for the hanger.
7. All electrical conduits, less than 2 1/2 inches inside diameter.
8. All rectangular air handling ducts less than six square feet in cross sectional area.
9. All round air handling ducts less than 28 inches in diameter.
10. All ducts suspended by hangers 12 inches or less in length from the top of the duct to the bottom of support for the hanger.

PART 2 – PRODUCTS

2.1 STEEL:

- A. Structural Steel: ASTM A36/A36M, and A992.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A501.
- D. Steel Pipe: ASTM A53/A53M, Grade B.
- E. Bolts & Nuts: ASTM A307, A325, A325M, A490, and A490M.

PART 3 – EXECUTION

3.1 CONSTRUCTION, GENERAL:

- A. Provide equipment supports and anchoring devices to withstand the seismic design forces, so that when seismic design forces are applied, the equipment cannot displace, overturn, or become inoperable.
- B. Provide anchorages in conformance with recommendations of the equipment manufacturer and as shown on approved shop drawings and calculations.
- C. Construct seismic restraints and anchorage to allow for thermal expansion.
- D. Testing Before Final Inspection:
 1. Test 10-percent of anchors in masonry and concrete per ASTM E488, and ACI 355.2 to determine that they meet the required load capacity. If any anchor fails to meet the required load, test the next 20 consecutive anchors, which are required to have zero failure, before resuming the 10-percent testing frequency.
 2. Before scheduling Final Inspection, submit a report on this testing indicating the number and location of testing, and what anchor-loads were obtained.

3.2 EQUIPMENT RESTRAINT AND BRACING:

- A. All equipment not meeting one of the exceptions above shall be seismically restrained or braced.

3.3 MECHANICAL DUCTWORK AND PIPING; PLUMBING PIPING; FIRE PROTECTION PIPING; ELECTRICAL BUSWAYS, CONDUITS, AND CABLE TRAYS; AND TELECOMMUNICATION WIRES AND CABLE TRAYS

- A. Support and brace mechanical ductwork and piping; plumbing and fire protection piping, electrical busways, conduits and cable trays; and telecommunication wires and cable trays to resist directional forces (lateral, longitudinal and vertical).
- B. Brace duct branches with a minimum of 1 brace per branch.
- C. Provide supports and anchoring so that, upon application of seismic forces, piping remains fully connected as operable systems which will not displace sufficiently to damage adjacent or connecting equipment, or building members.
- D. Seismic Restraint of Piping:
 - 1. Design criteria:
 - a. Piping resiliently supported: Restrain to support 120 percent of the weight of the systems and components and contents.
 - b. Piping not resiliently supported: Restrain to support 60 percent of the weight of the system components and contents.
 - 2. Provide seismic restraints according to one of the following options:
- E. Piping Connections: Provide flexible connections where pipes connect to equipment. Make the connections capable of accommodating relative differential movements between the pipe and equipment under conditions of earthquake shaking.

3.4 PARTITIONS

- A. In buildings with flexible structural frames, anchor partitions to only structural element, such as a floor slab, and separate such partition by a physical gap from all other structural elements.
- B. Properly anchor masonry walls to the structure for restraint, so as to carry lateral loads imposed due to earthquake along with their own weight and other lateral forces.

3.5 CEILINGS AND LIGHTING FIXTURES

- A. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls.
- B. Independently support and laterally brace all lighting fixtures. Refer to applicable portion of lighting specification, Section 26 51 00, INTERIOR LIGHTING.

3.6 FACADES AND GLAZING

- A. Do not install concrete masonry unit filler walls in a manner that can restrain the lateral deflection of the building frame. Provide a gap with adequately sized resilient filler to separate the structural frame from the non-structural filler wall.
- B. Tie brick veneers to a separate wall that is independent of the steel frame as shown on construction drawings to ensure strength against applicable seismic forces at the project location.
- C. Install attachments to structure for all façade materials as shown on construction drawings to ensure strength against applicable seismic forces at the project location.

3.7 STORAGE RACKS, CABINETS, AND BOOKCASES

- A. Install storage racks to withstand earthquake forces and anchored to the floor or laterally braced from the top to the structural elements.
- B. Anchor medical supply cabinets to the floor or walls and equip them with properly engaged, lockable latches.

- C. Anchor filing cabinets that are more than 2 drawers high to the floor or walls, and equip all drawers with properly engaged, lockable latches.
- D. Anchor bookcases that are more than 30 inches high to the floor or walls, and equip any doors with properly engaged, lockable latches.

END OF SECTION

END OF VOLUME 1