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SUMMARY OF PROJECT

PART 1    GENERAL

1.1 PROJECT INFORMATION

A. Project Identification: Activate Starbucks, Exchange Food Court/Mall
   Project number: 6081-11-000001.
   Project Location: JBPHH, HAWAII.

B. Owner: EXCHANGE.
   EXCHANGE Contracting Office: Nikisha Knowlton, Army & Air Force Exchange Service;
   3911 South Walton Walker Blvd.; Dallas, TX 75236. 214.312.4570;
   knowltonn@aafes.com

C. Architect: YFH ARCHITECTS; Lloyd Higa; 1100 Ward Avenue, Suite 1020; Honolulu, HI 96814;
   808.531 8825.

D. Architect's Consultants: The Architect has retained the following design professionals who have
   prepared designated portions of the Contract Documents:
   MEP Engineers: Ross Tanaka, Mechanical Enterprises Inc. (Mechanical); 501 Sumner Street,
   Suite 503; Honolulu, HI 96817; 808.591.9038; Clayton Pang, Electech Hawaii Inc. (Electrical);
   1100 Ward Avenue, Suite 750; Honolulu, HI 96814; 808.522.1866.

E. EXCHANGE Project Manager: Daniel Watkins RE-F; Army & Air Force Exchange Service; 3911
   South Walton Walker Blvd.; Dallas, TX 75236. 214.312.2405; watkinsd@aafes.com

1.2 STATEMENT OF WORK

A. The work covered by these specifications consists of furnishing all plant, supervision, labor,
   equipment, materials and incidentals necessary to perform all operations required to complete the
   work, all in accordance with these specifications and the applicable drawings, and subject to the
   terms and conditions of the contract.

B. The work to be performed is located within the Hickam AFB Base Exchange, JBPHH, HI.

C. Principal Features:
   The work to be performed in connection with this project includes, but is not limited to the
   following:
   a. Demolition of existing Baskin Robins space. Demolition to include, wall, interior finishes,
      fixtures, and equipment as indicated on drawings for a new vendor, Starbucks. Construction
      of interior space to current Starbucks vendor standards including revised walls, interior finish
      work, installation of Vendor, Contractor and Exchange-supplied equipment/fixtures as
indicated on drawings including final connections and associated mechanical, electrical, plumbing and fire protection work.

D. The Contractor is advised to take note of the following General Provisions of the Contract: Cleaning; Material and Workmanship; Accident Prevention; Protection of Existing Structures, Utilities and Improvements; Operation and Storage Areas; Site Investigation; Permits and Responsibilities. Copies of the General Provisions may be obtained from the Contracting Officer.

1.3 SPECIAL BASE REQUIREMENTS

A. Regular business hours during the week for the Department of Public Works (Army) are 600 to 1700, Monday through Friday, excluding Federal Holidays. NAVFAC Monday through Friday 700 to 1530.

The Food Court normal business hours of operation are Monday – Friday 600 to 2100; Saturday 800 to 2100; Sunday 800 to 1900. Holiday times vary. Items of work can only be performed during Food Court operational hours.

B. The Contractor is to familiarize themselves with the requirements for gaining daily access to the base. All workers, subcontractors and material deliveries will require permits to gain site entry.

C. JBPHH may require special access requirements during times of heightened security measures and/or force protection events requiring the Contractor to adjust schedules and access accordingly. Advance notice will be given to the Contractor as soon as possible in the event of such an occurrence.

1.4 UTILITIES (WATER, GAS AND ELECTRICITY)

A. Existing waterlines, gas and electrical will be used to obtain utilities for this project. The Contractor will not be charged for consumption of utilities (water, gas and electricity) refer to Section 01 51 00, “Temporary Utilities”.

1.5 LAYING OUT WORK

A. Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between drawings, specifications, and conditions shall be referred to the Contracting Officer in writing for adjustment before work affected is performed. Failure to make such notifications shall place responsibility upon the Contractor to carry out work in a satisfactory and workmanlike manner.

B. The Contractor shall be held responsible for the location and elevation of all the construction contemplated by the construction documents.

C. Prior to commencing work, the Contractor shall carefully compare and check all Architectural, Mechanical, and Electrical drawings, each with the other, that in any way affect the locations of elevation of the work to be executed by him, and should any discrepancy be found, he shall immediately report the same to the Contracting Officer for verifications and adjustment. Any
duplication of work made necessary by failure or neglect on the Contractor's part to comply with this function shall be done at his sole expense.

D. The drawings accompanying these specifications indicate generally the design and arrangement of all apparatus, fixtures, accessories, etc. necessary to complete the work required. The exact location or arrangement of equipment is subject to minor changes necessitated by field conditions and shall be made as required without additional cost to EXCHANGE. Measurements shall be verified by actual observations at the construction site, and the Contractor shall be responsible for all work fitting into place in a satisfactory and workmanlike manner meeting the approval of the Contracting Officer.

1.6 EXISTING OVERHEAD OR UNDERGROUND WORK

A. Carefully check the site where this project is to be erected and observe any overhead wires and equipment. Any such work shall be moved, replaced, or protected, as required, whether or not shown or specified.

B. Attention is directed to the existence of pipe and other underground improvements which are shown on the drawings. All reasonable precautions shall be taken to preserve and protect all such improvements shown on the drawings.

C. Locations of underground lines, shown on the drawings, are based on the best available sources, but are to be regarded as approximate only. Exercise extreme care in locating and identifying these lines before excavating in adjacent areas.

1.7 INTERRUPTION OF EXISTING UTILITIES SERVICES

A. The Contractor shall perform the work under this Contract with a minimum of outage time for all utilities. Interruption shall be by approved section of the utility. In some cases, the Contractor may be required to perform the work while the existing utility is in service. The existing utility services may be interrupted only when approved by the Contracting Officer. When it is necessary to interrupt the existing utilities, the Contractor shall notify the Contracting Officer and facilities engineer in writing at least seven days in advance of the time he desires the existing service to be interrupted. The interruption time shall be kept to a minimum. Depending upon the activities at the facility which require continuous service from the existing utility, an interruption may not be subject to schedule at the time desired by the Contractor. In such cases the interruption may have to be scheduled at a time of minimum requirement of demand for the utility. The amount of time requested by the Contractor for interruption of existing utility services shall be as approved by the Contracting Officer.

1.8 EXCAVATION

A. Prior to commencing any excavation work the Contractor shall obtain a valid Excavation Permit, from the DPW Facilities Engineers Office. It shall be the Contractor's responsibility to obtain the necessary signatures and coordination for the permit.

1.9 HOT WORK PERMIT
A. Prior to commencing any welding, the Contractor shall obtain a hot work permit from the JBPHH & Emergency Services, Fire Prevention 315-772-4702 between the hours of 0700 – 1600. 24 hour lead time is requested.

1.10 BARRICADES AND WARNING DEVICES
A. The Contractor shall provide barricades and dust barriers to protect adjacent operational spaces.

1.11 PROTECTION FOR OPEN FLAME DEVICES
A. When open flame and/or spark producing devices, i.e., acetylene oxygen welding equipment, electric arc welding, etc., are employed for job accomplishment, the following procedures are mandatory:
   1. Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.
   2. Ensure that no open containers or spills of combustible substances are present.
   3. Ensure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.
   4. Proper protection equipment and practices will be used, i.e., fireproof blankets, wetting of surrounding area, removal of combustible materials where practicable, earth filled backing and portable fire extinguishers of proper type on hand.
   5. When the above devices are being used notify the Installation Fire Department 24 hours ahead of usage.

1.12 FIRE PROTECTION
A. The Contractor shall at all times maintain good housekeeping practices to reduce the risk of fire damage. All scrap materials, rubbish, and trash shall be removed daily from in and about the building and shall not be permitted to be scattered on adjacent property.
B. Suitable storage space shall be provided 50 feet minimum outside the building area for storing flammable materials and paints; no storage will be permitted in the building. Excess flammable liquids being used inside the building shall be kept in closed metal containers and removed from the building during unused periods.
C. A contractor shall provide a fire extinguisher at each location where cutting and welding is being performed. Where electric or gas welding or cutting is done, interposed shields of incombustible material shall be used to protect against fire damage due to sparks and hot metal. When temporary heating devices are used, a watchman shall be present to cover periods when other workmen are not on the premises.
D. The Contractor shall provide fire extinguishers in accordance with the recommendations of NFPA No. 10 and 241.
E. Fire Codes: The Contractor shall obey all requirements of the National Fire Codes, and Base/Post Fire Regulations, as they relate to his work on base/post.
1.13 WORK BY OTHERS (IF APPLICABLE)

A. Work not included: Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is not included in the Contract:

1. Any work shown, but marked "NOT IN CONTRACT" (N.I.C.).
2. Any work indicated to be furnished and installed by the Exchange.
3. Any work indicated to be furnished and installed by the Vendors or Concessionaires.

1.14 EXCHANGE-FURNISHED AND INSTALLED EQUIPMENT

A. See Specification Section 01 10 17: EXCHANGE Furnished and Installed Equipment.

1.15 EXCHANGE FURNISHED-CONTRACTOR INSTALLED EQUIPMENT

A. See Specification Section 01 10 18: EXCHANGE Furnished Contractor Installed Equipment.

1.16 LINING OF JOINTS IN FINISH MATERIALS

A. It shall be the responsibility of the Contractor to make certain in the installation of jointed floor, wall, and ceiling and pavement materials that:

1. The joints line through in a straight line and in both directions wherever possible.
2. The joints relate to all openings and breaks in the structure and be symmetrically placed wherever possible. This includes heating registers, light fixtures, equipment, etc.
3. If, because of the non-related sizes of the various materials and locations of openings, etc., it is not possible to accomplish the above, the Contractor shall meet with the Contracting Officer to determine the most satisfactory arrangement. The Contractor shall establish center lines for all trades.

1.17 INTEGRATING WORK

A. All streets, buildings, and other improvements shall be protected from damage.

B. Contractor's operations shall be confined to the immediate vicinity of the project work and shall not in any way interfere with or obstruct the ingress or egress to and from street or adjacent property.

C. If new work is to be connected to existing work, special care shall be exercised not to disturb or damage the existing work more than necessary. All damaged work shall be replaced, repaired, and restored to its original condition at no cost to the Exchange Service.

1.18 HEADROOM UNDER PIPES

A. All horizontal runs of plumbing and heating pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance, but in no case shall this clearance be less than 7'-0" without written consent from the Contracting Officer. Where piping or conduit is left exposed within a room, the same shall run true to plumb, horizontal or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.

1.19 PATCHING GOVERNMENT-OWNED FACILITIES
A. Government-owned structures, facilities, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced, and be left in their original state of repair by the Contractor, to the satisfaction of the Contracting Officer and of authorities having jurisdiction thereof.

1.20 LOCATION OF EQUIPMENT AND PIPING
A. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions shall not always permit their installation in the location shown. When this situation occurs, it shall be brought to the Contracting Officer’s attention immediately and the relocation determined in a joint conference. The Contractor will be held responsible for the relocating of any items without first obtaining the Contracting Officer’s approval. He shall remove and relocate such items at his own expense if so directed by the Contracting Officer.

1.21 OVERLOADING
A. The Contractor shall be responsible for overloading any part or parts of structures beyond their safe calculated carrying capacities by placing of materials, equipment, tools, machinery, or any other item thereon. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

1.22 STANDARDS
A. Any material specified by reference to the number, symbol, or title of a specific standard such as Commercial Standard, a Federal Specification, a trade association standard, or other similar standard shall comply with the requirements in the latest revision thereof, and any amendment or supplement thereto, in effect on the date of invitation for proposals, except as limited to type, class, or grade, or modified in such reference, and except as otherwise indicated.

B. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements.

1. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.

2. Where Federal Specification numbers are used, they refer to the latest edition including amendments thereto.

3. Where Commercial Standards are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards issued by the U.S. Department of Commerce.
4. Where ASTM Serial Numbers are used, they refer to the latest tentative specifications, standards specifications, standards methods, or standard method of testing issued by the American Society for Testing and Materials.

1.23 CERTIFICATE OF CONFORMANCE
A. Except where tests and/or inspections in connection with structural materials are specified or required by applicable laws, rules, and regulations, manufacturer's certificate covering conformance with the requirements of the above mentioned Federal Specifications and Commercial Standards may be acceptable in lieu of such items. Such certificates shall be furnished to the Contracting Officer for all items so specified.

1.24 OCCUPANCY BY THE EXCHANGE
A. EXCHANGE shall reserve the right and privilege of partial occupancy during and prior to the absolute completion of the total work. Refer to the Drawings for additional information. Access shall be allowed at all times to the Exchange and its own Contractors in the endeavor.

1.25 TESTS AND REPORTS
A. See Specification Section 01 40 00: Quality Requirements.

1.26 REFERENCES
A. All references to the word "Government" or "Exchange" in the specifications shall mean Army and Air Force Exchange Service (AAFES).
B. Wherever the word "provide" is used in the Contract Documents as a directive, it shall be interpreted as meaning "provide and install completely and ready for use".
C. Definitions:
1. Vendor: Person or persons selling any material item.
2. Base, Post, Installation or Facility: Location on which Exchange is being remodeled.
3. Concessionaire: Person who is directly responsible for the lease of and operation of the concessions.
4. Architect-Engineer: That person or firm responsible for preparing the working drawings and specifications.
5. AAFES or Exchange: Army and Air Force Exchange Service.
6. Inspection Agency: Project Inspector contracted by EXCHANGE.

1.27 TOXIC MATERIALS
A. Removal or disposal of toxic materials or asbestos is not included in this contract. If the Contractor encounters such materials, he shall immediately notify the Contracting Officer.

1.28 SUBMISSION OF PHOTOGRAPHS
A. Contractor shall submit, to the Contracting Officer, digital photographs taken on or about the first of every month, showing the general conditions of the work as viewed from each area and phase of work. Photographs (minimum of 20) must accompany each Application for Payment. Each print shall be identified by date of exposure, project title, and Exchange Project Number, location and
direction taken. The contractor may also submit a video of the above requirements as an option to photographs.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 10 00
SECTION 01 10 17

EXCHANGE FURNISHED AND INSTALLED EQUIPMENT (EF/EI)

PART 1 GENERAL

1.1 EXCHANGE FURNISHED AND INSTALLED PROPERTY (EF/EI)
   A. Property: Property is indicated on the drawings.
   B. Schedule: Contractor shall schedule early completion of designated areas for beneficial occupancy by EXCHANGE usage prior to completion of entire project.
   C. EXCHANGE will furnish and install equipment as indicated on the Fixture Plan and in the drawings.
   D. Contractor's Duties:
      1. Provide access for EXCHANGE personnel.
      2. Coordinate work and cooperate with the installers of the property so that installation can be accomplished in accordance with construction schedule.
      3. Provide mechanical and electrical connections to equipment and building systems where indicated on the drawings and in the specification.
      4. Provide security of designated areas.
      5. Schedule equipment delivery dates and installation times to coordinate with the overall schedule. Provide EXCHANGE advance notice so equipment can be ordered on time.
   E. EXCHANGE Duties:
      1. Inspect designated area prior to use and issue statement of acceptance of area for installation of property.
      2. Make final mechanical and electrical connections between property and building systems where indicated on the drawings and/or in the specifications.
      3. Provide custodial services for designated areas during use after beneficial occupancy.

1.2 DELIVERY DATE CHANGES
   A. Requests by Contractor to change designated delivery dates shall be made in writing at least 30 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of EXCHANGE furnished property the Contractor shall be responsible for storage and redelivery cost. Should EXCHANGE be unable to effect the change, or should the Contractor fail to submit his request within the time stated above, the Contractor's obligation under this contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which he can file a claim under these conditions.

1.3 EXCHANGE ACTIVITIES AFFECTING PROGRESS OF WORK:
A. Serving Areas & Food Preparation Areas: Schedule date of use and possession of food preparation serving areas 30 days prior to completion of project.

B. Construction in each area at date scheduled for its use and possession by EXCHANGE shall be sufficiently complete, in accordance with Contract Documents, so EXCHANGE may occupy the area for the use for which it is intended. Comply with Contract Clauses titled inspection of Construction, and Use and Possession Prior to Completion.

1.4 ACCEPTANCE OF AREAS FOR BENEFICIAL OCCUPANCY

A. Inspection: Prior to acceptance by EXCHANGE of an area for beneficial occupancy, the Contracting Officer will conduct an inspection of the specific area. A list of deficiencies will be provided to the Contractor.

B. Acceptance: If the Contracting Officer determines the specific area is sufficiently complete for beneficial occupancy by EXCHANGE, the area will be accepted in writing with the exception of the deficiencies listed. The deficiencies listed shall be completed or corrected prior to final acceptance at the completion of the project.

C. Damage: Damage resulting from EXCHANGE' use will not be considered the Contractor's responsibility.

D. Refer to clause entitled "Final Inspection and Acceptance" of the EXCHANGE "General Provisions".

1.5 MATERIALS AND EQUIPMENT (EF/EI):

A. Equipment or material to be furnished and installed by EXCHANGE is indicated on the Drawings and as follows:
   1. Check-out fixtures and POS equipment.
   2. Telephone system equipment.

B. See Part 3 for Final Connection information.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 FINAL CONNECTIONS:

A. Final utility connections to EXCHANGE furnished and installed equipment shall be made by the Contractor as part of the construction contract. Contractor shall construct all openings, furnish and install required sleeves and conduit, and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE-furnished equipment in place.

B. The Contractor shall provide for, and cooperate with, personnel installing EXCHANGE furnished materials and equipment, when overlap of work occurs.
END OF SECTION 01 10 17
PART 1 GENERAL

1.1 EXCHANGE/STARBUCKS/LICENSEE FURNISHED / GENERAL CONTRACTOR INSTALLED EQUIPMENT (E, SB, LC / GC):

A. EXCHANGE furnished/Contractor installed equipment shall be handled in accordance with the "Army and Air Force Exchange Service General Provisions" clause entitled "EXCHANGE Furnished Property".

B. EXCHANGE Furnished Equipment: EXCHANGE will furnish the equipment indicated for installation by the Contractor as indicted on drawings and as follows:

1. EXCHANGE Furnished/Contractor Installed Items:
   a. STARBUCKS Equipment as indicated on drawings
   b. LICENSEE Equipment as indicated on drawings

1.2 WORK INCLUDED:

A. The material noted below will be furnished by the Exchange and shall be installed by the Contractor. See drawing references. The Contractor shall provide for and cooperate with personnel furnishing the designated material.

B. All food service equipment must be approved by the National Sanitation Foundation, NSF.

C. See Division 1 for General Requirements.

D. Contractor's Duties:

1. Designate required delivery date for each product. Notify the Contracting Officer in writing at least 30 days in advance of the date that EXCHANGE furnished equipment and furnishings will be needed.

2. The equipment will be received at the job site by a representative of EXCHANGE who will jointly, with the Contractor, verify condition and quantities. The representative will then effect receipted transfer of custody of the equipment to the Contractor.

3. Unload, handle, store (on-site), protect, uncrate, assemble, install set in final position, align, join, level, and make all utility connections to all items of equipment. Installation shall be performed in accordance with the specifications, equipment plans, and schedules shown on the Drawings and the rough-in drawings provided by EXCHANGE.
4. Construct all openings, furnish and install required sleeves and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE furnished equipment in place.
5. Repair or replace items damaged as a result of Contractor's operations.
6. Apply finish indicated, if any.
7. The installation shall be complete in all respects, including mechanical and electrical hookups, and put into good operating condition.

E. EXCHANGE Duties:
1. Deliver all EXCHANGE furnished items to the job site. Schedule delivery date with supplier in accordance with Progress Chart.
2. Provide Contractor with installation drawings and instructions.

1.3 DELIVERY:
A. Contractor shall unload, handle, store, protect, uncrate, assemble, set in final position, align, join, and level all Exchange-Furnished material, and shall make all utility connections thereto.
EXCHANGE will provide supervision for installation of the material.
B. The material will be received at the job site by a representative of the local EXCHANGE who, together with the Contractor, will jointly verify conditions and quantities. The representative of the local EXCHANGE will then affect receipted transfer of custody of the material to the Contractor. Material damaged by or during construction operations shall be replaced at no additional cost to EXCHANGE.

1.4 FAILURE TO VERIFY:
A. Failure to execute above required verification shall not relieve the Contractor of responsibility for proper installation of the material, which shall be installed without additional cost to EXCHANGE.

1.5 DELIVERY DATE CHANGES:
A. Requests by Contractor to change designated delivery dates shall be made in writing at least 60 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of EXCHANGE furnished equipment the Contractor shall be responsible for storage and delivery cost. Should EXCHANGE be unable to effect the change, or should the Contractor fail to submit his request within the time stated above, the Contractor's obligation under his contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which he can file a claim under these conditions.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 INSTALLATION
A. The Contractor shall construct openings, furnish and install required sleeves and conduit, and furnish and install reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE-furnished equipment in place. Final electrical connections to EXCHANGE furnished equipment shall be made by the Contractor as part of the Construction Contract.

END OF SECTION 01 10 18
SECTION 01 10 60

SAFETY POLICIES AND PROCEDURES

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Contractor required health and safety plan.
   1. Contractor is responsible for reading the Risk Assessment Plan and following the directions therein.
   2. Contractor must maintain OSHA permissible exposure limits related by the risk assessment: That is, 25 ppm (170 mg/cubic meter) during any 8 hour work shift for a 40-hour week
B. Sample Safety Plan.

1.2 RELATED SECTIONS
A. Submittal Procedures - Section 01 33 00 (Construction Hazard Plan, Job Safety and Health Plan, Emergency Response Plan).
B. Project Record Documents - Section 01 78 39.
C. Environmental Protection – Section 01 35 43

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 the basic designation only.
   1. OSHA 1910 R.E.G. - 29CFR, OSHA 1910.120

1.4 SUBMITTALS
A. Submittals for EXCHANGE approval - The following items shall be submitted for EXCHANGE approval:
   1. Designation of Safety Representative: The Contractor shall designate in writing a qualified employee OSHA Trained under 1910.120 responsible for the overall supervision of all accident prevention activities. Duties shall include ensuring applicable safety requirements are incorporated into work methods and inspecting the job site to ensure that safety measures and instructions are actually being applied. This person shall be on site at all times that work is in progress.
   2. The Contractor shall be trained/certified in OSHA 1910.120 procedures. All other employees performing site work will meet OSHA 1910 training requirements for their job capacity.
B. Submittals for Information Only - The following items shall be Contractor certified:
1. Job Hazard Analysis: Contractor shall develop a job hazard analysis for presentation at the pre-construction conference. The Contractor's job hazard analysis shall list potential hazards that could arise during the course of the work.

2. Job Safety and Health Plan.
   a. The Contractor shall develop a Job Safety and Health Plan for presentation at the Pre-construction conference. The Contractor’s Safety Plan shall make whatever provisions are necessary to conduct his work in accordance with current OSHA standards.
   b. The safety and health plan must specifically address the excavation portion of construction and will be specific to perchloroethylene (tetrachloroethylene) (PCE), and incorporate decontamination procedures for personnel and equipment, continuous vapor monitoring, a prohibition against eating in proximity to the site, and a prohibition against the smoking of tobacco products in the proximity to the site.
   c. The following are minimum requirements for the health and safety plan:
      1. The Contractor is responsible for all compounds and degradation products addressed by the Risk Assessment Plan.
      2. Specialized Designs: Specialized designs will be provided when the situation requires. Examples of such designs include, but are not limited to, vapor barriers in areas of known vapor hazard.
      3. Safety Plans: Safety Plans will be the responsibility of the Contractor for construction areas identified by the installation and/or EXCHANGE as areas of known hazards only. These plans are required by 29 CFR 1910 and are the responsibility of the Contractor. This requirement will be coordinated through the Health and Safety Program of the military installation by the Contractor.
      4. Minimum Requirements for the Health and Safety Plan are as follows:
         (a) Must be kept on site, and must be written.
         (b) Will contain a hazard analysis (safety and health risk) for each site task and operation (to be supplied by the installation).
         (c) Will include employee training (per paragraph (3) of 1910.120).
         (d) Will include personal protective equipment to be used by employees for each of the site tasks and operations (paragraph (g) (5) of 1910.120).
         (e) Will include provision for medical surveillance (paragraph (f) of 1910.120).
         (f) Will include the frequency and types of air monitoring, personal monitoring, environmental sampling techniques, instruments to be used (their maintenance and calibration).
         (g) Will include a site control program (per paragraph (d) of 1910.120) to be coordinated with the installation.
         (h) Will include a decontamination procedure (per paragraph (k) of 1910.120).
(i) Will include an emergency response plan (per paragraph (1) of 1910.120).
(j) Will include a confined space entry procedure (per 1910.146, 147 or program equivalent).
(k) Will include provision for spill containment (per paragraph (j) of 1910.120).
(l) Will include pre-entry briefings (prior to each site task activity) for all employees involved in the task, supervision, or emergency response.
(m) Written verification of adherence to the "plan" by a Safety and Health Supervisor is required (the supervisor must meet the 1910.120 training requirements for supervisors).
(n) Deficiencies will be corrected immediately upon discovery and after consultation with the EXCHANGE Contracting Officer and Installation Safety Office.

d. Hazard Response Plan: The unplanned or non-predicted discovery of such hazards as transite pipe, contaminated soils, and other possible hazards will be addressed within an Emergency Response Plan (EMR) by all contractors. This requirement will be coordinated through the Health and Safety Program of the military installation by the contractor (sample provided).

e. Material Safety Data Sheets will be maintained at the site for all hazardous materials in use.

1.5 MONTHLY SAFETY MEETINGS
A. The Contractor will schedule safety meetings with subcontractor personnel on a monthly basis. The Owner's representative and installation may attend periodically. Minutes of safety meetings shall be prepared and signed by the Contractor. Copy submitted to the Contracting Officer for inclusion in the contract file.

1.6 ACCIDENT REPORTING AND RECORD KEEPING
A. Accident reporting and record keeping shall be in accordance with Base requirements. Telephonic reports of injuries or property damage will be made as soon as possible after the incident and will be followed by a copy of an Accident Report.

1.7 LIFE OF CONTRACT REQUIREMENTS
A. The Contractor shall comply with all provisions of this section during the life of the contract.

1.8 HEAD PROTECTION (HARD HATS)
A. All work sites under this contract are designated Hard Hat Areas. The Contractor shall post the area and shall ensure that all personnel, vendors and visitors use hard hats while within the limits of the work site.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)
END OF SECTION 01 10 60
SECTION 01 10 61

SAMPLE SAFETY PLAN

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification and are referred to in the text by the basic designation only.

1.1 US ARMY CORPS OF ENGINEERS:
   EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA):
   NFPA 70-1993 National Electric Code (NEC)

1.3 SOCIETY OF AUTOMOTIVE ENGINEERS (SAE):
   J 994-85 Alarm, Backup, Electric-Performance, Test, and Application, Recommended Practice.

2. GENERAL: Work safety is of paramount importance. The Contractor shall comply with the Contract Clause in the Solicitation entitled ACCIDENT PREVENTION, including the U.S. Army Corps of Engineers Safety and Health Requirements Manual referred to therein in addition to the provisions of this specification.

3. SAFETY PROGRAM: The U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, and all subsequent revisions to in the Contract Clause ACCIDENT PREVENTION of this contract, are hereby supplemented as follows:

   a. The Contractor shall designate an employee responsible for overall supervision of accident prevention activities. Such duties shall include:
      1. Assuring applicable safety requirements are incorporated in work methods
      2. Inspecting the work to ensure that safety measure and instructions are actually applied. The proposed safety supervisor's name and qualifications shall be submitted in writing for approval to the Contracting Officer's Representative. This individual must have prior experience as a safety engineer or be able to demonstrate his/her familiarity and understanding of the safety requirements over a prescribed trial period. The safety engineer shall have the authority to act on behalf of the Contractor's general management to take whatever action is necessary to assure compliance with safety requirements. The safety supervisor is required to be on the site when work is being performed.

   b. Prior to commencement of any work at a job site, a preconstruction safety meeting shall be held between the Contractor and the Corps of Engineers Area/Resident Engineer to discuss the Contractor's safety program and in particular to review the following submittals:
      1. Contracts Accident Prevention Plan: An acceptable accident prevention plan, written by the prime contractor for the specific work and implementing in detail the pertinent requirements of EM 385-1-1, shall be submitted for Government approval.
2. Activity Phase Hazard Analysis Plan: Prior to beginning each major phase of work, an activity hazard analysis (phase plan) shall be prepared by the Contractor for that phase of work and submitted to the Contracting Officer’s Representative for approval. A phase is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform work. The analysis shall address the hazards for each activity performed in the phase and shall present the procedures and safeguards necessary to eliminate the hazards or reduce the risk of an acceptable level.

c. Subsequent jobsite safety meetings shall be held as follows:

1. A safety meeting shall be held at least once a month for all supervisors on the project to review past activities, to plan ahead for new or changed operations and to establish safe working procedures to anticipate hazards. An outline report of each monthly meeting shall be submitted to the Contracting Officer’s Representative.

2. At least one safety meeting shall be conducted weekly, or whenever new crews begin work, by the appropriate field supervisors or foreman for all workers. An outline report of the meeting giving date, time, attendance, subjects discussed and who conducted it shall be maintained and copies furnished the designated authority on request.

4. ACCIDENTS: Chargeable accidents are to be investigated by both Contractor personnel and the Contracting Officer.

4.1 ACCIDENT REPORTING, ENG FORM 3394: Section I, paragraph 01.D, of EM 385-1-1 and the Contract Clause entitled ACCIDENT PREVITION are amended as follows: The prime Contractor shall report on Eng Form 3394, supplied by the Contracting Officer, all injuries to his employees or subcontractors that result in lost time and all damage to property and/or equipment in excess of $2,000 per incident. Verbal notification of such accident shall be made to the Contracting Officer within 72 hours following such accidents. The written report shall include the following:

a. A description of the circumstances leading up to the accident, the cause of the accident, and corrective measures taken to prevent recurrence.

b. A description of the injury and name and location of the medical facility giving examination and treatment.

c. A statement as to whether or not the employee was permitted to return to work after examination and treatment by the doctor, and if not, an estimate or statement of the number of days lost from work. If there have been days lost from work, state whether or not the employee has been reexamined and declared fit to resume work as of the date of the report.

4.2 OSHA Requirements:

4.2.1 OSHA Log: A copy of the Contractors’ OSHA Log of Injuries shall be forwarded monthly to the Contracting Officer.

A. The Contractor shall comply with all provisions of this section during the life of the contract.

4.2.2 OSHA Inspections: Contractors shall immediately notify the Contracting Officer when an OSHA
Compliance Official (Federal or State Representative) presents his/her credentials and informs the Contractor that the workplace will be inspected for OSHA compliance. Contractors shall also notify the Contracting Officer upon determination that an exit interview will taken place upon completion of an OSHA inspection. (NABSA).

4. SUBMITTALS FOR GOVERNMENT APPROVAL: Submittals shall be in accordance with Section 01 33 00 CONTRACTOR SUBMITTAL PROCEDURES. All required submittals of items specified in this section shall be for information only, except for those items including, but not limited to, the following which shall be submitted for Government approval:
   a. Written designation of safety representative.
   b. Written project specific accident prevention plan.
   c. Written activity phase hazard analysis plan.

END OF SECTION 01 10 61
PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED
   A. Reference Standards.
   B. Licenses and Permits
   C. Safety.
   D. Fire Safety.
   E. Affirmative Procurement Program
   F. Use of Ionizing Radiation (IR).
   G. Use of Lasers.
   H. Use of Radioactive Materials
   I. Use of Radio Frequency (RF) Radiation.
   J. Use of Ultraviolet (UV) Radiation.
   K. Ozone Depleting Substances.
   L. Lead Base Paint.
   M. Cleaning & Debris Control
   N. Nuisance Dumping & Polluting Activities
   O. Excavation at IRP Sites
   P. Contaminated Soil
   Q. Suspected Hazardous Materials
   R. Oil-Filled or Impregnated Electrical Components
   S. Hazardous Waste Testing
   T. Hazardous Material Inventory
   U. Spill Response and Reporting
   V. Waste Disposal and Environmental Protection.

1.2 REFERENCE STANDARDS
   A. Federal, State and Local Codes and Ordinances take precedence over these Specifications and
      Drawings where conflicts occur, unless the Drawings or Specifications call for more stringent
      requirements. Notify the Contracting Officer in writing of conflicts.
   B. Comply with all applicable laws, building and construction codes, OSHA Safety and Health
      Regulations and applicable requirements of any governmental agency under whose jurisdiction
      this Work is being performed.
   C. Obtain a copy of standards referenced in the various Specification Sections. Maintain a copy at
      the jobsite during execution of Work to which the standard applies.
D. Construction that is not governed by the contract specifications will be governed by the more stringent provisions of the latest published edition or statute adopted edition, of the following applicable codes, regulations and standards.

ABA Architectural Barriers Act
ADA Americans with Disabilities Act Accessibility Guidelines
AFR Air Force Regulations
ASME American Society of Mechanical Engineers
CFR Code of Federal Regulations
FAR Federal Acquisition Regulations
IBC International Building Code
IMC International Mechanical Code
IPC International Plumbing Code
NEC International Electrical Code
NFPA National Fire Code
OSHA Occupational Safety and Health Act
UFC Unified Facilities Criteria

Other applicable codes and standards as applicable or as referenced by the individual specification Sections.

1.3 LICENSES AND PERMITS

A. For the duration of this contract, Contractor shall obtain and maintain current required Federal, State and local licenses and permits.

B. License and permit fees and taxes shall be paid by the Contractor without additional cost to the Government.

C. Obtain required vehicle and entry permits from Installation security.

D. Obtain any additional Installation required permits from the Contracting Officer. Current permit requirements shall be provided to the Contractor at the preconstruction conference.

1.4 SAFETY

A. Comply with all Federal and State regulations concerning safety of personnel and equipment. All Contractor personnel shall wear hard hats and steel toe safety shoes while on the project site. In addition, all personnel shall wear hearing protection (ear muffs or ear plugs) when inside the power plant, excluding office areas, restrooms, break rooms and other “quiet” areas.

B. Ensure that lock out, tag out procedures are established and used as directed by 29 CFR 1910.145. Comply with the lock out, tag out procedures in use by CH&PP personnel. Ensure that contractor’s personnel on site are trained on the government’s procedures.

C. Comply with all safety, traffic and protection requirements in effect on Installation. Government will brief the Contractor on these requirements at the preconstruction conference.
D. Provide safety barriers around open excavations, openings in floors and other hazards created by the Contractor’s activities.

E. The Contracting Officer may direct the Contractor to cease activities which, in their opinion, are unsafe.

1.5 FIRE SAFETY

A. Comply with all fire safety and protection requirements in effect on Installation. Government will brief the Contractor on these requirements at the preconstruction conference.

B. Prior to beginning any welding, use of open flame device, or any activity that produces sparks, obtain a “hot work permit” from Installation Fire Department. The permit shall be renewed each day welding or open flame devices will be used.

C. If the contract work requires numerous days of hot work, the Contractor may elect to have one of his on-site personnel designated as a Permit Authorizing Individual (PAI). The Contractor’s PAI may issue hot work permits at the work site, thus avoiding the requirement for daily permits issued by the Fire Department.

D. The Contractor’s PAI shall be the on-site superintendent, a foreman, the Contractor’s Safety Manager, or other individual with sufficient knowledge and experience to recognize unsafe work practices or conditions and having authority to stop work immediately if such unsafe practices or conditions are observed. To be designated as a PAI, a person must schedule and successfully complete PAI certification training offered by the Post Fire Department. PAI certification training is estimated to last 60 to 90 minutes.

E. Fire Department personnel may periodically visit the site to ensure the Contractor is complying with fire safety requirements. A PAI’s certification may be revoked if the PAI has failed to issue permits on days when hot work is performed, or if unsafe practices or conditions are observed.

F. Questions concerning these requirements may be directed to Installation Fire Chief.

G. The Contractor shall notify the Post Fire Department a minimum of 48 hours before, and again immediately prior to, temporarily closing any street or paved building access, interrupting water service to any fire hydrant or interrupting the operation of any fire detection, alarm or suppression system. The fire Department shall be immediately notified upon reopening closed areas, restoration of water service to any fire hydrant, or reactivation of any detection, alarm or suppression system. This notification requirement is in addition to other contract requirements.

H. Provide a 10 lb, ABC fire extinguisher at all work stations.

I. Report a fire: Dial 911.

1.6 AFFIRMATIVE PROCUREMENT PROGRAM

A. These standards apply to all new construction, demolition, rehabilitation, alteration, modification, repair, and maintenance of existing facilities.

B. In an effort to comply with the affirmative procurement requirements of Section 6002 of the Resource Conservation Recovery Act (RCRA) and Executive Order 13101, the government
strongly promotes the use of the recycled and recovered materials and products identified in the Environmental Protection Agency’s Comprehensive Procurement Guidelines.

C. Recycled and recovered materials and products must be considered first before any other materials and products will be accepted. Recycled and recovered materials and products must be used throughout the project unless they either do not meet the requirements of this specification, delay the progress of the work, or are cost prohibitive.

D. Examples of these materials and products are detailed below. These are recommended quantities and represent minimum compliance. The actual requirement is to use the maximum amount of recycled material possible, while meeting the performance specifications.

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Recycled Material</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>Rock wool</td>
<td>Slag</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Fiberglass</td>
<td>Glass cullet</td>
<td>20-25</td>
</tr>
<tr>
<td></td>
<td>Loose fill &amp; spray on (cellulose)</td>
<td>Postconsumer paper</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Perlite composition board</td>
<td>Postconsumer paper</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Plastic rigid foam</td>
<td>Recovered material</td>
<td>9</td>
</tr>
<tr>
<td>Wall Board</td>
<td>Structural fiberboard</td>
<td>Postconsumer paper</td>
<td>80-100</td>
</tr>
<tr>
<td></td>
<td>Laminated paperboard</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Carpet</td>
<td>Polyester carpet face fiber</td>
<td>Excludes severe wear applications</td>
<td>25-100</td>
</tr>
<tr>
<td></td>
<td>Playground surfaces</td>
<td>Rubber or plastic</td>
<td>90-100</td>
</tr>
<tr>
<td>Cement/Concrete</td>
<td>Concrete &amp; cement</td>
<td>Coal fly ash</td>
<td>15-35</td>
</tr>
<tr>
<td></td>
<td>Concrete &amp; cement</td>
<td>Ground granulated blast furnace</td>
<td>25-50</td>
</tr>
<tr>
<td>Flooring/Patio</td>
<td>Patio blocks</td>
<td>Plastic or plastic blends</td>
<td>90-100</td>
</tr>
<tr>
<td></td>
<td>Patio blocks</td>
<td>Rubber or rubber blends</td>
<td>90-100</td>
</tr>
<tr>
<td></td>
<td>Floor tiles</td>
<td>Rubber</td>
<td>90-100</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Paper based hydraulic mulch</td>
<td>Postconsumer paper</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Wood based hydraulic mulch</td>
<td>Recovered wood and/or paper</td>
<td>100</td>
</tr>
</tbody>
</table>

1.7 USE OF IONIZING RADIATION (IR)

A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of IR generating devices.

B. Submit request to the Installation Radiation Safety Officer (RSO) with a courtesy copy to the Contracting Officer. Request shall include:

1. Description/Characteristics:
   a. X-ray unit manufacturer
   b. Model number
   c. Serial number
   d. Maximum kVp, mA, Sec
e. Ionizing radiation source/emitter (electron tube)

2. The part of the EXCHANGE contract describing work to be done at the Installation and the
inclusive dates of such work.

3. An acknowledgment that the RSO may make initial and periodic checks to ensure the
Contractor is following applicable radiological health and safety practices which prevent
unnecessary exposures to Installation personnel.

1.8 USE OF LASERS
A. Submit a written request for approval at least 30 calendar days before commencement of
activities which require the use of a laser.

B. Submit request to the RSO with a courtesy copy to the Contracting Officer. Request shall include:
   1. Description/Characteristics:
      a. Manufacturer.
      b. Model.
      c. Number of same units.
      d. Serial number(s).
      e. Laser medium.
      f. Mode of operation (i.e. continuous wave (CW), single pulse, multiple pulse).
      g. Maximum exposure time (train length).
      h. Ime (sec) & wave length.
      i. Energy/pulse (J) or CW power (W).
      j. Pulse repetition frequency.
      k. Pulse width.
      l. Beam diameter (at 1/e point).
      m. Beam divergence (at 1/e point).

2. The part of the EXCHANGE contract describing work to be done and the inclusive dates of
such work.

3. An acknowledgment that the RSO may make initial and periodic checks to ensure the
contractor is following applicable radiological health and safety practices which prevent
unnecessary exposures to Installation personnel.

1.9 USE OF RADIOACTIVE MATERIALS (RAM):
A. Prior to bringing RAM onto Post property, the Contractor shall obtain permission from the RSO.
To obtain approval, forward an application to the RSO, and a courtesy copy to the Contracting
Officer at least 30 calendar days before the planned date for commencement of activities on the
installation. Requests shall include: A description of the proposed activities on NRC Form 241,
Report of Proposed Activities in Non-Agreement States, (the 180-day limitation on the form does
not apply to organizations holding an NRC license). Contractors possessing Agreement State
Licenses shall also submit an NRC Form 241 to NRC in compliance with 10 CFR 150.21.
Contractors requiring more than 180 days of operation per calendar year on the installation shall possess an NRC license.

1. The procedures established to ensure radiological health and safety of Post personnel and the public while on Army or Air Force installations on site and the name of the responsible Contractor representative.

2. A current copy of the applicable NRC, or Agreement State license. Expired licenses are unacceptable. To be valid at the installation, the license must either specifically state the installation by name on the license or state approval for work at temporary job sites anywhere in the United States where the NRC or Agreement State maintains jurisdiction. DOE or DOE prime contractors must provide, in lieu of a license, written certification of their exemption from NRC licensing requirements and cite the applicable exemption of 10 CFR.

3. The part of the EXCHANGE contract describing work to be done and the inclusive dates of such work

4. An acknowledgment that the Post RSO may make periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Army or Air Force personnel and prevent potential contamination of Government property.

1.10 USE OF RADIO FREQUENCY (RF) RADIATION

A. Prior to using equipment generating RF Radiation in excess of seven watts peak power and a frequency of 1000 MHz or greater on Installation must submit a written request for approval at least 30 calendar days before commencement of activities which require the use of the RF generating device.

B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Submittal shall include:

1. Description.
2. Nomenclature.
3. Location of emitters.
4. Quantity.
5. Frequency (Mhz).
6. Pulse width (microsec.).
7. Pulse repetition freq. (pps).
8. Peak power (kW).
10. Antenna band width (degrees-- horizontal/vertical).
11. Antenna gain (dB).
12. Scan rate (rpm).
C. The part of the EXCHANGE contract describing work to be done at the Installation and the inclusive dates of such work.

D. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Installation personnel.

1.11 USE OF ULTRAVIOLET (UV) RADIATION

A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of UV generating devices on Post.

B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Request shall include:
   1. The part of the EXCHANGE contract describing work to be done at the Installation and the inclusive dates of such work.
   2. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Installation personnel.

1.12 OZONE DEPLETING SUBSTANCES

A. No ozone depleting substances (refrigerants or any other compounds) shall be used in any capacity on this project unless specifically approved by the HazMart.

1.13 LEAD BASE PAINT

A. No paint with a lead content of 0.06 percent or greater shall be used in any capacity on this project unless specifically approved by the HazMart.

1.14 CLEANING AND DEBRIS CONTROL

A. During the term of this Contract, the Contractor shall remove any materials and equipment that are not required for the completion of the work as promptly as possible. All debris shall be removed from the site and legally disposed. The Contractor shall take particular care to eliminate any hazards created by his operations.

B. The Contractor is responsible for any damage caused by his debris without additional cost to the Government.

C. The Contractor shall maintain at all times during his work at this Project Site a strict windblown debris control program. This program shall ensure no windblown debris or other debris from his work shall contaminate or interfere with any access to or operation of any facility or any parking area, road or street.

1.15 NUISANCE DUMPING AND POLLUTING ACTIVITIES

A. Polluting, dumping, or discharging of any harmful, nuisance, or regulated materials (such as concrete truck washout, vehicle maintenance fluids, residue from saw cutting operations, solid waste or hazardous substances) into building drains, site drains, streams, waterways, holding ponds or to the ground surface is not permitted. The contractor shall be responsible for any and
all damages resulting from dumping or discharges. Further, the Contractor shall conduct activities in such a fashion to avoid creating any legal nuisance, including but not limited to, suppression of noise and dust, control of erosion, and implementation of other measures as necessary to minimize off site impacts of work activities.

B. Fugitive Dust emissions (airborne dust generated by vehicles operating on unpaved surfaces, Transfer or transport of dust producing materials, etc.) shall be controlled at the construction site, along haul routes and at staging areas. Water spraying shall be conducted as necessary to minimize fugitive dust generation.

1.16 CONTAMINATED SOIL 
A. If unexpected contaminated soil is encountered while performing work, stop work immediately and contact the Contracting officer. Do not resume work until approved by the Contracting Officer.

1.17 SUSPECTED HAZARDOUS MATERIALS 
A. Any suspect hazardous materials encountered during demolition or construction shall immediately be brought to the attention of the Contracting Officer’s representative. Work shall not resume until the Contracting Officer is satisfied that the materials are not hazardous. Should they be found to be hazardous, the contractor shall immediately take steps to contain the material, so further damage and contamination does not occur. The contractor shall then submit a proposal for removal. See exhibit “A” for Hazmat Report.

1.18 OIL-FILLED OR IMPREGNATED ELECTRICAL COMPONENTS 
A. Notify Installation Environmental Safety Office and phone number) before demolition or installation of any oil-filled electrical equipment (for example: transformers and regulators). All transformers (both PCB and non-PCB-containing) and light ballasts (unless labeled “No PCBs”) shall be disposed through the Installation Hazardous Material and Waste Handling facility.

1.19 HAZARDOUS WASTE TESTING 
A. The Contractor shall subject a representative sample of each type of hazardous waste, or potentially hazardous waste, generated to TCLP (Toxic Characteristic Leaching Procedure) testing. Sampling and testing for appropriate metals, and volatile and semivolatile chemicals shall be performed by an independent test agency that is regularly engaged in the sampling and testing of hazardous materials and waste. Provide the test results to Installation Hazardous Waste Facility before transferring the waste to the facility. Refer to the attached Waste Disposal and Borrow Pit Worksheet for additional hazardous waste handling requirements.

1.20 HAZARDOUS MATERIAL INVENTORY 
A. Contractor must submit an inventory of all hazardous materials to be used to include quantities. Inventory must be updated at completion of the project to indicate quantities used, spilled, and disposed of, etc.

B. The Contractor shall provide the Hazardous Materials Pharmacy (HazMart) a list and quantity of all hazardous materials that the Contractor intends to bring onto Government property. The
Contractor shall provide the HazMart with copies of all MSDSs and an inventory for each Hazardous chemical listed in OSHA Hazard Communication Standard 29 CFR 1910.1200 intended to be used. Each MSDS shall be on file prior to use of the chemical, and shall be maintained for all chemicals. Once the hazardous material is used, its quantity of use shall be reported to the HazMart along with the disposition of the container.

C. Submit a completed Hazardous and Related Material Identification Form, and an MSDS for all materials listed on the form and brought on Installation.

D. If hazardous materials are not in their original container, the container containing the substance must be labeled.

1.21 SPILL RESPONSE AND REPORTING

A. Spills of hazardous waste, hazardous materials or non-regulated substances such as oils, antifreeze, grease, latex paint, hydraulic fluid, etc. shall immediately be reported to Department of Public Works for reporting purposes to local, state and federal agencies and proper clean-up action. If a spill occurs after normal working hours, or on a weekend or holiday, report spills to the Installation Fire Department and request they contact Department of Public Works.

B. The contractor is encouraged to have a supply of absorbent pads on-site to aid in immediate clean-up of smaller spills, such as oil, coolant or hydraulic fluid leaks from vehicles or equipment.

C. Spill notification placards are to be placed on the job site (CEV or DPW) will provide format and required locations prior to construction.

D. The contractor shall develop a spill plan. The format for the plan will be provided by CEV or DPW prior to construction.

1.22 WASTE DISPOSAL AND ENVIRONMENTAL PROTECTION

A. The Contractor shall comply, and ensure that all subcontractors comply, with all Federal, State, local laws, and regulations, ordinances and standards related to environmental pollution control and abatement in effect and the specific requirements stated elsewhere in the Contract Documents.

B. All hazardous wastes as defined in 40 CFR, Part 261, shall be collected and disposed of in accordance with 40 CFR, Parts 260-268. The Contractor is responsible for properly storing, marking, labeling, securing and transporting hazardous wastes. All hazardous wastes shall be collected in contractor furnished DOT/UN approved containers and taken to Installation Hazardous Waste Facility for disposal. Call the Hazardous Waste Facility prior to transporting wastes to the facility to coordinate delivery of the waste materials. The Contractor shall not store hazardous waste on Installation for more than 30 days.

C. Any previously unidentified suspected hazardous materials encountered during performance of the work of the contract shall immediately be brought to the attention of the Contracting Officer.

D. All general construction wastes, other than those specifically allowed, or required, to be disposed of on-Installation shall be legally disposed at an off-Installation sanitary landfill.
E. Comply with the requirements of Installation Waste Disposal requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 13 00
SECTION 01 13 01
WASTE DISPOSAL

The Contractor shall obtain all permits required by federal, state and local laws for the construction activities involved. The Contractor shall perform all work in such a manner as to minimize the polluting of air, water or land and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants. The Contractor shall ensure that all construction, repair, maintenance operations and practices and waste disposal performed under this contract shall be in strict compliance with all applicable city, county, state and federal environmental laws and regulations.

1. Hazardous and Non-hazardous Waste Disposal: There are no known existing sources of hazardous waste involved with this project. If the Contractor generates or discovers suspected hazardous waste it shall be brought to the immediate attention of the Contracting Officer for review and direction on how to proceed with handling and disposal. As part of the proposed implementation above and prior to on-site construction, the Contractor shall submit for approval, a plan for storing, characterizing and disposing of hazardous and non-hazardous waste materials resulting from the work under this contract. Waste includes, but is not limited to, paint waste, paint equipment cleaners and used paint containers. If any waste material is dumped in unauthorized areas, the Contractor shall remove the materials and restore the area to the condition of the adjacent undisturbed areas. Where directed and approved by the Contracting Officer, contaminated ground shall be excavated, characterized, stored, disposed of and replaced with suitable fill material at the expense of the Contractor. All waste disposal shall be in strict accordance with local, state and federal requirements and regulations. Waste paint, paint equipment cleaners and used paint containers shall be disposed of off base by the Contractor, at the Contractors’ expense. Any soil contaminated through spillage shall be removed and disposed of in accordance with the requirements specified herein. Soil that is required to be removed shall be replaced by similar soil approved by the Contracting Officer.

END OF SECTION 01 13 01
SECTION 01 14 50
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED SECTIONS
A. Section 01 10 00 - Summary.
B. Section 01 33 00 - Submittals.
C. Individual Product Specification Sections:
   1. Cutting and patching incidental to work of the section.
   2. Advance notification to other sections of openings required in work of those sections.
   3. Limitations on cutting structural members.

1.3 SUBMITTALS
A. Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   5. Work of EXCHANGE or separate contractor.
B. Include in request:
   1. Identification of Project.
   2. Location and description of affected Work.
   3. Necessity for cutting or alteration.
   4. Description of proposed Work and Products to be used.
   5. Alternatives to cutting and patching.
   6. Effect on work of EXCHANGE or separate contractor.
   7. Written permission of affected separate contractor.
   8. Date and time work will be executed.

PART 2 – PRODUCTS

2.1 MATERIALS
A. Primary Products: Those required for original installation.

PART 3 – EXECUTION
3.1 EXAMINATION
   A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
   B. After uncovering existing Work, assess conditions affecting performance of work.
   C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION
   A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
   B. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 CUTTING
   A. Execute cutting and fitting to complete the Work.
   B. Uncover work to install improperly sequenced work.
   C. Remove and replace defective or non-conforming work.
   D. Remove samples of installed work for testing when requested.
   E. Provide openings in the Work for penetration of mechanical and electrical work.
   F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
   G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
   H. Contractor to ensure when cutting slabs, no utilities below are affected.

3.4 PATCHING
   A. Execute patching to complement adjacent Work.
   B. Fit Products together to integrate with other Work.
   C. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
   D. Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
   E. Restore work with new Products in accordance with requirements of Contract Documents.
   F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
   G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
   H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION 01 14 50
PART 1 – GENERAL

1.1 ACTION SUBMITTALS
A. Documentation:
   1. Justification.
   2. Coordination information.
   3. Detailed comparison.
   4. Product Data.
   5. Samples.
   6. Certificates and qualification data.
   7. List of similar installations.
   8. Material test reports.
   9. Research reports.
   10. Detailed comparison of Contractor’s construction schedule.
   11. Cost information.
   12. Contractor’s certification.
   13. Contractor’s waiver of rights to additional payment or time.

1.2 CONTRACTING OFFICERS APPROVAL
A. The contract is based on materials and methods described in the contract document.
B. The Contracting Officer will consider proposals for substitution of materials, equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Contracting Officer to evaluate the proposed substitution.
C. Do not substitute materials or equipment, unless such substitution has been specifically approved for this Work by the Contracting Officer.
D. Requests for substitution must be made no less than 10 days prior to proposal closing date. No further substitutions will be permitted after contract award.
E. Where the phrase “or equal” or “or equal as approved in advance by the Contracting Officer” occurs in the Contract Documents, do not assume that material and equipment will be approved as equal by the Contracting Officer unless the item has been specifically approved for this work by the Contracting Officer. All requests for “or equal” or “equal as approved in advance by the Contracting Officer” must be submitted 10 days prior to proposal closing date.
F. The decision of the Contracting Officer shall be final.

1.3 SUBSTITUTIONS FOLLOWING AWARD OF CONTRACT
A. Substitutions for Cause: Not later than 15 days prior to time required for preparation and review of submittals. The submittal must include a justification explaining the rational for the requested substitution. The contractor shall be liable for costs of the Contracting Officer’s review for Contractors failure to order materials, equipment, e.g. in sufficient time.

B. Substitutions for Convenience: Not allowed after contract award.

1.4 AVAILABILITY OF SPECIFIED ITEMS

A. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work.

B. In the event specified item or items will not be so available, notify the Contracting Officer 10-days prior to receipt of proposals with a recommended replacement item.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back-charged as necessary and shall not be borne by EXCHANGE.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 25 00
PART 1 – GENERAL

1.1 REQUESTS FOR INFORMATION (RFIs)
   A. RFI Forms: Software-generated form acceptable to Architect and EXCHANGE Project Manager.
   B. Architect’s Action: Allow seven working days for Architect’s response for each RFI.
   C. RFI Log: Maintain a tabular log of RFIs. Submit log weekly.

1.2 PROJECT WEB SITE
   A. Use Contractor’s approved web site for project communication and documentation.

1.3 PRECONSTRUCTION MEETING
   A. The Contracting Officer and/or Contracting Officer’s representative will schedule and preside at preconstruction meeting.
   B. Attendance Required:
      1. Contracting Officers and/or Contracting Officer’s representative and other Headquarters EXCHANGE representatives.
      2. Local and regional EXCHANGE representatives.
      3. Installation representative (Engineering, Fire Marshall, Security, etc.)
      4. Contractor
   C. Agenda:
      1. Execution of Notice to Proceed.
      3. Submission of list of sub-contractors.
      4. Review of EXCHANGE checklist of contract requirements.
      5. Discussion of Schedule.
      6. Discussion of critical sequencing.
      7. Designation of responsible personnel.
      8. Processing of field decisions and change orders.
      9. Submission of applications for payment.
     10. Submittal of shop drawings.
     11. Procedures for maintaining record documents.
     12. Fire and safety procedures.
     15. Housekeeping procedures.
     16. Use of premises
a. Office and storage locations.
b. Personnel parking.

17. Major equipment deliveries.
18. Other issues pertinent to completing the contract.

D. Meeting minutes: Minutes will be taken by the A/E and distributed to EXCHANGE, Contractor, and Installation Engineer.

1.4 PROGRESS MEETINGS
A. The contractor shall schedule and preside at monthly progress meetings.
B. The contractor shall make arrangements for meetings, prepare agenda with copies for participants.
C. Location of Meetings: Construction office, or as directed in the notice.
D. Attendance Required:
   1. Contractor's project manager.
   2. Contractor's superintendent.
   3. Major sub-contractors and suppliers.
   4. EXCHANGE representative (EXCHANGE' option).
E. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Coordination of projected progress.
  10. Maintenance of quality and work standards.
  11. Effect of proposed changes on progress schedule and coordination.
  12. Other business relating to work.
F. Meeting Minutes: Architect/Engineer shall record meeting minutes, and distribute copies to the participants (including the EXCHANGE Contracting Officer, within three (3) business days of the meeting.

1.5 PROJECT MEETINGS
A. The Contractor shall schedule and preside at other project meetings when required.
B. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and EXCHANGE of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   b. Options.
   c. Related RFIs.
   d. Related Change Orders.
   e. Purchases.
   f. Deliveries.
   g. Submittals.
   h. Review of mockups.
   i. Possible conflicts.
   j. Compatibility requirements.
   k. Time schedules.
   l. Weather limitations.
   m. Manufacturer's written instructions.
   n. Warranty requirements.
   o. Compatibility of materials.
   p. Acceptability of substrates.
   q. Temporary facilities and controls.
   r. Space and access limitations.
   s. Regulations of authorities having jurisdiction.
   t. Testing and inspecting requirements.
   u. Installation procedures.
   v. Coordination with other work.
   w. Required performance results.
   x. Protection of adjacent work.
   y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Coordination Meetings: At weekly intervals, in addition to specific meetings held for other purposes.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 31 00
PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Format
   B. Content
   C. Revisions to schedules
   D. Submittals

1.2 RELATED SECTIONS
   A. General Provisions of the EXCHANGE Contract for Construction, Article entitled: "Schedule and Progress"
   B. Section 01 10 00 - Summary of Project
   C. Section 01 33 00 - Submittals

1.3 GENERAL
   A. The Contractor-prepared progress chart shall serve as a guide in managing the construction progress.
   B. In preparing this system, the scheduling of construction shall be the responsibility of the Contractor.
   C. The schedules shall be prepared using the Critical Path Method (CPM).

1.4 FORMAT
   A. Prepare schedules as a horizontal bar chart with separate bar for each major portion of work or operation, identifying first workday of each week.
   B. The format shall be such to enable the Contracting Officer to evaluate the reasonableness of the proposed schedule and to determine if the actual construction is on schedule.

1.5 CONTENT
   A. Show complete sequence of construction by activity with dates for beginning and completion of each element of construction.
   B. Identify each item by specification section number.
   C. Show accumulated percentage of completion of each item and total percentage of Work completed as of the first day of each month.
   D. Indicate delivery dates for EXCHANGE furnished products.

1.6 REVISIONS TO SCHEDULES
   A. Indicate progress of each activity to date of submittal and projected completion date of each activity.
B. Identify activities modified since previous submittal, major changes in scope and other identifiable changes which could affect the schedule.

C. Provide narrative report with each submittal describing work accomplished during the previous period, the work scheduled for the next period, anticipated problem areas and delays and impact on the schedule. Report corrective action taken or proposed.

1.7 SUBMITTALS

A. Submit a preliminary schedule through the Contracting Officer defining the Contractor's proposed operations for the first sixty (60) of the contract within ten (10) days after date of Notice to Proceed. Indicate the Contractor's general approach for the balance of the project. Include the cost of the activities expected to be completed or partially completed before submission and approval of the complete progress schedule.

B. Upon approval of the preliminary schedule by the Contracting Officer and within thirty (30) calendar days after the Notice to Proceed, the Contractor shall submit the complete Progress Schedule.

C. Submit revised Progress Schedules with each monthly Application for Payment.

D. Submit the number of opaque reproductions which Contractor requires plus four (4) copies which will be retained by Contracting Officer.

1.8 DISTRIBUTION

A. Distribute copies of reviewed schedules to project site file, subcontractors, suppliers and other concerned parties.

B. Instruct recipients to promptly report in writing, problems anticipated by projections indicated in schedules.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 32 00
PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Submittal procedures.
   B. Construction progress schedules.
   C. Shop Drawings.
   D. Samples.
   E. Product Data.
   F. Certificates.

1.2 RELATED SECTIONS
   A. Section 01 10 00 - Summary of Project.
   B. Section 01 32 00 - Construction Progress Schedules
   C. Section 01 78 39 - Project Record Documents.

1.3 SUBMITTAL PROCEDURES
   A. Transmit each submittal with EXCHANGE Form 4450-48, Shop Drawings and Material Approval Submittal.
   B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
   C. Identify Project, Contractor, subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
   D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
   E. Schedule submittals to expedite the Project. Transmit submittals to Contracting Officer. Coordinate submission of related items.
   F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work. Failure to identify such variations will not relieve the Contractor of the responsibility for completing the work in full accordance with the Contract Documents even though such submittals are approved by the Contracting Officer.
   G. Prior to approval of the material/product submitted, the contractor shall include with the submittal a written certification that the material/product contains no asbestos. This certificate is mandatory before approval will be issued.
   H. Provide space for Contractor and Contracting Officer review stamps.
   I. When revised for resubmission, identify all changes made since previous submission.
J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

1.4 CONSTRUCTION PROGRESS SCHEDULES
A. Submit preliminary Progress Schedule within ten (10) days of the Notice to Proceed.
B. Submit complete (final) Progress Schedule within thirty (30) days of the Notice to Proceed.
C. Submit monthly revisions of Progress Schedule.
D. Refer to Section 01 32 00 - Construction Progress Documentation, for submittal information.

1.5 SHOP DRAWINGS
A. Shop Drawings For Review:
   1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. Shop drawings shall be prepared by a qualified detailer.
   3. Minimum sheet size for shop drawings shall be 8 1/2” x 11”.
   4. After review, and distribute copies in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.
B. Shop Drawings For Project Close-out:
   1. Submitted for the EXCHANGE's benefit during and after project completion.
C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
   1. Submit the number of opaque reproductions which Contractor requires, plus three (four on structural, mechanical, and electrical submittals) copies which will be retained by Contracting Officer.

1.6 SAMPLES
A. Samples For Review:
   1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. After review, produce duplicates and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.
B. Samples For Information:
   1. Submitted for the Contracting Officer's knowledge as project administrator or for EXCHANGE.
C. Samples For Selection:
   1. Submitted to Contracting Officer for aesthetic, color, or finish selection.
2. Submit samples of finishes from the full range of manufacturers' standard colors, or in custom colors (if so stated in the product specification section), textures, and patterns for Contracting Officer selection.

3. After review, distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 – Project Closeout.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; two of which will be retained by Contracting Officer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Coordinate sample submittals with respective shop drawings.

1.7 PRODUCT DATA

A. Submit Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, specifications, illustrations, and other descriptive data.

B. Product data that relates to shop drawings or samples must be submitted with the respective shop drawings or samples.

1.8 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Contracting Officer, in quantities specified for Product Data.

B. Certify that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, test results, affidavits, and/or certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.9 LIMITATIONS AND CONTRACTOR’S RESPONSIBILITIES

A. Submittals will be reviewed for the limited purpose of checking for conformance with the design concept and the information shown in the drawing and specifications. These reviews shall not include review of the accuracy for completeness of details. A review shall not indicate that the reviewer has checked the entire system of which the reviewed item is a component. The reviewer shall not be required to review partial submissions.
PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 33 00
PART 1 – GENERAL

1.1 SECTION INCLUDES (Scope)

A. The work covered by this section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental degradation during and as a result of construction operations under this contract. These requirements are in addition to any environmental protection requirements elsewhere in these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents, not naturally occurring at the site, which adversely affect human health or welfare; unfavorably alter ecological balances important to human life; affect other species of importance to humans; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution by the contractor requires consideration of air, water, and land, and involves noise control, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. This section also requires the protection of cultural and historic resources.

1.2 CONTRACTOR’S GENERAL ENVIRONMENTAL COMPLIANCE OBLIGATIONS.

Work under this contract is to be performed on a government facility. All environmental rules applying to contractor operations elsewhere will also apply on the government facility. Contractor (and any subcontractor, agent or representative) shall comply with all Applicable Federal, State, and local laws and regulations providing for environmental protection and pollution control and abatement. These include but are not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, Archeological Resources Protection Act, and Pollution Prevention Act. Contractor has the duty to determine for itself where such laws and regulations apply. Although the Contractor may request assistance from the Contracting Officer in delineating applicable environmental laws and regulations, Contractor has an independent responsibility to make its own determination and to do so in a timely fashion.

1.3 FINES OR PENALTIES FOR ENVIRONMENTAL NON-COMPLIANCE.

The Contractor shall be responsible for paying any fines or penalties assessed against EXCHANGE or the installation or the Army or the Air Force for violations of environmental laws or regulations resulting from acts or omissions of the contractor or its employees, subcontractors or agents. This obligation is in addition to any fines or penalties that may be assessed against the contractor for the
same conduct. Contractor may either reimburse these fines or penalties through the Contracting Officer or with the consent of the Contracting Officer, the Contractor may pay such fines or penalties directly to the regulatory agency or agencies concerned.

1.4 CONTRACTOR'S LIABILITY FOR ENVIRONMENTAL DAMAGES

Contractor agrees to hold harmless and indemnify EXCHANGE (which includes the Army, Air Force, or other Department of Defense component, as appropriate) for any and all damages of any kind resulting from environmentally harmful activities by the contractor, contractor's employees or agents or subcontractors. "Damages" includes but is not limited to personal injury, property damage (including diminution of value), or death, environmental restoration and response costs, natural resource damages, expert witness and attorney's fees, and reimbursement of any and all expenses incurred to obtain permits as a result of Contractor's failure to identify or obtain permits for itself or EXCHANGE.

1.5 CONTACTS WITH ENVIRONMENTAL REGULATORY OFFICIALS.

Contractor shall immediately advise the Contracting Officer and the installation environmental office of the content of all contacts with federal, state, or local environmental regulators, before, during, and after the performance of this contract concerning the performance of this contract.

PART 2 – PERMITS

2.1 PERMITS FOR EQUIPMENT USED BY CONTRACTOR IN PERFORMING EXCHANGE CONTRACTS.

For equipment used in the performance of this contract, Contractor shall obtain in Contractor's name and at no additional expense to EXCHANGE, all permits, co-ordinations, certifications or other regulatory authorization necessary to perform and complete the work required by this contract under applicable environmental laws and regulations. "Applicable environmental laws and regulations" includes but is not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, and Pollution Prevention Act and State, County, and Local laws and regulations on the same subjects.

2.2 PERMITS NEEDED FOR CONSTRUCTION, EXCAVATION, MODIFICATION, RENOVATION, DEMOLITION, INSTALLATION, OR OTHER ALTERATION OF BUILDINGS, STRUCTURES, EQUIPMENT, INSTALLATIONS, REAL PROPERTY OR SYSTEMS

Contractor shall identify all Federal, State, County, or local, permits, co-ordinations, certifications or other regulatory authorization requirements under all applicable environmental laws and regulations.
as defined in (a.) above. Contractor shall then prepare and submit in draft all applicable permit applications, co-ordinations, notices, or other required filings, together with all supporting data to the contracting officer for review. Permit applications or notifications or other documents that must be submitted by EXCHANGE will be submitted by EXCHANGE, and any documents that must be submitted by the contractor will be returned after review to the contractor for submission. No work requiring permit or other written authorization shall proceed before the Contractor has the permit or authorization or a copy thereof in its possession.

PART 3 – MATERIALS

3.1 RECYCLED MATERIALS.

Materials used in this contract shall be, to the greatest extent practicable and consistent with financial prudence, made of recycled materials or of materials that are recyclable.

3.2 ASBESTOS

Asbestos will not be used or included in this project.

3.3 POLYCHLORINATED BIPHENYL’S (PCBs)

PCBs will not be used or included in this project.

3.4 LEAD-BASED PAINT

Lead-based paint will not be used included in this project.

3.5 OZONE-DEPLETING SUBSTANCES.

A. "Class I substance," as used in this clause, means any substance designated as class I by the Environmental Protection Agency (EPA)(40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform.

B. "Class II substance," as used in this clause, means any substance designated as class II by EPA (40 CFR Part 82), including but not limited to, hydro-chlorofluorocarbons.

C. As required by 42 USC 7671j(b), c, and (d) and 40 CFR Part 82, Subpart E, the Contractor shall label products which contain class I or class II ozone-depleting substances or are manufactured with a process that uses class I or class II ozone-depleting substances, or containers of class I or class II ozone-depleting substances, as follows:

"WARNING: Contains (or manufactured with, if applicable) __________*__________. (a) substance(s) which harm(s) public health and the environment by destroying ozone in the upper atmosphere."

*The Contractor shall insert the name of the substance(s).

D. The contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 USC 7671g, National Recycling and Emission Reduction Program and 7671h, Servicing of Motor Vehicle Air Conditioners) as each or both apply to the contract.
PART 4 - EXECUTION (WORK PRACTICES)

4.1 CONTROL OF AIR EMISSIONS.
Contractor's actions shall conform to all federal, state, and local requirements for the control of air emissions during work under this contract. Contractor will ensure that all internal construction vehicles and equipment used will have the lowest practicable emissions characteristics and be maintained in optimum operating condition for the reduction of air emissions. Where use of electric motors instead of internal combustion engines is feasible, electric motors will be used during construction.

PART 5 – POLLUTION PREVENTION AND WASTE DISPOSAL

5.1 POLLUTION PREVENTION
The contractor should use prior planning to find those materials that will minimize the creation of waste in general and hazardous waste in particular. Recycling should be considered and implemented at every practicable stage of the project.

5.2 WASTE DISPOSAL
A. Pollution Prevention: The contractor should use prior planning to find those materials and work practices that will minimize the creation of waste in general and hazardous waste in particular.
B. Hazardous Waste Generation, Handling, and Disposal. Work done under this contract is to be performed on a government facility. According to rules and procedures of the United States Environmental Protection Agency, the federal facility is required to have a generator identification number under the Resource Conservation and Recovery Act (RCRA) and to be responsible for wastes (as defined under RCRA) produced, managed, stored, disposed on, or transported from the facility. Accordingly, Contractor will, to the greatest extent practicable, use materials, processes, and techniques that will avoid the creation of hazardous waste. Contractor shall prepare and follow a written waste management and disposal plan for all hazardous wastes generated on the site. Prior to generation of any hazardous wastes, contractor will coordinate planned activities regarding hazardous materials and hazardous waste with the Contracting Officer. Contractor shall submit a written waste management plan, through the contracting officer, to installation environmental office. Contractor shall follow this plan once it has been approved by the contracting officer. Under no circumstances will contractor bring onto the site hazardous waste that has been generated elsewhere. All hazardous waste will be properly disposed of by the Contractor in accordance with all federal, state, and local requirements.
C. Disposal of Non-RCRA Wastes.
All non-hazardous wastes generated on the site as a result of this contract must be disposed of properly, in accordance with all federal, state and local requirements. Materials will be recycled whenever practicable. Prior to creation of such wastes, the contractor shall submit to the
installation environmental management function, through the Contracting Officer, a plan for
disposal of wastes. Such plan shall include the types of waste to be created, how they shall be
stored, managed and disposed. Contractor shall follow this plan once it has been approved by the
installation and contracting officer. Such wastes will not be created until approved by the
Contracting Officer.

D. Construction Debris.

1. Debris from demolition of existing structures will be removed to a location off the installation.

2. Debris will be recycled or disposed of in accordance with all applicable federal, state and
local rules. Such debris must be free of all contamination, including but not limited to, lead
paint, asbestos, and insecticides. Prior to removal of any construction debris, that debris must
be certified by the installation to be free of contamination and of no value to the United
States, and this certification must be provided to the contracting officer. To expedite work,
this may be accomplished by suitable electronic means, however, the original certification
form must be provided to the contracting officer. No form is prescribed for this certification so
long as all necessary information is provided and the document is signed by an authorized
installation representative. However, an example is provided at below and this form may be
used. All construction debris removed from the installation must be covered by a certification.
The contractor must arrange with the installation POC whether all debris will be covered by
one certification or if several certifications will be required.

E. Consolidated Waste Disposal Plans: Contractor may, at contractor’s option, submit for approval
as specified above one consolidated plan for handling hazardous and non-hazardous wastes.
INSTALLATION CERTIFICATION FOR CLEAN CONSTRUCTION DEBRIS TO BE REMOVED FROM
EXCHANGE PROJECT SITE

As representative of _____________________________ JBPHH, I am authorized to certify, and hereby
do so certify, that the construction debris to be removed from the EXCHANGE project site at JBPHH,
Hawaii has been inspected and is of no value to the United States and is free of all contamination,
including but not limited to: lead paint, asbestos, PCBs, and pesticides.

CERTIFICATION:

Signed: ____________________________________________ Date: _________________
Printed Name, Rank or Grade, and Duty Title:
_________________________________________________________

ORIGINAL OF THIS FORM MUST BE PROVIDED TO CONTRACTING OFFICER

END OF SECTION 01 35 43
PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. The Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractor(s) to insure conformation to applicable specifications and drawings with respect to the materials, workmanship, construction, finish and functional performance. Tests of materials and/or special inspections will be made, when required by these specifications, by applicable law, rules and regulations in accordance with respective Sections of the specifications. Where required, the Contractor shall employ and pay for the services of an independent agency to perform specific services and testing.

B. The Contractor shall arrange and pay for all services and testing which are not specifically indicated to be provided by EXCHANGE.

C. If a material is not required to be field tested, the Contracting Officer may require the supplier to furnish with each delivery of such material, a certificate bearing legal signature of said supplier, stating that such material complies with specification requirements.

D. If any work or material requiring tests and inspections is executed, enclosed or covered before tests are made, or test reports distributed, then the Contractor shall, at his own expense, uncover such part of this work or material and keep it uncovered until such tests and inspections have been made and test reports distributed. If work or material so tested and inspected shall not be found to conform to the requirements of the Construction Documents, it shall be deemed and construed to be defective materials or faulty workmanship and the Contractor, at his own expense, shall replace work or material removed and repair all work disturbed thereby.

1.2 EXCHANGE RESPONSIBILITY

A. No testing by Exchange.

1.3 CONTRACTORS RESPONSIBILITY

A. Contractor shall employ and pay for the services of an Independent Testing Agency to perform specified quality control testing during construction indicated in the following sections:

1. Testing Adjusting and Balancing for HVAC: Section 23 01 00.

B. Cooperate with the Contracting Officer and laboratory personnel and provide access to work an to manufacturer’s operations. Provide samples of materials to be tested, in required quantities. Furnish casual labor and facilities required to provide access to work to be tested; to obtain and handle samples at the site; to facilitate inspections and tests; and for laboratory’s exclusive use for storage and curing of test samples. Notify laboratory sufficiently in advance of operations to allow for its assignment of personnel and scheduling of tests.
C. The use of independent testing services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the plans and specifications.

D. The Contractor shall coordinate testing laboratories so that the work will be inspected and tested according to contract requirements. This coordinately includes notification of when tests should be taken, easy access to the work, and general cooperation in every way to insure proper control of the work.

E. Upon completion of the project the Contractor shall submit a signed certificate stating tests for this work were made in accordance with provisions of these specifications and, further, all such tests and reports made were reported as required. This certificate shall list all tests and dates when work was completed.

1.4 AGENCY RESPONSIBILITIES

D. Test samples of mixes submitted by Contractor.

E. Provide qualified personnel at site. Cooperate with Contracting Officer and Contractor in performance of services.

F. Perform specified sampling and testing of Products in accordance with specified standards.

G. Ascertain compliance of materials and mixes with requirements of Contract Documents.

H. Promptly notify Contracting Officer, and Contractor of observed irregularities or non-conformance of Work or Products.

I. Perform additional tests required by Contracting Officer.

J. Provide Contracting Officer with three (3) copies of each written test report, and the Contractor each with one copy of each test report. Each report shall include:

1. Date issued.

2. Project title and number.

3. Testing Laboratory name, address and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature.

7. Date of test.

8. Identification of product and specification section.

9. Location of sample or test in the project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by the Contracting Officer.

H. Upon completion of the project, the testing agency shall prepare a certificate, certified in the presence of a Notary Public, stating testing for this work was conducted in accordance with the provisions of these specifications, and further, all tests and reports were provided for this job were reported as required.
1.5 LIMITS ON TESTING AUTHORITY
   A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   B. Agency or laboratory may not approve or accept any portion of the Work.
   C. Agency or laboratory may not assume any duties of Contractor.
   D. Agency or laboratory has no authority to stop the Work.

1.6 RELATED REQUIREMENTS
   A. Required Submittals Section 01 33 00.
   B. Related requirements and tests specified in Division 2 through 33.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 40 00
SECTION 01 50 00
TEMPORARY FACILITIES, BARRIERS AND CONTROLS

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.

1.2 SUMMARY
A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
B. Related Requirements:
   1. Section 01 10 00 Summary of Project for work restrictions and limitations on utility interruptions.
   2. Section 01 59 00 Field Offices and Sheds

1.3 USE CHARGES
A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner’s construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
C. Electric Power Service from Existing System: Electric power from Owner’s existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
D. Sewer, Water, and Electric Power Service: Use charges are specified in Division 01.

1.4 INFORMATIONAL SUBMITTALS
A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE
A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board’s ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS
A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner’s acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Interior Barriers for Phasing: Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2, secured to temporary wood or metal framework without excess sagging or pillowing.
B. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

2.2 TEMPORARY FACILITIES
A. Storage and Fabrication Sheds: Provide temporary storage sheds as necessary to accommodate weather-sensitive materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.3 EQUIPMENT
A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.
PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
   1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION
A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to private system as directed by authorities having jurisdiction.
C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
D. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
F. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
G. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
      a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.

3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

H. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

I. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

1. Connect temporary service to Owner's existing power source, as directed by Owner.

J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Parking: Use designated areas of Owner's existing parking areas, if available and approved by the Exchange for construction personnel.

C. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION
A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Section 01 10 00 Summary of Project.

C. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL
   A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
   B. Maintenance: Maintain facilities in good operating condition until removal.
   C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
   D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
      1. Materials and facilities that constitute temporary facilities are property of Contractor.
      2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 Project Closeout.

END OF SECTION 01 50 00
SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water and sanitary facilities.

1.2 RELATED SECTIONS
A. Section 01 59 00 - Field Offices, Storage Sheds.
B. Section 01 50 00 – Temporary Facilities, Barriers and Controls
C. Section 01 77 00 - Project Closeout.

1.3 TEMPORARY ELECTRIC
A. The contractor shall furnish and install a complete, temporary electric service for construction needs throughout the construction period.
  1. The temporary electric service shall originate from within the existing building. The electrical contractor shall be responsible for furnishing and installing all fused cutouts, conductors, disconnects, and miscellaneous hardware.
  2. The temporary electric service shall be a 120/208 volt, 3 phase, 4 wire, 200 amp service for construction operations.
  3. Provide power centers, located such that all points of the construction area can be reached with extension cords no more than 100 feet long. Provide 20 amp, 120 and 208 volt grounded outlets, for use by all trades, each protected by a circuit breaker.
  4. The Contractor will not be charged for a reasonable amount of electricity consumed. The contractor shall maintain strict conservation measures to prevent wasteful use of electricity.
  5. Use of electric resistance heating devices is not permitted.
  6. Unusually heavy electric loads, such as electric welding equipment, and other equipment with special power requirements shall not be connected to the existing system.
B. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of five (5) foot candles.
  1. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
  2. Provide guarded lighting sockets and lamps. Use 100 watt lamps, minimum. Maintain 110 volts in lighting system.
  3. Maintain lighting and provide routine repairs.
  4. Permanent building lighting may be utilized during final stages of construction.
D. Standards: the temporary electric service shall comply with the National Electric Code. Extension cords used by any and all trades, shall be UL approved. No temporary power is to come from the building.

1.4 TEMPORARY HEATING – AS APPLICABLE

A. General: The Contractor shall provide, install and maintain temporary heat in the construction areas throughout the construction period to facilitate the progress of work, protect work against cold, dampness, condensation, and to provide suitable ambient temperatures and humidity levels for proper installation and curing of materials.

B. Requirements: The Contractor shall provide and maintain temporary heat meeting the following requirements:

1. As required under each individual specification section for proper placement, setting, and curling of materials.

2. Maintain a minimum temperature of 40 degrees F. For twenty four (24) hours a day during placing, setting, and curing of cementsation materials.

3. Maintain a minimum temperature of 50 degrees F., or as required under each individual specification section, for twenty four (24) hours a day, seven (7) days prior to, and during installation of all finish materials, including but not limited to: resilient flooring and base, carpet, paint and wall covering, tile work, acoustic ceilings, and all finish woodwork.

4. Maintain a minimum temperature of 65 degrees F. For twenty four (24) hours a day from the time of placement until beneficial occupancy, for installation all finish materials, including but not limited to: resilient flooring and base, carpet, paint and wall covering, tile work, acoustic ceilings and all finish woodwork.

C. The Contractor may use the existing permanent heating system for temporary heat during construction, supplemented by temporary equipment if needed, under the following conditions:

1. Use of the existing permanent equipment does not spread hazardous or objectionable dust, fumes, mists, vapors, gases or odors into areas occupied by EXCHANGE or other Personnel or customers.

2. Use of the existing permanent equipment does not damage or cause excessive wear to the equipment.

3. The Contractor shall provide and pay for operation, maintenance, and replacement of filters and worn or damaged parts on the equipment used.

D. The Contractor will not be charged for a reasonable amount of fuel or energy used by the existing permanent equipment. The Contractor shall maintain strict conservation measures to prevent waste of fuel or energy.

E. The Contractor shall pay for the fuel consumed by temporary heating devices.

F. Temporary equipment using electric resistance heating is not permitted.

1.5 TEMPORARY COOLING
A. The Contractor may utilize the existing cooling system, extend and supplement with temporary cooling devices as needed to maintain specified conditions for construction operations.
B. The Contractor will not be charged for a reasonable amount of fuel or energy consumed by the existing system. The Contractor shall maintain strict conservation measures to prevent waste of fuel or energy.

1.6 TEMPORARY VENTILATION
A. The Contractor shall provide adequate ventilation to:
   1. Aid in curing installed materials.
   2. Dispersal of humidity.
   4. Prevent hazardous accumulations of dust, fumes, mists, vapors, or gases in areas occupied during construction.
B. The Contractor may use the existing, permanent ventilating equipment, supplemented by temporary equipment, if required, under the following conditions:
   1. Use of the existing, permanent equipment does not spread hazardous or objectionable dust, fumes, mists, vapors, gases, or odors into areas of the building occupied by EXCHANGE personnel or customers.
   2. Use of the existing, permanent equipment does not cause damage to equipment.
   3. The Contractor shall provide and pay for operation, maintenance, and replacement of filters and worn or damaged parts on the equipment used.

1.7 TEMPORARY WATER SERVICE
A. Connect to existing water source for construction operations at time of project mobilization.
B. The Contractor will not be charged for a reasonable amount of water consumed for construction purposes. The Contractor shall maintain strict conservation measures to prevent waste of water.
C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 SECURITY AND PROTECTION FACILITIES INSTALLATION
A. Temporary Barriers: Provide floor-to-ceiling dustproof barriers to limit dust and dirt migration and to separate areas occupied by EXCHANGE and tenants from fumes and noise.
   1. Dust Barrier: Where dust barriers are required, provide a single layer of 6 mil fire resistant clear polyethylene fiberglass reinforced sheet as manufactured by Griffolyn, or equal. Tape
all joints and provide fire resistive treated 2 x 4 wood or metal stud top and bottom runners and
verticals 4 foot o.c. with polyethylene sheet wrapped and taped to the runners.

2. Opaque Dust Barrier: Where dust barriers are required and where indicated for long duration
separation of construction operations from EXCHANGE and tenant spaces, provide braced
metal stud framing covered on construction side with 6 mil fire resistant clear polyethylene
fiberglass reinforced sheet as manufactured by Griffolyn, or equal. Tape all joints and
perimeter. Provide ½ inch gypsum board, fire taped on the EXCHANGE/tenant side from floor
to ceiling. Provide R-11 batt insulation for thermal separation from unconditioned construction
areas and noise reduction adjacent to sales, food service or office areas.

B. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed
to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in construction areas.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources
of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at
Project site. Review needs with local fire department and establish procedures to be followed.
Instruct personnel in methods and procedures. Post warnings and information.

END OF SECTION 01 51 00
SECTION 01 71 00
CLEANING

PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Progress Cleaning.
B. Final Cleaning.

1.2 RELATED SECTIONS
A. General Provisions of the Contract.
B. Section 01 10 00 – Summary of Project.
C. Section 01 14 50 - Cutting and Patching.
D. Section 01 55 00 – Temporary Facilities, Barriers and Controls.
E. Individual Specification Sections - Cleaning Requirements.

1.3 SAFETY REQUIREMENTS
A. Standards: Maintain project in accordance with the following safety and insurance standards:
B. O.S.H.A. Standards:
   1. The Contractor shall be required to comply with OSHA Requirements in 29 CFR 1926 and 29 CFR in 1910. The OSHA Standards are subject to change, and such changes may affect the Contractor in his performance under the contract. It is the Contractor’s responsibility to know such changes, effective dates of changes, and comply with all requirements.
C. Hazards Control:
   1. Store volatile wastes in covered metal containers and remove from premises daily.
   2. Prevent accumulation of wastes which create hazardous conditions.
   3. Provide adequate ventilation during the use of volatile or noxious substances.
D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste materials on the installation.
   2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.
B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING
A. Execute cleaning to ensure that the building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
B. Maintain site in a clean and orderly condition.
C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
D. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off of Government property.
E. Vacuum clean interior building areas when ready to receive finish painting, and continue cleaning to eliminate dust.
F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Open free-fall chutes are not permitted.
G. Schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING
A. Employ professional cleaners for final cleaning.
B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces.
C. Remove grease, dust, dirt, stains, temporary labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine; finish vacuum carpeted and soft surfaces.
D. Repair, patch, and touch-up marred surfaces to specified finish, to match adjacent surfaces.
E. Clean all glass.
F. Replace air conditioning filters if units were operated during construction.
G. Clean ducts, blowers, and coils, if air H.V.A.C. units were operated without filters during construction.
H. Maintain cleaning until project, or portion thereof, is occupied by EXCHANGE.

END OF SECTION 01 71 00
SECTION 01 77 00
PROJECT CLOSEOUT

PART 1 – GENERAL

1.1 SECTION INCLUDES:
   A. Substantial Completion.
   B. Final Inspections.
   C. Closeout Submittals.
      1. Operation and Maintenance Manuals.
      2. Operation and Maintenance Instruction.

1.2 RELATED SECTIONS:
   A. General Provisions of the Contract: Final Acceptance and Payment.
   B. Section 01 33 00 – Submittal Procedures.
   C. Section 01 71 00 - Cleaning.
   D. Section 01 72 39 - Project Record Documents.

1.3 SUBSTANTIAL COMPLETION:
   A. Preliminary Procedures: Before requesting inspection, complete the following.
      1. Contractor's list of incomplete items (punch list) prepared.
         a. Submit PDF electronic file.
         b. Submit paper copies.
      2. Owner advised of pending insurance changeover.
      3. Warranties, maintenance service agreements, and similar documents submitted.
      4. Releases, occupancy permits, and operating certificates submitted.
      5. Project Record Documents submitted.
      6. Tools, spare parts, and extra materials delivered.
      7. Final changeover of locks performed.
      8. Startup testing completed.
     10. Temporary facilities removed.
     11. Owner advised of heat and utility changeover.
     13. Owner's personnel instructed in operation, adjustment, and maintenance of equipment and systems, including demonstration and training videotapes submitted.

   B. Contractor:
      1. Submit written certification to Contracting Officer that project, or designated portion of Project, is substantially complete.
2. Submit list of major items to be completed or corrected.

C. Contracting Officer will make an inspection after receipt of certification.

D. Should Contracting Officer consider that work is substantially complete:
   1. Contractor shall prepare, and submit to Contracting Officer, a list of items to be completed or corrected, as determined by the inspection.

2. Contracting Officer will prepare and issue a Certificate of Substantial Completion, containing:
   a. Date of Substantial Completion.
   b. Contractor's list of items to be completed or corrected, verified, and amended by Contracting Officer.
   c. The time within which Contractor shall complete or correct work of listed items.
   d. Time and date EXCHANGE will assume possession of work or designated portion thereof.
   e. Responsibilities of EXCHANGE and Contractor for:
      (1) Utilities.
      (2) Operation of mechanical, electrical, and other systems.
      (3) Maintenance and cleaning.
      (4) Security.
   f. Signatures of:
      (1) Contracting Officer.
      (2) Contractor.

3. EXCHANGE occupancy of project or designated portion of project:
   a. Contractor shall:
      (1) Perform final cleaning in accordance with Section 01 71 00.
   b. EXCHANGE will occupy project, under provisions stated in Certificate of Substantial Completion.

4. Contractor: Complete work listed for completion or correction, within designated time.

E. Should Contracting Officer consider that work is not substantially complete:
   1. Contracting Officer shall immediately notify Contractor, in writing, stating reasons.

   2. Contractor: Complete work, and send second written notice to contracting officer, certifying that project, or designated portion of project, is substantially complete.

   3. Contracting Officer will re-inspect work.

1.4 FINAL INSPECTION

A. Contractor shall submit written certification that:
   1. Contract documents have been reviewed.
   2. Project has been inspected for compliance with contract documents.
   3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in presence of Facility Representatives and are operational.
5. Project is completed and ready for final inspection.
B. Contracting Officer will make final inspection after receipt of certification.
C. Should the Contracting Officer consider that work is finally complete in accordance with requirements of contract documents, he shall request contractor to make project closeout submittals.
D. Should the Contracting Officer consider that work is not finally complete:
1. He shall notify contractor, in writing, stating reasons.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Contracting Officer certifying that work is complete.
3. The Contracting Officer will re-inspect work.
1.5 PROJECT RECORD DOCUMENTS:
A. Project Record Documents: Specified requirements of Section 01 78 39.
B. Upon completion of the Project, final record drawings (As Built drawing sets) in hardcopies and in CD/electronic copies shall be provided to Naval FEC/APWO NAVFAC HI. Documents in electronic such as as-built drawings shall be in pdf and in AutoCAD. Other closeout documents O&M manuals, warranties, etc. shall also be provided.
1.6 OPERATION AND MAINTENANCE MANUALS:
A. Submit data bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.
B. Prepare binder cover with printed title "Operation and Maintenance Manuals", title of project, and subject matter of binder when multiple binders are required.
C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
D. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on 20 pound white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Value chart.
f. Maintenance instructions for equipment and systems.
g. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties.
   e. Training Sessions attendance roster.
   f. Warrantees.

E. Submit six (6) copies of the operation and maintenance manuals to the Contracting Officer.

1.7 OPERATION AND MAINTENANCE INSTRUCTION:
   A. The Contractor shall provide, at his expense, manufacturer's representatives to completely check out all mechanical and electrical systems and items covered by the drawings and specifications. This requirement shall be scheduled just prior to, and during the initial start-up. After all systems are functioning properly, the representatives shall instruct Facility Maintenance Personnel in the proper operation and maintenance of each item.

1.8 DD FORM 1354:
   A. Preparation of DD Form 1354 "Transfer and Acceptance of Military Real Property": At the conclusion of the project the Contractor will compile and furnish to the Contracting Officer certain costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data are required will be furnished to the Contractor. Such information will be returned to the Contracting Officer within 10 days from the receipt of the list. Form is attached at the end of Division 1.

1.9 WARRANTY AND EXTENDED WARRANTIES:
   A. Upon completion of project, prior to final payment, guarantees required by technical divisions of Specifications shall be properly executed in quadruplicate by subcontractors and submitted to Contracting Officer. Delivery of guarantees shall not relieve contractor from any obligation assumed under contract.
   B. Submit guarantee covering entire project for one year. In addition, where separate guarantees, for certain portions of work, are for longer periods, General Contractor's guarantee shall be extended to cover such longer periods.
   C. Guarantees shall become valid and operative upon issuance of Certificate of Inspection and Acceptance by EXCHANGE. Guarantees shall not apply to work where damage is a result of abuse, neglect by EXCHANGE, or his successor(s) in interest.

**PART 2 – PRODUCTS (NOT USED)**
PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 77 00
SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 DESCRIPTION
A. Submittals: Section 01 33 00 – Submittal Procedures.

1.2 RECORD FIELD DATA
A. General: Maintain at job site, two complete sets of Contract Documents. During construction, both sets shall be marked to show all deviations in actual construction from the Contract Documents.
   1. Red Markers: Indicate all additions.
   2. Green Markers: Indicate all deletions.
B. Record Documents: The drawings shall show, but no be limited to, the following information:
   1. Locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. Include dimensions and/or survey coordinates to permanent features.
   2. Locations and dimensions of any changes within the building or structure and the accurate location and dimension of all underground utilities and facilities.
   3. Changes in details of design or additional information obtained from shop drawings prepared or furnished by the Contractor including, but not limited to:
      a. Fabrication erection
      b. Installation and placing details
      c. Pipe sizes
      d. Insulation materials
      e. Equipment pad dimensions
   4. All changes or modifications from the original design.
   5. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the Record Drawings. The option not used shall be deleted.
C. Record Field Data: All deviations shall be shown in the same general detail utilized in the Contract Documents. Marking of the documents shall continue throughout construction to keep the documents up to date.
   1. Additional Data: The Contractor shall maintain the following:
      a. Full size marked-up drawings.
      b. Survey notes
      c. Sketches
      d. Nameplate data
      e. Pricing information
f. Description and serial number of all equipment

2. Record field data shall be available for inspection by the Contracting Officer whenever requested and shall be jointly inspected for accuracy and completeness by the Contracting Officer and Contractor. Failure to keep record field data current shall be sufficient justification to withhold a retained percentage from the monthly Application for Payment.

D. Submittal of Record Field Data:

1. Submit two sets to the Contracting Officer a minimum of 20 calendar days prior to the date of final inspection.

2. The Contractor shall make all corrections identified during Contractor Officer review and resubmit corrected data within ten (10) calendar days of receipt.

3. When data is accepted as complete, one set of documents will be returned to the Contractor for completion of the Record Documents.

1.3 RECORD ELECTRONIC FILE DOCUMENTS

A. Electronic File Format: No earlier than 30 days after award, the Contracting Officer will provide one set of AutoCAD electronic file format contract drawings to be used for preparation of Record Drawings.

1. Media: ISO – 9660 CD

2. The Contractor shall verify usability of AutoCAD files and notify the Contracting Officer of any discrepancies within 30 calendar days of receipt. Any discrepancies will be corrected and files returned to the Contractor.

3. The Contractor shall incorporate all deviations from the original Contract Documents as recorded in the approved “Record Field Data” as indicated in Paragraph 1.2.C above.

4. The Contractor shall also incorporate all written modifications to the Contract Documents which were issued by amendment or contract modification.

5. All revisions and changes shall be incorporated:
   a. Items marked deleted shall be deleted.
   b. Clouds around new items shall be removed.

B. Electronic File Submittal: Submit a complete set of Record Drawings in AutoCAD electronic file format no later than 30 days after final acceptance. The Record Drawings shall be done in equal quality to the originals, including line work, line weights, lettering and symbols. Identify each drawing with the word “RECORD” in block letters at least 3/8” high above the title block. The date of completion and the words “Revised Record” shall be placed in the revision block above the latest revision notation.

1. Format: AutoCAD Release 2005 ‘DWG’ format. All support files required to display or plot the files in the same manner as they were developed shall be delivered along with the files, including but not limited to:
   a. Font files
b. Menu files
c. Plotter setup
d. Referenced files

2. Layering: Conform to AIA Standard Document, “CAD Layer Guidelines,” latest version. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the standard AIA CAD Layer Guidelines including any user definable fields permitted by the guidelines shall be provided with each submittal.

3. Electronic File Deliverable Media: ISO 9660 Format CD-ROM. Submit three (3) complete sets of disks and one complete set of full size reproducible prints taken from the disks. Each disk shall have a clearly marked label stating the Contractor’s firm name, project name and location, submittal type (record) and date. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with tabulated information about each file as shown below:

   Electronic File Name Plate Number Drawing Title
   a. Include electronic version of the table.

4. Submit one copy of the CD-Rom and one set of full-size Mylar re-producibles of the drawings to (Building Records staff person) at (Post or Base).

1.4 SUBMITTAL OF FINAL RECORD DRAWINGS

A. Complete and return the final record documents and the approved preliminary record documents to the Contracting Officer within 30 calendar days of final acceptance.
   1. All drawings from the original contract documents shall be included, including drawings where no changes were made.
   2. The drawings will be returned to the Contractor if corrections are necessary.
   3. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within seven (7) calendar days of receipt.

1.5 RECORD DOCUMENT COST

A. All costs incurred by the Contractor in the proportion and furnishing of record documents, including electronic file format, shall be included in the contract price and no separate payment will be made for this work.
   1. Approval and acceptance of the final record documents shall be accomplished before final payment is made to the Contractor.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)
SECTION 02 41 16
SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary
      Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Demolition and removal of selected portions of a building.
      2. Demolition and removal of selected site elements.
      3. Removal of selected interior finishes in areas to be modernized.
      4. Patching and repairs.
      5. Salvage existing items to be reused or recycled.
   B. Work by Others: Elements of selective demolition will be accomplished by EXCHANGE or the
      Army Air Force Exchange Service under separate contracts:
         1. Fixture removal/relocation.
   C. Related Sections: The following Sections contain requirements that relate to this Section:
      1. Division 1 Section "Summary of Project" for use of the building and phasing requirements.
      2. Division 1 Section "Temporary Facilities, Barriers and Controls" for temporary utilities,
         temporary construction and support facilities, temporary security and protection facilities, and
         environmental protection measures for selective demolition operations.
      3. Division 22 Sections for cutting, patching, or relocating Plumbing items.
      4. Division 23 Sections for cutting, patching, or relocating HVAC items.
      5. Division 26 Sections for cutting, patching, or relocating Electrical items.

1.3 DEFINITIONS
   A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged,
      or to remain EXCHANGE property.
   B. Remove and Salvage: Items indicated to be removed and salvaged remain EXCHANGE property.
      Remove, clean, and pack or crate items to protect against damage. Identify contents of
      containers and deliver to EXCHANGE designated storage area.
   C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for
      reuse; store and protect against damage. Reinstall items in the same locations or in locations
      indicated.
   D. Existing to Remain: Protect construction indicated to remain against damage and soiling during
      selective demolition. When permitted by the Contracting Officer, items may be removed to a
suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP
A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain EXCHANGE property, demolished materials shall become the Contractor's property and shall be removed from the site and legal disposed of off Installation.
  1. See Section 01 13 01.

1.5 SUBMITTALS
A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.
B. Schedule of selective demolition activities indicating the following:
  1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
  2. Interruption of utility services.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of EXCHANGE' on-site operations.
  5. Coordination of EXCHANGE' continuing occupancy of portions of existing building and of EXCHANGE' partial occupancy of completed Work.
C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.
D. Record drawings at Project close-out according to Division 1 Section "Closeout Procedures."
  1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.6 PROJECT CONDITIONS
A. EXCHANGE will occupy portions of the building immediately adjacent to selective demolition area. Conduct selective demolition so that EXCHANGE' operations will not be disrupted. Provide not less than 72 hours' notice to EXCHANGE of activities that will affect EXCHANGE' operations.
B. EXCHANGE assumes no responsibility for actual condition of buildings to be selectively demolished.
  1. Conditions existing at time of inspection for bidding purpose will be maintained by EXCHANGE as far as practical.
C. Hazardous Materials: Asbestos and lead paint are not known to be present in areas of demolition. Reference Spec 01 10 00, 1.26. See Exhibit "A" Hazmat Report
PART 2 - PRODUCTS

2.1 REPAIR MATERIALS
   A. Use repair materials identical to existing materials.
      1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
      2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Verify that utilities have been disconnected and capped.
   B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
   C. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Contracting Officer.
   D. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.
   E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES
   A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
      1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by EXCHANGE and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to EXCHANGE and to governing authorities.
         a. Provide not less than 72 hours' notice to EXCHANGE if shutdown of service is required during changeover.
   B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
      1. Arrange to shut off indicated utilities with utility companies.
      2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
3. 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 after bypassing.

C. Utility Requirements: Refer to Divisions 22, 23, and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION
A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from EXCHANGE and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
D. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof partitions of not less than nominal 4-inch (100-mm) studs, 5/8-inch (16-mm) gypsum wallboard with joints taped on occupied side, and 1/2-inch (13-mm) fire-retardant plywood on the demolition side.
2. Insulate partition to provide noise protection to occupied areas.
3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
4. Protect air-handling equipment.

3.4 POLLUTION CONTROLS
A. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

3.5 SELECTIVE DEMOLITION
A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

4. Maintain adequate ventilation when using cutting torches.

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. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

8. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.

9. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.

C. Break up and remove concrete slabs on grade, unless otherwise shown to remain.

D. Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum.

1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

3.6 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Patching is specified in Division 1 Section "Cutting and Patching."

C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
D. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

E. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.
   1. Closely match texture and finish of existing adjacent surface.
   2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
   3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
   4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   5. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.

F. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS
   A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
   B. Burning: Do not burn demolished materials.
   C. Disposal: Transport demolished materials off EXCHANGE' property and legally dispose of them. Dispose all contaminated materials to an approved disposal site.

3.8 CLEANING
   A. Sweep the building broom clean on completion of selective demolition operation.
   B. Change filters on air-handling equipment on completion of selective demolition operations.

END OF SECTION 02 41 16
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplementary Conditions
      and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section specifies cast-in-place concrete, including formwork, reinforcing, mix design,
      placement procedures, and finishes.
   B. Related Sections:
      RETAIN SECTIONS IN SUBPARAGRAPHS BELOW THAT CONTAIN REQUIREMENTS
      CONTRACTOR MIGHT EXPECT TO FIND IN THIS SECTION BUT ARE SPECIFIED IN OTHER
      SECTIONS.
      1. Division 03 Section "Architectural Concrete" for general building applications of specially
         finished formed concrete.
      2. Division 03 Section "Concrete Topping" for emery- and iron-aggregate concrete floor
         toppings.
      REVISE BELOW TO SUIT PROJECT.

1.3 SUBMITTALS
   A. General: Submit the following in accordance with Conditions of Contract and Division 1
      Specification Sections.
      REVISE BELOW TO SUIT PROJECT.
   B. Product Data: For proprietary materials and items, including reinforcement and forming
      accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds,
      dry-shake finish materials, and others as requested by Contracting Officer.
      DELETE BELOW IF NOT REQUIRED. REVIEW WITH GOVERNING AUTHORITIES CONCERNING
      DESIGN RESPONSIBILITY.
   C. Shop drawings for reinforcement for fabrication, bending, and placement of concrete
      reinforcement. Comply with ACI SP-66 (88), "ACI Detailing Manual", showing bar schedules,
      stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include
      special reinforcement required for openings through concrete structures. All wall reinforcement
      must be shown in elevation.
      DELETE BELOW IF NOT REQUIRED. INDICATE LOCATION OF SPECIALTY FINISHES.
D. Samples of materials as requested by Contracting Officer, including names, sources, and descriptions.

**BELOW ARE EXAMPLES ONLY. REVISE TO SUIT PROJECT OR DELETE IF NONE REQUIRED.**

E. Laboratory test reports for concrete materials and mix design test.

**DELETE BELOW IF LABORATORY TEST REPORTS ARE REQUIRED FOR ALL MATERIALS.**

F. Materials certificates in lieu of materials laboratory test reports when permitted by Contracting Officer. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

G. LEED Submittals:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
   2. Product Data for Credit IEQ 4.3: For liquid floor treatments and curing and sealing compounds, documentation including printed statement of VOC content.
   3. Design Mixtures for Credit ID 1: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.

**ADD PROVISIONS FOR SPECIAL FINISH MOCKUPS IF REQUIRED.**

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
   1. ACI 318, "Building Code Requirements for Reinforced Concrete."
   2. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
   3. ACI 301 "Specifications for Structural Concrete for Buildings."

**REVISE BELOW IF OWNER PROVIDES TEST LAB SERVICES OR IF TESTING IS PROVIDED UNDER "ALLOWANCES." COORDINATE WITH SECTION 01400 AND WITH QUALITY CONTROL TESTING IN PART 3.**

B. Concrete Testing Service: Engage a testing laboratory acceptable to Contracting Officer to perform material evaluation tests for submittal.

C. EXCHANGE will engage and pay a testing lab to control testing during construction described by Item 3.16 below.

**COORDINATE BELOW WITH DRAWINGS FOR SIZE AND LOCATION.**

D. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense. Allow free access to material stockpiles and facilities.
PART 2 - PRODUCTS

2.1 FORM MATERIALS

CAREFULLY REVIEW THE FOLLOWING AND DELETE OR REVISE TO SUIT PROJECT.

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide panel with sufficient thickness to withstand pressure of newly-placed concrete without how or deflection.
   1. Use exterior grade plywood complying with U.S. Product Standard PS-1 Medium Density Overlay, Class 1 or better, mill-oiled and edge-sealed.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

ADD SPECIFIC FORM LINER REQUIREMENTS FOR TEXTURED FINISH.

C. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface.

REVIEW BELOW WITH DESIGNERS AND REVISE IF REQUIRED.
   1. Provide ties that, when removed, will leave holes not larger than 1 inch diameter in concrete surface.

2.2 REINFORCING MATERIALS

DELETE, REVISE, OR ADD BELOW TO SUIT REINFORCEMENT REQUIREMENTS. SEE THE EVALUATIONS FOR DETAILED INFORMATION ON REINFORCING MATERIALS.

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed for #4 and larger bars. ASTM A 615, Grade 40, deformed for #3 bars.

REVISE BELOW TO CLASS I FOR HEAVIER (3-OUNCE) ZINC COATING, IF REQUIRED.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.


D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

DELETE OR REVISE BELOW TO SUIT PROJECT.
   1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
E. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than (25)(60) <Insert number> percent.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.
   1. Use one brand of cement throughout project.

B. Normal-Weight Aggregates: ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.
   1. For exposed exterior surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.

ADD SPECIFIC AGGREGATE REQUIREMENTS TO SUIT PROJECT.

2. Local aggregates not complying with ASTM C 33 but that special tests or actual service have shown to produce concrete of adequate strength and durability may be used when acceptable to Contracting Officer.

C. Water: Potable.

DELETE BELOW IF NOT REQUIRED. REVISE IF OTHER TYPE OF FIBER REQUIRED. SEE THE EVALUATIONS.

D. Admixtures, General: Provide admixtures for concrete that contain not more than 0.1 percent chloride ions. Calcium chloride is not acceptable. Provide admixture manufacturer's written certification that chloride ion content complies with specific requirements.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
   1. Products: Subject to compliance with requirements, provide one of the following:
      b. "Air-Mix" or "Perma-Air", Euclid Chemical Co.
      c. "Darex AEA" or "Daravair", W.R. Grace & Co.
      d. "MB-VR" or "Micro-Air", Master Builders, Inc.
      f. "Sika AER", Sika Corp.

REVISE BELOW IF REQUIRED. SEE THE EVALUATIONS.

F. Water-Reducing Admixture: ASTM C 494, Type A.
   1. Products: Subject to compliance with requirements, provide one of the following:
      b. "PSI N", Cormix.
      c. "Eucon WR-75", Euclid Chemical Co.
      e. "Pozzolith Normal" or "Polyheed", Master Builders, Inc.
g. "Plastocrete 161", Sika Corp.

G. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G.
1. Products: Subject to compliance with requirements, provide one of the following:
   b. "PSI Super", Cormix.
   c. "Eucon 37", Euclid Chemical Co.
   d. "WRDA 19" or "Daracem", W.R. Grace & Co.
   e. "Rheobuild", Master Builders, Inc.
   g. "Sikament 300", Sika Corp.

H. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. "Q-Set", Conspec Marketing & Manufacturing Co.
   b. "Gilco Accelerator", Cormix.
   c. "Accelguard 80", Euclid Chemical Co.
   e. "Pozzutec 20", Master Builders, Inc.

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
1. Products: Subject to compliance with requirements, provide one of the following:
   b. "Eucon Retarder 75", Euclid Chemical Co.
   d. "Pozzolith R", Master Builders, Inc.
   e. "Protard", Prokrete Industries.

2.4 RELATED MATERIALS

COORDINATE THE FOLLOWING RELATED MATERIALS FOR SIZES AND LOCATIONS ON DRAWINGS. DELETE BELOW IF NONE.

A. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
   1. Waterproof paper.
   2. Polyethylene film.
   3. Polyethylene-coated burlap.

B. Cure and Seal Compound: Typical concrete slab liquid membrane forming curing compound to be "Ashford Formula", Concrete Distribution, Inc., 1203 W. Spring Creek Place, Springville UT 84663 (801-489-5663) approximately 200 square feet per gallon in locations not receiving polished concrete floor finish.
2.5 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Contracting Officer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

B. Slabs on Grade: It is the intent of the design that slabs on grade receive special attention for mix design. The submitted slab mix design is to incorporate proportioning to minimize paste content (minimize total water content) and provide a well-graded aggregate with maximum aggregate size (1" preferred). Gap graded mixes with primarily ¾" aggregate and sand will not be allowed.

C. Submit written reports to Contracting Officer for each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Contracting Officer.

REVISE SAMPLE FIGURES BELOW (FROM ACI 318) TO SUIT PROJECT. DELETE TYPES NOT REQUIRED. IF USING A CONCRETE SCHEDULE FOR STRENGTHS ABOVE 4000 PSI, ESTABLISH PROPORTIONS BASED ON ACI 318--SECTION 4.3.

D. Design mixes to provide normal weight concrete properties as indicated on the structural drawings and schedules.

COORDINATE BELOW WITH STRUCTURAL ENGINEER.

E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Contracting Officer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Contracting Officer before using in Work.

2.6 ADMIXTURES

REVISE THIS ARTICLE TO SUIT PROJECT REQUIREMENTS. COORDINATE ADMIXTURES WITH STRUCTURAL ENGINEER.

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use nonchloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

EDIT EXAMPLES BELOW TO SUIT PROJECT.

C. Use high-range water-reducing admixture (HRWR) in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.
D. Use air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

REVISE BELOW TO SUIT PROJECT OR LOCAL REQUIREMENTS.

1. 5% - 7% as indicated on the drawings.
2. Other concrete (not exposed to freezing, thawing, or hydraulic pressure) or to receive a surface hardener: 2 percent to 4 percent air.

E. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.

F. Slump Limits: For trench work to have slumps limit to 4" with 2500 psi.

2.7 CONCRETE MIXING

DELETE PARA AND SUBPARA BELOW IF NO JOB-SITE MIXING ANTICIPATED.

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.8 REPAIR MATERIALS

A. Repair Underlayment Beneath Floor Finishes: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm).

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.9 CONCRETE TYPES (INTERIOR AND EXTERIOR SLABS):
A. As indicated, provide concrete of specified strengths and mix designs with the following appearance characteristics:
   2. Portland cement, broom finish, exterior.

PART 3 - EXECUTION

3.1 GENERAL
A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 FORMS
A. General: Design, erect, support, brace, and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.
B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

**REVISE BELOW TO INCLUDE OTHER FACTORS PERTINENT TO FIELD PROCEDURES.**

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before concrete placement, as required, to prevent mortar leaks and maintain proper alignment.

3.3 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute’s recommended practice for “Placing Reinforcing Bars,” for details and methods of reinforcement placement and supports and as herein specified.

1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Contracting Officer.

D. Place reinforcement to maintain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 JOINTS

**COORDINATE ALL JOINTS WITH STRUCTURAL ENGINEER. DRAWINGS SHOULD INDICATE DETAIL CONDITIONS AT JOINTS.**

A. Construction Joints: Locate and install construction joints as indicated on the structural drawings or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Contracting Officer.

**REVISE BELOW TO SUIT PROJECT. DELETE IF ON DRAWINGS.**

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Accepted bulkheads designed for this purpose may be used for slabs.
C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

DELETE BELOW IF NONE. REVISE IF USING TYPES OTHER THAN RUBBER OR PVC.

E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere, as indicated.

COORDINATE JOINT FILLER AND SEALANT WITH DIVISION 7 SECTION "JOINT SEALANTS," AS REQUIRED.

1. Joint filler and sealant materials are specified in Division 7 Section "Joint Sealants."

DELETE BELOW IF NONE. REVISE IF PROPRIETARY (SOFCUT) METHOD ALLOWABLE.

F. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth slab depth.

1. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate. Joints MUST be made within 6 hours of finishing floors, and in no case shall cuts be made later than 12 hours from placement.

COORDINATE CONTROL JOINT FILLER MATERIAL WITH DIVISION 7 SECTION "JOINT SEALANTS," AS APPLICABLE.

2. Apply joint sealant to all exposed contraction joints. Color selected to match adjacent surface. Joint sealant material is specified in Division 7 Section "Joint Sealants."

3.5 INSTALLATION OF EMBEDDED ITEMS

ANCHORAGE DEVICES FOR OTHER WORK THAT IS ATTACHED TO OR SUPPORTED BY CAST-IN-PLACE CONCRETE MUST BE SPECIFIED WITH THAT WORK. ADD SPECIFIC REQUIREMENTS FOR INSTALLATION OF EMBEDDED ITEMS, IF ANY THAT ARE PART OF THIS WORK.

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

DELETE TWO PARAS BELOW IF NO REGLETS OR SLOTS. REVISE TO SUIT PROJECT.

COORDINATE WITH DRAWING DETAILS FOR LOCATIONS AND EXTENT.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.6 VAPOR RETARDERS

A. Vapor Retarder: There is no underslab vapor retarder in this project.

3.7 PREPARATION OF FORM SURFACES
A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer’s instructions. Clean reused forms of concrete residue, repair and patch as required to return forms to acceptable surface condition.

DELETE BELOW IF NO STEEL FORMS.

C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.

B. General: Comply with ACI 304, “Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete,” and as herein specified.

C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Hot-Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor’s option.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete.

4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to Contracting Officer.

G. Cold-Weather Placing: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

   a. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

   b. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

3.9 FINISH OF FORMED SURFACES

REVISE BELOW OR ADD TYPES OF FORMED CONCRETE FINISHES TO SUIT PROJECT.
COORDINATE WITH FINISH AND/OR CONCRETE SCHEDULE.

A. Rough-Form Finish: For formed concrete surfaces not exposed to view in the finish Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Form Finish: For formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is
an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

NORMALLY DELETE BELOW AS LABOR-INTENSIVE (COSTLY). BELOW REQUIRE EARLY FORM REMOVAL (2 TO 3 DAYS). RETAIN PARA ABOVE IF SMOOTH-RUBBED FINISH IS USED.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

SELECT TYPE OF SLAB FINISHING REQUIRED; DELETE OTHERS. REVISE SURFACE PLANE TOLERANCES TO SUIT PROJECT. SEE THE EVALUATIONS FOR F-NUMBER DESIGNATIONS.

A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified:

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of overall minimum Ff 35-FI 25 with local minimum Ff 21-FI 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film-finish coating system.

REVISE FLOOR TOLERANCE TO SUIT PROJECT. SEE THE EVALUATIONS.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff20 - FI 17. Grind smooth any surface defects that would telegraph through applied floor covering system, including edge curling at joints.

C. For polished interior concrete finish, refer to Section 03 35 10 “Polished Concrete Floor Finish”.

3.11 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with
manufacturer’s instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

**REVISE THE FOLLOWING TO SUIT PROJECT REQUIREMENTS.**

C. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
   1. Provide moisture curing by following methods:
   RETAIN ALL AS CONTRACTOR OPTIONS UNLESS NOT SUITABLE TO PROJECT.
      a. Keep concrete surface continuously wet by covering with water.
      b. Use continuous water-fog spray.
      c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
   2. Provide moisture-cover curing as follows:
      a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   **REVISE LOCATIONS BELOW TO SUIT PROJECT.**
   3. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs as follows:
      a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
      b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

E. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.

F. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
3.12 REMOVAL OF FORMS

**REVIEW THIS ARTICLE WITH A STRUCTURAL ENGINEER. REVISE OR DELETE AS REQUIRED.**

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

**ADD PROVISIONS FOR IN-PLACE NONDESTRUCTIVE TESTING BELOW IF PERMITTED.**

3.13 REUSE OF FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to Contracting Officer.

3.14 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment. Grout base plates and foundations as indicated using specified non-shrink grout. Use non-metallic grout for exposed conditions.

3.15 CONCRETE SURFACE REPAIRS

**THIS ARTICLE PROVIDES BASIC CRITERIA FOR REPAIRING CONCRETE SURFACES. REVIEW AND REVISE, OR DELETE TO SUIT PROJECT.**

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Contracting Officer.

   1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and
brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.

2. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

ADD PROVISION OF TESTING REPAIR TECHNIQUES ON MOCKUP (IF ANY) BEFORE FINISHED SURFACES, IF REQUIRED.

B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Contracting Officer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, that contain defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces that contain defects that affect the concrete's durability. Surface defects, as such, include crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Contracting Officer.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
5. Correct low areas in existing slab by scarifying surface, priming and finishing with patching compound blended into adjacent concrete.

DELETE BELOW IF NOT REQUIRED; IT CAN BE VERY EXPENSIVE.

D. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

E. Perform structural repairs with prior approval of Contracting Officer for method and procedure, using specified epoxy adhesive and mortar.

F. Repair methods not specified above may be used, subject to acceptance of Contracting Officer.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

RETAIN THIS ARTICLE EVEN IF OWNER'S LABORATORY DOES QUALITY CONTROL TESTING. MODIFY TO SUIT PROJECT OR DELETE IF NOT REQUIRED FOR SMALLER WORK. COORDINATE WITH SECTION 01400

A. General: EXCHANGE will employ a testing laboratory to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Contracting Officer.

C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   3. Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and each time a set of compression test specimens is made.
   4. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required.
   5. Compressive-Strength Tests: ASTM C 39; at least one set for each day's pour, or not less than once for each 150 cubic yards of concrete, or not less than once for each 5,000 s.f. of surface area for slabs or walls; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
a. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

D. Test results will be reported in writing to Contracting Officer, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Contracting Officer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03 30 00
SECTION 03 35 40
INTERIOR CONCRETE SLAB REPAIRS AND JOINT FILLER REPLACEMENT

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Joint filler removal and replacement, with or without metal keyway.
         a. Contractor is to provide unit price per linear foot in Section 01026 for joint filler removal
            and replacement based on the following formula:
            1) Total Area to be Polished X 0.14 = Total Projected Linear Feet of Joint Filler Removal
               and Replacement to be Included and Broken Out in the Bid.
      2. Spalled joint repair or joint with metal keyway (less than 3/4")
         a. Contractor is to provide unit price per linear foot in Section 01026 for keyway segment
            removal and filler installation based on the following formula:
            1) Total Area to be Polished X 0.08 = Total Projected Linear Feet of keyway segment
               removal to be Included and Broken Out in the Bid.
      3. Spalled joint repair, joint with metal keyway or self-leveling compound removal (great than
         3/4")
         a. Contractor is to provide unit price per linear foot in Section 01026 for keyway segment
            removal and repair material installation based on the following formula:
            1) Total Area to be Polished X 0.08 = Total Projected Square Feet of keyway segment
               and self-leveling compound removal and repair material installation to be Included
               and Broken Out in the Bid.
         a. Contractor is to provide unit price per linear foot in Section 01026 for crack cleaning and
            filling based on the following formula:
            1) Total Polished Area X 0.03 = Total Projected Linear Feet of Crack Repair to be
               Included and Broken Out in the Bid.
      5. Surface defect repair, including pop-outs, spalls, and gouges.
         a. Contractor is to provide unit price per occurrence in Section 01026 for pop-out and spall
            repair based on the following formula.
            1) Total Polished Area X 0.025 = Total Projected Occurrences of 3/4" to 1-1/2" DIA X
               1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
            2) Total Polished Area X 0.025 = Total Projected Occurrences of 1-1/2" to 3" DIA X 1/2"
               Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.
   a. Contractor is to provide unit price per occurrence in Section 01026 for over-coring cleanouts, in-floor electrical outlets and Walker Duct access holes based on the following formula.
      1) Total Polished Area X 0.001 = Total Projected Occurrences of 4" average DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.

7. Large area surface repair, existing underlayment removal and replacement
   a. Contractor is to provide unit price per square foot in Section 01026 for large area surface repair of rough surface, or removal and replacement of existing underlayment's > 1/4" in thickness.
      1) 1/4" Minimum Thick Self-leveling Topping to be Included as a Unit Cost

8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies.
   a. Contractor is to provide unit price per square foot in Section 01026 for grout coat surface enhancement based on the following formula:
      1) Total Polished Area X 0.10 = Total Projected Square Feet of Grout Coat to Include and Breakout in Bid.

9. Full Grind, Densify and Polish portions of the project not currently indicated on the drawings.
   a. Contractor is to provide unit price per square foot in Section 01026 to provide a Full Grind, Densify and Polish for portions of the project not currently indicated on the drawings.
      1) Full Grind, Densify and Polish to be Included as a Unit Cost

1.2 SUBMITTALS

A. Section 01330 - Submittal Procedures: Procedures for Submittals.

B. Joint Filler Installer Qualification Certification:
   1. Company branch or regional office shall provide a list of five projects minimum performed within the last three years of similar type, size and complexity as this contract. Provide project names, addresses, contact names and phone numbers for each project. General Contractor to validate the abilities of the subcontractor prior to submitting bid.
   2. Submit letter of certification, identifying specific individuals that are currently certified installers of the specified materials and are familiar with proper procedures and installation methods as required by the specified product manufacturers.

C. Product data for:
   1. All products and primary equipment used for repair of existing concrete slab defects.

1.3 QUALITY ASSURANCE
A. AAFES reserves the right to engage the services of a Concrete Consultant to review, observe and inspect the work in progress.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Limit and control damage from excessive dust caused by demolition, preparation, and installation of all Work.
B. Limit and control damage from moisture.
C. All replaced concrete shall be cured a minimum of 8 calendar days prior to joint filler installation.
D. Concrete repair area shall be closed to traffic during preparation and repair for a time as recommended by manufacturer.

PART 2 - PRODUCTS and EQUIPMENT

2.1 MATERIALS

A. Polyurea Joint Filler: Rapid setting, two-component polyurea polymer liquid of 100% solids content, Shore hardness 60 - 65, compatible with construction materials in contact.
   1. SL/60 Polyurea in complementary darker color to match Polished Concrete, by VersaFlex Incorporated
   2. RS65 Polyurea in complementary darker color to match Polished Concrete, by Metzger/McGuire.
   3. HT-PE65 Polyurea in complementary darker color to match Polished Concrete, by Hi-Tech Systems
   4. Colors to be reviewed and approved by AAFES Project Manager in mock-up.
B. Joint Filler Stain Preventing Film:
   1. SPF by Metzger/McGuire.
C. Low Viscosity Crack and Spall Repair:
   1. Quick-Mender in complementary matching color, by VersaFlex Incorporated
   2. Rapid ReFloor in complementary matching color, by Metzger/McGuire.
   3. HT Spall-FX2 in complementary matching color, by Hi-Tech Systems
   4. 10 Minute Mender or Matchcrete by Roadware
   5. Colors to be reviewed and approved by AAFES Project Manager in mock-up.
D. Wide Area Surface Repairs
   1. TRU Self Leveling, by CTS Cement Manufacturing Corporation
   2. Diama-Top by Ardex Engineered Cements
   3. Color after application of Specified Dye to be reviewed and approved by AAFES Project Manager in mock-up.
E. Pin Hole and Surface Pitting Grout Coat
   1. GM 3000, by Husqvarna Construction Products
2. StarSeal Fusion, by Vexcon Chemicals, Inc
3. Diama-Fill, by Ardex Engineered Cements
4. Color after application to be reviewed and approved by AAFES Project Manager in mock-up.

2.2 EQUIPMENT

A. Dust extraction system for grinding/sawing:
   1. HEPA filtration vacuum, designed for use with all hand tools when grinding or sawing concrete (minimum 125CFM air flow).
   2. Provide one of the following:
      a. 26D, by HTC.
      b. S2400, by Pullman-Ermator.
      d. Approved equal.

B. Joint Filler Removal and Preparation
   1. The Mongoose, by Engrave-a-Crete
   2. Humpback Cutter Complete, by Joe Due.
   3. Dust Buggy, by U.S. Saws.
   4. Approved equal.

C. Crack Repair:
   1. 5" Dustmizer 007, by Joe Due.
   2. 5" Crack Attacker, by Joe Due.
   3. 7" Handheld Crack Chaser, by Joe Due.
   5. SawTec 7" Crac-Vac, by U.S.Saws.
   6. Approved equal.

D. Surface Grinder: Handheld 4"-7" electric surface grinder with dustless shroud/housing.
   1. Dust Avenger 5, by Joe Due.
   2. Dust Avenger 7, by Joe Due.
   4. SawTec 7" Grinder Vac, by U.S. Saws.
   5. Approved equal.

PART 3 – EXECUTION

3.1 EXAMINATION

A. An evaluation of the existing floor slab shall be conducted, identifying all defects. Scope of repairs shall be confirmed by the AAFES Project Manager, Architect of Record, or AAFES
Concrete Consultant prior to commencement of work. Identify scope of work on Floor Polishing Plan specified in other section(s) of Division 3 – Concrete.

B. Repairs are not to be conducted until Unit Price in attached Worksheet has been reviewed and approved by the AAFES Contracting Officer.

C. Repairs exceeding the Estimated Scope of Repairs developed in the attached Worksheet and included in the Base Bid must be approved by the AAFES Contracting Officer prior to executing the work in any new Phase.

3.2 PREPARATION

A. Protect surface of slab immediately adjacent to defect under repair.

3.3 JOINT MILLING AND CAP FILLER REPLACEMENT

A. If existing joint filler is sound and resting on top of saw cut shelf, mill top 1/2" of material and refill with specified Polyurea joint filler.

1. Re-saw the joint to a minimum depth of 1/2" with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint.

2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer’s recommendation. Slightly overfill and shave flush to the surface after the grinding process has been completed.

3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.
3.4 FULL DEPTH JOINT FILLER REPLACEMENT

A. If existing joint filler is loose, easily removed, or able to be forced downward with a hand tool, remove all filler material from joint and refill.

1. Re-saw joint full depth with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint. Remove all filler material, debris, and laitance.

2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer’s recommendation. Slightly overfill and shave flush to the surface prior to grinding process.

3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.5 NARROW SPALLED JOINT REPAIR OR JOINT WITH METAL KEYWAY (LESS THAN 3/4”)

A. For joints that are spalled, are constructed with metal keys or have radius tooled edges not exceeding 3/4” in width at slab surface.

1. Re-saw the joint edge to a minimum depth of 3/4” with a dry-cut, vacuum-equipped saw allowing removal of the widest spall (or top of radius) along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint.
2. Clean joint of loose concrete, metal key fragments, joint filler, laitance, dirt, debris, backer rod, etc.
3. Joints must be free of all visible moisture.
4. Ensure filler penetrates the irregular aggregate interlock portion of the sawn contraction joint as shown below, re-establishing the aggregate interlock that may have been lost due to shrinkage, curling, and lack of reinforcement.
5. Fill joint cavity with specified Polyurea joint filler per manufacturer’s instructions, taking care not to entrap large air bubbles. Overfill joint slightly and shave flush to slab surface after the grinding process has been completed.

3.6 WIDE SPALLED JOINT REPAIR (GREATER THAN 3/4”)

A. For joints that are spalled, contain metal key or self-leveling floor material that exceeds 3/4” in width at slab surface.
   1. Re-saw the joint edge to a minimum depth of 1/4” with a dry-cut, vacuum-equipped shaver/leveler allowing removal of the widest spall or non-linear keyway along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint. Maintain consistent width of repair to within 1/2 inch in 10 feet.
   2. Overfill repair cavity with overlay material per manufacturer’s instructions and grind flush to slab surface.
   3. After repair has cured, and prior to any traffic on patched surface, re-saw original slab joint(s) 3/8” in depth to honor joint and fill full depth with Polyurea joint filler per manufacturer’s instructions.
3.7 CRACK REPAIR

A. Crack width less than 1/32” without surface spalling.
   1. Do not repair.
   2. Grout coat may be used to fill thin hairline deficiencies.

B. Cracks from 1/32” to 1/4” in width.
   1. Clean crack cavity.
   2. Remove loose concrete, dirt and debris from crack with a wire brush or hand grinder with twisted wire wheel attachment, 1/2” minimum depth, insuring crack sidewall is clean.
   3. Remove any loose segments, including islands formed by crack, with sharp tool.
   4. Use methods that will not widen existing crack.
   5. Vacuum crack to remove all dirt, debris and other laitance.
   6. Mask slab surface along crack as necessary to minimize overfill.
   7. Choose material color that closely matches the adjacent floor.
   8. Install low viscosity crack and spall repair material in accordance with manufacturer’s instructions.
   9. Repeat until all voids are filled and material crowns slab surface.
      a. Do not flood area around crack.
      b. Watch for bubble formation and out gassing.
      c. Do not allow material to gel before adding additional material.
   10. Shave or grind material flush to surface as stipulated by manufacturer.
3.8 SURFACE SPALLING REPAIR

A. For slab surface that is chipped and spalled, where the deficiency is 1/2” in length or width up to 3” in length or width, by 1/2” in depth.
   1. Route edge of spall to provide 1/8” deep square edge or 30° edge (consult manufacturer’s data sheet for specific surface preparation instructions).
   2. Use small hand grinder with maximum 5” diameter dry diamond blade and vacuum system attachment.
   3. Do not overcut slots into existing slab surface.
   4. Clean and prep spalled cavity.
   5. Wire brush spalled surface to remove all dirt and laitance.
   6. Mask slab at perimeter of spall with tape.
   7. Install Low Viscosity Crack and Spall Repair material.
   8. Polish over repair area with diamond disks to blend surface.
   9. Feather filler material into the adjacent concrete floor surface.
  10. With 2000 grit disk and firm pressure, add a few burn marks to mottle surface to blend with adjacent floor surface.
      a. NOTE: For inconsistent, varying spalled joints that comply with the measurements in this section, a form material may be needed to temporarily form and support the vertical face of spalled joint edge. Ensure that the repair material will not adhere to the form and the rigid repair material does not fuse the joint together.
  11. For cleanouts, in-floor electric outlets and Walker Duct access plates, over-core around perimeter of existing embed by 1/2” in width and depth, then install Low Viscosity Crack and Spall Repair Material.

3.9 BOLT HOLE, CONDUIT REPAIR

A. For slab surfaces containing surface or sub-surface bolts, bolt-hole voids, conduit or subsurface conduit.
1. Recess steel bolt or conduit a minimum of 1/2" below finish floor by either punching or cutting.
   a. Check with General Contractor prior to cutting into active electrical or communication conduit.
2. For spall fractured edges less than 30 degrees, square edge to a minimum 1/8" depth with either a drill bit, chisel or edge grinder.
3. Clean cavity of all debris and laitance with drill activated, brass wire wheel. Vacuum hole to remove all dirt, debris and other laitance.
4. Dispense Low Viscosity Crack and Spall Repair at moderate pace using steady pressure. Dispense material into void, refilling as necessary to produce slight crown.
5. Grind material flush to slab surface per manufacturer’s instructions.

3.10 LARGE SURFACE REPAIR, UNDERLAYMENT REMOVAL AND REPLACEMENT
A. For slab surfaces containing wide-area irregular rough surfaces greater than 3” in width and length such as irregular coarse aggregate surfaces or surfaces with existing tile or carpet underlayment’s > 1/4” in thickness.
1. Define edge perimeter with diamond masonry wheel or shaver/leveler to produce sharp edge, at least 1/8” deep.
2. Roughen base surface using shaver/leveler to ICRI CSP 3 – 5 and vacuum clean.
3. Wire brush to remove any small loose material and vacuum again.
4. Mix and install overlay material in accordance with manufacturer’s instructions.
5. Place repair material in floor surface defect, float level or leave slightly proud of existing floor.
6. Grind, densify and polish to match adjacent concrete.
7. Re-establish original concrete slab joints by sawing completely through patch and re-filling with Polyurea joint filler prior to exposure to traffic.

3.11 SMALL SURFACE PITTING, PINHOLE REPAIR, GROUT COAT
A. For surfaces consisting of micro-deficiencies, pin holes, hairline cracks and other surface clutter that impedes the achievement of the specified overall gloss values
1. Clean pitted sections with 90-degree angle grinder equipped with wire wheel to remove all dirt/laitance. Wheel should be run over defect in multiple directions to ensure proper cleaning.
2. Vacuum prepared pitted sections.
3. Install and disperse grout coat using GM 3000, StarSeal Fusion, or Diama-Fill in accordance with manufacturer’s directions.
4. Ensure a thin, uniform layer of repair material covers the pitted areas. Refill any low spots as needed.
5. Grind or polish flush with metal or resin-bond diamonds, ensuring repair material is flush with slab surface.
6. Repeat repairs in areas as required if repair material pulls out of defects.
7. Apply required applications and polish smooth to meet specified overall gloss values.

3.12 PROTECTION
A. Protect surfaces of finished floor.
B. Prohibit traffic until floor repairs have received final approval by Owner.

WORKSHEET

INTERIOR CONCRETE SLAB ENHANCEMENT, REPAIR AND JOINT FILLER REPLACEMENT
(To Be Turned in with Sub-Contractor’s Bid Behind Form 4450-024, Page 2)

<table>
<thead>
<tr>
<th>ENTER TOTAL AREA TO BE POLISHED: ______________ SQUARE FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Joint Filler Removal and Replacement</td>
</tr>
</tbody>
</table>

..... SAMPLE CALCULATION ..... NOT PART OF BID ..... 

..... DO NOT INCLUDE SAMPLE CALCULATION COST IN BID ..... 

| 1. Joint Filler Removal and Replacement | ______ | 0.14 | ______ LF | $_______ / LF | $_______ |
| 2. Spalled joint repair or joint with metal keyway (less than 3/4”) | ______ | 0.08 | ______ LF | $_______ / LF | $_______ |
| 3. Spalled joint repair, joint with metal keyway | | | | $_______ / LF | |

ACTIVATE STARBUCKS
JBPHH 6081-11-000001
CONSTRUCTION ISSUE MAR 2017

INTERIOR CONCRETE SLAB REPAIRS AND JOINT FILLER REPLACEMENT
03 35 40 - 11
<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Cost per Unit</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>or self-leveling compound removal (great than 3/4&quot;)</td>
<td>_______</td>
<td>0.03</td>
<td>_______ / LF</td>
<td>$_________</td>
</tr>
<tr>
<td>4. Crack repair</td>
<td>_______</td>
<td>0.03</td>
<td>_______ / LF</td>
<td>$_________</td>
</tr>
<tr>
<td>5a. Surface defect repair, including pop-outs, spills, and gouges 3/4 – 1-1/2&quot; DIA</td>
<td>_______</td>
<td>0.025</td>
<td>_______ / EA</td>
<td>$_________</td>
</tr>
<tr>
<td>5b. Surface defect repair, including pop-outs, spills, and gouges 1.1/2 - 3&quot; DIA</td>
<td>_______</td>
<td>0.025</td>
<td>_______ / EA</td>
<td>$_________</td>
</tr>
<tr>
<td>6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.</td>
<td>_______</td>
<td>0.001</td>
<td>_______ / EA</td>
<td>$_________</td>
</tr>
<tr>
<td>7. Large surface repair, existing underlayment removal and replacement wit 1/4&quot; Polished Overlay.</td>
<td>_______</td>
<td>0.10</td>
<td>_______ / SF</td>
<td>$_________</td>
</tr>
<tr>
<td>8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies</td>
<td>_______</td>
<td>0.10</td>
<td>_______ / SF</td>
<td>$_________</td>
</tr>
<tr>
<td>9. Full Grind, Densify and Polish portions of the project not currently indicated on the drawings.</td>
<td>_______</td>
<td>______</td>
<td>_______ / SF</td>
<td>$_________</td>
</tr>
</tbody>
</table>
END OF SECTION – 03 35 40
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. This Section includes the following:
   1. Interior non load bearing wall framing
   2. Hood supports

1.3 PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads:
      a. For existing hood framing shall meet design loads as set by Wood Manufacturer.
   2. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
   3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of [1/2 inch (13 mm)].

B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
   2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
   3. Roof Trusses: Design according to AISI's "Standard for Cold-Formed Steel Framing - Truss Design."

1.4 ACTION SUBMITTALS
A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
B. LEED Submittals:
1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings: For hood supports show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [professional engineer].

B. Welding certificates as applicable.

C. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:

1. Steel sheet.
2. Expansion anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

D. Research/Evaluation Reports: For cold-formed metal framing.

1.6 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.

D. Product Tests: Mill certificates or data from a qualified independent testing agency,[ or in-house testing with calibrated test equipment] indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements,[ductility,] and metallic-coating thickness.

F. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

G. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
   2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

H. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

I. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
   1. Allied Studco.
   2. AllSteel Products, Inc.
   4. Clark Steel Framing.
   5. Consolidated Fabricators Corp.; Building Products Division.
   6. Craco Metals Manufacturing, LLC.
   7. Custom Stud, Inc.
   8. Dale/Incor.
   10. Dietrich Metal Framing; a Worthington Industries Company.
   11. Formetal Co. Inc. (The).
12. Innovative Steel Systems.
13. MarinoWare; a division of Ware Industries.
15. SCAFCO Corporation.
18. Steeler, Inc.
20. United Metal Products, Inc.

2.2 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [25] percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: **ST50H** or **As required by structural performance**.
   2. Coating: **G60** or equivalent.

2.3 INTERIOR

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **0.0428 inch (1.09 mm)**.
   2. Flange Width: **1-5/8 inches (41 mm)**.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **0.0428 inch (1.09 mm) or Matching steel studs**.
   2. Flange Width: **1-1/4 inches (32 mm)**.

C. Vertical Deflection Clips: Manufacturer's standard [bypass] [head] clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dietrich Metal Framing; a Worthington Industries Company.
      b. MarinoWare, a division of Ware Industries.
      c. SCAFCO Corporation
      d. The Steel Network, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with
flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Minimum Base-Metal Thickness: \(0.0538\) inch \((1.37\) mm\).
3. Flange Width: \(1\) inch \((25\) mm\) plus the design gap for 1-story structures.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

2.4 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard\(\text{-shape steel sections}\) \(\text{C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges}\).

1. Minimum Base-Metal Thickness: \(0.0329\) inch \((0.84\) mm\)] [0.0428 inch \((1.09\) mm)] [0.0538 inch \((1.37\) mm)] [0.0677 inch \((1.72\) mm)] [0.0966 inch \((2.45\) mm)].
2. Flange Width: \(1-5/8\) inches \((41\) mm\)] [2 inches \((51\) mm)] [2-1/2 inches \((63\) mm)], minimum.
3. Section Properties: \(<\text{Insert minimum allowable calculated section modulus, moment of inertia, and allowable moment}>\)

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade [36] [55], threaded carbon-steel \[\text{hex-headed bolts}\] \[\text{headless, hooked bolts}\] \[\text{headless bolts, with encased end threaded}\] and carbon-steel nuts;
and flat, hardened-steel washers; zinc coated by [hot-dip process according to ASTM A 153/A 153M, Class C] [mechanically deposition according to ASTM B 695, Class 50].

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: 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.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: [SSPC-Paint 20 or DOD-P-21035] [ASTM A 780].

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.8 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies 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. Spacing: 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.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistant materials from damage.

C. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
   1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
   1. Cut framing members by sawing or shearing; do not torch cut.
   2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. 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.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 07 Section "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 standard punched openings.

J. Erection Tolerances: Install cold-formed metal 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.

3.4 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
B. Fasten both flanges of studs to [top and] bottom track, unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm).

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to [infill] studs and anchor to building structure.
4. Connect drift clips to cold formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within [12 inches (305 mm)] of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   a. Install solid blocking at [centers indicated] [centers indicated on Shop Drawings].
2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 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 Contractor 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 Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal 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 metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00
PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Wood furring, grounds, nailers, and blocking.
   2. Miscellaneous lumber.
   3. Plywood backing panels.

1.2 DELIVERY, STORAGE, AND HANDLING
A. General:
   1. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
   2. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

1.3 SUBMITTALS
A. Product Data:
   1. For each type of process and factory-fabricated product.
      a. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Submittal List:

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<thead>
<tr>
<th>Reference</th>
<th>Submittal Item</th>
<th>Quantity</th>
<th>Action</th>
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<tr>
<td>1.3A</td>
<td>Product Data</td>
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X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL
A. Lumber Standards:
1. Comply with DOC PS 20, “American Softwood Lumber Standard,” and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee’s (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:
   1. RIS - Redwood Inspection Service.
   2. NLGA - National Lumber Grades Authority (Canadian).
   3. SPIB - Southern Pine Inspection Bureau
   4. WCLIB - West Coast Lumber Inspection Bureau.
   5. WWPA - Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
   1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

D. Sizes:
   1. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   2. Provide dressed lumber, S4S, unless otherwise indicated.
   3. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

2.2 FIRE-RETARDANT-TREATED PLYWOOD

A. General:
   1. Comply with performance requirements in AWPA C27 (plywood).

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Use treatment that does not promote corrosion of metal fasteners.
      a. Use treatment that does not promote corrosion of metal fasteners.
   2. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
   3. Application: Treat items indicated on Drawings, and the following:
      a. Concealed blocking.
b. Plywood backing panels.

2.3 MISCELLANEOUS LUMBER
A. General:
   1. Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
   2. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
   3. Moisture Content: 19 percent maximum for lumber items are not specified to receive wood preservative treatment.
   4. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any approved species.

2.4 FASTENERS
A. General:
   1. Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
      a. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153 or of Type 304 or Type 316 stainless steel.

D. Wood Screws: ASME B18.6.1.
E. Lag Bolts: ASME B18.2.1.
F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5 for interior applications.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for exterior applications.
G. Screws for Fastening to Cold-Formed Metal Framing, Unless Otherwise Indicated: ASTM C 954.
   1. Except with wafer heads and reamer wings.
   2. Length as recommended by screw manufacturer for material being fastened.
PART 3 - EXECUTION

3.1 INSTALLATION
   A. General:
      1. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
      2. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
      3. Fit carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
      4. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
      5. Countersink nail heads on exposed carpentry work and fill holes with wood filler.
      6. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS
   A. General:
      1. Install where shown and where required for screeding or attaching other work. Cut and shape to required size. Coordinate locations with other work involved.
      2. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING
   A. General:
      1. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

END OF SECTION 06 10 00
SECTION 06 40 23
INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Interior standing and running trim.
   2. Flush wood paneling and wainscots.
   3. Solid-surfacing-material countertops.
   4. Melamine cabinets
   5. Accessory materials.
B. Related Sections:
   1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.

1.2 DEFINITIONS
A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.

1.3 SUBMITTALS
A. Product Data:
   1. For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.
B. Shop Drawings:
   1. Dimensioned plans, elevations, and large scale details showing location of each cabinet, attachment devices, and other components.
C. Samples For Verification:
   1. Standing and running trim with transparent finish, 12 inches long, for each species and cut, finished on one side and one edge.
   2. Plastic-laminate and solid-surfacing material color, pattern, and texture selected.
D. Submittal List:
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<th>Submittal Item</th>
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X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications:
   1. Firm experienced in producing architectural woodwork that employs skilled workers who
      custom fabricate products similar to that indicated for this Project and with a record of
      successful in-service performance, as well as sufficient production capacity to produce
      required units without delaying the Work.

B. Installer Qualifications:
   1. Arrange for interior architectural woodwork installation by a firm that can demonstrate
      successful experience in installing architectural woodwork items similar in type and quality to
      those required for this Project.

C. Quality Standard:
   1. Except as otherwise indicated, comply with the following standard:
      a. "Architectural Woodwork Standards" for grades of interior architectural woodwork,
         construction, finishes, installation, and other requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and
   deterioration. Do not deliver woodwork until painting and similar operations that could damage,
   soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be
   stored in other than installation areas, store only in areas whose environmental conditions meet
   requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

A. Environmental Limitations:
   1. Do not deliver or install woodwork until building is enclosed, wet-work is completed, and
      HVAC system is operating and will maintain temperature and relative humidity at occupancy
      levels during the remainder of the construction period.

B. Field Measurements:
   1. Where woodwork is indicated to be fitted to other construction, check actual dimensions of
      other construction by accurate field measurements before fabrication, and show recorded
      measurements on final shop drawings. Coordinate fabrication schedule with construction
progress to avoid delaying the Work. Fabricate to allow trimming at site and coordinate construction to ensure that actual dimensions correspond to established dimensions.

2. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final Shop Drawings.

1.7 COORDINATION

A. General:

1. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: To establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers, a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation. Subject to compliance with requirements, provide either the named products or equal products.

2.2 MATERIALS

A. General:

1. Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

   b. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
   c. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
   e. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

2. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2. Nd material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without a pre-coated finish.
3. All Cabinetry & Countertops to be provided by FC/FC installers.

2.3 ACCESSORY MATERIALS
   A. General:
      1. Provide accessory materials associated with interior architectural woodwork.

2.4 INSTALLATION MATERIALS
   A. Furring, Blocking, Shims, and Hanging Strips:
      1. Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
   B. Screws:
      1. Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements. For metal framing supports, provide screws as recommended by metal-framing manufacturer.
   C. Nails:
      1. Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
   D. Anchors:
      1. Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.5 FABRICATION, GENERAL
   A. Interior Woodwork Grade:
      1. Provide interior woodwork complying with the referenced quality standard and of the following grade:
         a. Grade: Premium.
   B. Wood Moisture Content:
      1. Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.
   C. Fabrication:
      1. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius
      2. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
      3. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of
cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

2.6 SOLID-SURFACING-MATERIAL TOPS FURNISHED BY OTHERS

A. Quality Standard:
   1. Comply with requirements of referenced standard for solid-surface countertops.
   2. Grade: Premium.
   4. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
      a. Match color, pattern, and finish as selected in finish schedule.

B. Fabrication:
   1. Fabricate tops in one or as few pieces as reasonable shop-applied edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

PART 3 - EXECUTION

3.1 PREPARATION

A. General:
   1. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
   2. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. General:
   1. Quality Standard: Install interior architectural woodwork to comply with referenced quality standard for the same grade specified in Part 2 of this Section for type of woodwork involved.
   2. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches for plumb and level (including tops).
   3. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
   4. Anchor woodwork to anchors or blocking built in or directly attached to substrates.
   5. Secure to grounds, stripping, and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed nailing, countersunk and filled flush with woodwork and matching final finish.
   6. Tops: Anchor securely to base and other support systems as indicated.
a. Install tops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

3.3 ADJUSTING AND CLEANING

A. General:
   1. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
   2. Clean, lubricate, and adjust hardware.
   3. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of final acceptance.

END OF SECTION 06 40 23
SECTION 06 83 16

FIBERGLASS REINFORCED PANELING

PART 1 – GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Glass-fiber reinforced plastic (FRP) wall paneling and trim accessories

1.2 SUBMITTALS
   A. Product Data:
      1. Manufacturer’s data sheets on each product to be used, including:
         a. Preparation instructions and recommendations.
         b. Storage and handling requirements and recommendations.
         c. Installation methods.
   B. Submittal List:
      | Reference | Submittal Item | Quantity | Action |
      |-----------|----------------|----------|--------|
      | 1.2A      | Product Data   | X        | R      |

X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
   A. Basis-of-Design Products: To establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers, a specific manufacturer's product is named and accompanied by the words "basis-of-design", including make or model number or other designation. Subject to compliance with requirements, provide either the named products or equal products.

2.2 WALL PANELS
   A. Basis-of-Design Product:
      1. Marlite, FP-100 White or equal.
   B. Materials:
1. Fiberglass reinforced polyester plastic sheets: Sheets shall comply with fire-test-response characteristics specified, be chemical and stain resistant, and be USDA acceptable for incidental food contact. Provide manufacturer's standard matching moldings and trim as indicated.

2. Size: 4 feet by 10 feet.

3. Thickness: 0.09 inch.

4. Do not furnish material in roll form.

C. Fire Classification:
1. NFPA Class A interior finish in accordance with ASTM E 84.
2. Flame spread: 0 to 25.
3. Smoke development: 0 to 450.

D. Panel Finish:

E. Accessories:
1. Moldings: Manufacturer's standard one-piece white, extruded polyvinyl chloride plastic designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
2. Adhesive: Manufacturer's approved adhesive for substrate to which panels are applied.
   a. VOC Content: 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.
4. Sealant: Provide silicone type sealant specified in Division 07 Section Joint Sealants for joints between panels occurring in rooms exposed to moisture.
   a. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSPECTION

A. General:
1. Ensure surfaces to receive wall paneling are clean, true and free of irregularities.
2. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.
3. Ensure wall surface flatness tolerance do not vary more than 1/8 inch in 10 feet.
4. Schedule installation of panels as late as possible to prevent damage during construction and movement of materials.
3.2 WALL PANEL INSTALLATION

A. General:
   1. Handle and apply wall panels in accordance with manufacturer’s written instructions.
   2. Install panels in a full spread of adhesive.
   3. Where fasteners are required for additional support use non-corroding fasteners where concealed and Nylon drive rivets where exposed. Install in accordance with manufacturer’s written instructions allowing for expansion and contraction of panels.
   4. Install with edges inserted into moldings. Allow clearance for expansion and contraction of panels when fitting into moldings.
   5. Install trim accessories with adhesive. Do not fasten through panels.
   6. Apply a continuous bead of sealant into molding slots prior to insertion of panels.

3.3 CLEANING

A. Clean panels after installation with materials recommended by panel manufacturer.

END OF SECTION 068316 – FIBERGLASS REINFORCED PANELING
SECTION 07 92 00
JOINT SEALANTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Joint sealants for the following applications, including those specified by reference to this Section:
   a. Interior Joints in Vertical Surfaces and Nontraffic Horizontal Surfaces:
      1) Joints around door frames, cabinetry, equipment and adjacent gypsum board.
      2) Joints in tile work.
   b. Joint-sealant applications not indicated will be selected by the Contracting Officer from elastomeric products indicated in Part 2.

B. Related Sections:
1. Division 09 Section Tiling/Gypsum Board
2. Division 08 Section Steel Door & Frames/Flush Wood Doors

1.2 SUBMITTALS

A. Product Data:
1. For each joint-sealant product indicated.

B. Samples for Verification:
1. For each kind and color of joint sealant required, provide manufacturer standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

C. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

D. Submittal List:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Submittal Item</th>
<th>Quantity</th>
<th>Action</th>
</tr>
</thead>
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<td>R</td>
</tr>
<tr>
<td>1.3B</td>
<td>Product Test Reports</td>
<td>X</td>
<td>I</td>
</tr>
</tbody>
</table>

X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.3 QUALITY ASSURANCE

A. Source Limitations:
1. Obtain each kind of joint sealant through one source from a single manufacturer.
B. General:
   1. Do not proceed with installation of joint sealants under the following conditions:
      a. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
      b. When joint substrates are wet.
      c. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
      d. Where Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
   A. Basis-of-Design Products: To establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers, a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation. Subject to compliance with requirements, provide either the named products or equal products.

2.2 MATERIALS, GENERAL
   A. Compatibility:
      1. Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
   B. VOC Content of Interior Sealants:
      1. Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
         a. Architectural Sealants: 250 g/L.
         b. Sealant Primers for Nonporous Substrates: 250 g/L.
         c. Sealant Primers for Porous Substrates: 775 g/L

2.3 ELASTOMERIC JOINT SEALANTS
   A. Elastomeric Sealants:
      1. Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
B. Stain-Test-Response Characteristics:
   1. Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Contact with Food:
   1. Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

D. **ES-S1** Single-Component Non-sag Neutral-Curing Surface Modified Silicone Sealant (Low dirt pick-up):
   1. Basis-of-Design Product: Dow Corning Corporation; 756 SMS.
   2. Type and Grade: S (single component) and NS (non-sag).
   3. Class: 50.
   4. Use Related to Exposure: NT (non-traffic).

E. **ES-S3** Single-Component Neutral-Curing Silicone Sealant:
   2. Type and Grade: S (single component) and NS (non-sag).
   3. Class: 100/50.
   4. Use Related to Exposure: T (traffic).
   5. Stain-Test-Response Characteristics: Non-staining to porous substrates.

F. **ES-S4** Single-Component Neutral-Curing Silicone Sealant:
   2. Type and Grade: S (single component) and NS (non-sag).
   3. Class: 50.
   4. Use Related to Exposure: NT (non-traffic).
   5. Stain-Test-Response Characteristics: Non-staining to porous substrates.

2.4 JOINT-SEALANT BACKING

A. General:
   1. Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings:
   1. ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bi-cellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
C. Bond-Breaker Tape:
   1. Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing
      sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.
      Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer:
   1. Material recommended by joint-sealant manufacturer where required for adhesion of sealant
      to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests
      and field tests.

B. Cleaners for Nonporous Surfaces:
   1. Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials,
      free of oily residues or other substances capable of staining or harming joint substrates and
      adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of
      sealants to joint substrates.

C. Masking Tape:
   1. Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to
      joints.

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. Proceed with installation only after unsatisfactory conditions have been
   corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints:
   1. Clean out joints immediately before installing joint sealants to comply with joint-sealant
      manufacturer's written instructions and the following requirements:
      a. Remove all foreign material from joint substrates that could interfere with adhesion of
         joint sealant, including dust, paints (except for permanent, protective coatings tested and
         approved for sealant adhesion and compatibility by sealant manufacturer), old joint
         sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
      b. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a
         combination of these methods to produce a clean, sound substrate capable of developing
         optimum bond with joint sealants. Remove loose particles remaining after cleaning
operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

1) Concrete.
2) Masonry.
3) Unglazed surfaces of ceramic tile.

c. Remove laitance and form-release agents from concrete.
d. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

1) Metal.
2) Glass.
3) Porcelain enamel.
4) Glazed surfaces of ceramic tile.

2. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer - or as indicated by preconstruction joint-sealant-substrate tests or 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.

3. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General:

1. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard:

1. Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Sealant Backings:

1. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

a. Do not leave gaps between ends of sealant backings.
b. Do not stretch, twist, puncture, or tear sealant backings.
c. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
D. Bond-Breakers:
   1. Install bond-breaker tape behind sealants where sealant backings are not used between
      sealants and backs of joints.

E. Sealant Installation:
   1. Install sealants using proven techniques that comply with the following and at the same time
      backings are installed:
      a. Place sealants so they directly contact and fully wet joint substrates.
      b. Completely fill recesses in each joint configuration.
      c. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow
         optimum sealant movement capability.

F. Tooling of Non-sag Sealants:
   1. Immediately after sealant application and before skinning or curing begins, tool sealants
      according to requirements specified in subparagraphs below to form smooth, uniform beads
      of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of
      sealant with sides of joint.
      a. Remove excess sealant from surfaces adjacent to joints.
      b. Use tooling agents that are approved in writing by sealant manufacturer and that do not
         discolor sealants or adjacent surfaces.
      c. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise
         indicated.
      d. Provide flush joint configuration where indicated per Figure 8B in ASTM C 1193.
      e. Provide recessed joint configuration of recess depth and at locations indicated per Figure
         8C in ASTM C 1193.
         1) Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Foam Compression Seals:
   1. Neatly cut 48-inch wide rolls of foam compression seal material into strips of appropriate
      width to insure force fit between refrigerated display cases and adjacent wall surfaces.
   2. Secure foam compression seals in place with adhesive sealant as indicated on drawings.

3.4 CLEANING
   A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods
      and with cleaning materials approved in writing by manufacturers of joint sealants and of products
      in which joints occur.

3.5 PROTECTION
   A. Protect joint sealants during and after curing period from contact with contaminating substances
      and from damage resulting from construction operations or other causes so sealants are without
      deterioration or damage at time of Substantial Completion. If, despite such protection, damage or
deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00
PART 1 – GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:
      1. Frames: Pressed steel frames for doors, pocket doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings of following type:
         a. Welded unit type.
      2. Provide factory primed frames to be field painted.
   B. Painting primed doors and frames is specified in Division 9 Section "Painting."
   C. Door hardware is specified in another Division 8 Section.

1.3 SUBMITTALS
   A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
   B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
   C. Shop drawings showing fabrication and installation of standard steel frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
      1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

1.4 QUALITY ASSURANCE
   A. Provide frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

1.5 DELIVERY, STORAGE, AND HANDLING
   A. Deliver frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
B. Inspect frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Contracting Officer; otherwise, remove and replace damaged items as directed.

C. Store frames at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inches spaces between stacked doors to promote air circulation.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide standard steel doors and frames by one of the following:

1. Standard Steel Frames:
   a. Amweld Building Products, Inc.
   b. Ceco Corp.
   c. Copco Door Co.
   d. Curries Company.
   e. Deansteel Manufacturing Co.
   f. Fenestra Corp.
   g. Kewanee Corp.
   h. Mesker Door Co.
   i. Pioneer Industries.
   j. Premier Products, Inc. (Formerly Dittco).
   k. Republic Builders Products.
   l. Steelcraft Manufacturing Co.

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.
F. Shop Applied Paint: Apply after fabrication.
   1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for
      specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria
      for Prime Painted Steel Surfaces for Steel Doors and Frames."

2.3 FRAMES
A. General: Provide steel frames for doors, transoms, sidelights, relights and other openings that
   comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings,
   unless otherwise indicated.
B. Frames of 0.053-inch- (1.3-mm-) (16 gauge) thick steel sheet for:
   1. Door openings wider than 48 inches (1220 mm).
   2. Level 2 steel doors.
C. Frames of 0.075-inch- (14 gauge) thick steel sheet for:
   1. Level 3 steel doors.
D. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on
   strike jambs of single-door frames and two silencers on heads of double-door frames.
E. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes
   to close off interior of openings; place at back of hardware cutouts where mortar or other
   materials might obstruct hardware operation.
F. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic
   zinc-coated or metallic-coated steel sheet.
   1. Wall Anchors in Masonry Construction: 0.177-inch- (4.5-mm-) diameter, steel wire complying
      with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.
G. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be
   built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

2.4 FABRICATION
A. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from
   either cold-rolled or hot-rolled steel.
B. Hardware Preparation: Prepare frames to receive mortised and concealed hardware in
   accordance with final Door Hardware Schedule and templates provided by hardware supplier.
   Comply with applicable requirements of ANSI A115 Series Specifications for door and frame
   preparation for hardware.
C. Reinforce frames to receive surface-applied hardware. Drilling and tapping for surface-applied
   hardware may be done at project site.
D. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with
   "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames,"
   published by Door and Hardware Institute.
E. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
   1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
   2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

PART 3 – EXECUTION

3.1 INSTALLATION
   A. General: Install standard steel, frames, and accessories in accordance with final shop drawings, manufacturer’s data, and as herein specified.
   B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.
      1. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.
   C. Door Installation: Fit doors accurately in frames, within clearances specified in ANSI/SDI-100.

3.2 ADJUST AND CLEAN
   A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
   B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
   C. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 11 13
PART 1 – GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary
   Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following:
   1. Solid-core doors with wood-veneer faces.

1.3 SUBMITTALS
A. Product Data: For each type of door. Include details of core and edge construction and trim for
   openings. Include factory-finishing specifications.
B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door;
   construction details not covered in Product Data; location and extent of hardware blocking; and
   other pertinent data.
   1. Indicate dimensions and locations of mortises and holes for hardware.
   2. Indicate dimensions and locations of cutouts.

1.4 QUALITY ASSURANCE
A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
   Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that
   doors comply with requirements of grades specified.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Protect doors during transit, storage and handling to prevent damage, soiling, warping and
   deterioration. Protect doors from direct sunlight. Comply with requirements of referenced
   standard and manufacturer’s written instructions.
B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
   Separate packing materials in accordance with Waste Management Plan and place in designated
   areas for recycling.
C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS
A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is
   complete, and HVAC system is operating and will maintain temperature and relative humidity at
   occupancy levels during the remainder of the construction period.
1.7 WARRANTY

A. General Warranty: Door manufacturer's 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.

1. Warranty shall be in effect from date of Substantial Completion for the life of the installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Wood Doors:
   a. Algoma Hardwoods Inc.
   b. Eggers Industries; Architectural Door Division.
   c. GRAHAM Manufacturing Corp.
   d. Haley Brothers, Inc.
   e. Lynden Door, Inc.
   f. Vancouver Door Company, Inc.
   g. VT Industries Inc.
   h. Weyerhaeuser Company.
   i. Western Oregon Door, Inc.

2.2 DOOR CONSTRUCTION, GENERAL

1. Grade: Premium, with Grade A faces.
2. Assembly of Veneer Leaves on Door Faces: Balance match.
4. Adhesive: Type I per WDMA T.M.-6.

2.3 SOLID-CORE DOORS

A. Particleboard Cores: Comply with the following requirements:

2. Blocking: Provide wood blocking in particleboard-core doors as follows:

B. Interior Veneer-Faced Doors:

1. Core: Particleboard.
2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.4 FABRICATION
A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
   1. Comply with clearance requirements of referenced quality standard for fitting.
B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

2.5 HARDWARE SETS
A. See Sheet A-19 in Contract Documents

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine doors and installed door frames before hanging doors.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. Hardware: For installation, see Division 8 Section "Door Hardware."
B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire ACTIVATE rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.

3.3 ADJUSTING
A. Operation: Rehang or replace doors that do not swing or operate freely.
B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinning.
C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.
PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Double action, self-closing, lightweight, solid core, laminate faced, impact resistant doors of
         the following types:
         a. Single door, non-sealed.

1.2 SUBMITTALS
   A. Product Data:
      1. Manufacturer's product description, installation and maintenance instructions for each type
         and size of traffic door.
   B. Submittal List:

<table>
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<th>Action</th>
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<tbody>
<tr>
<td>1.2A</td>
<td>Product Data</td>
<td>X</td>
<td>R</td>
</tr>
</tbody>
</table>

X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING
   A. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration.
      Store products in manufacturers unopened packages until ready for installation. Do not lay flat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Basis-of-Design Products: To establish the significant qualities related to type, function,
      dimension, in-service performance, physical properties, appearance, and other characteristics for
      purposes of evaluating comparable products of other manufacturers, a specific manufacturer's
      product is named and accompanied by the words "basis of design," including make or model
      number or other designation. Subject to compliance with requirements, provide either the named
      products or equal products.

2.2 DOOR TYPES AND ACCESSORIES
A. Traffic Doors:
   2. Door Body: Exterior surface of decorative high pressure laminate, bonded to a ¾" exterior grade solid wood core both sides; 1” inch total door thickness.
   4. Windows: Clear acrylic; 9” x 14”; black rubber molding.
   5. Impact Bumpers: Impact resistant 18 ga. S.S. material; 18 inches high; front and back, stainless steel edge trim and top hinge covers.
   7. Hinges; Double action, zinc coated.

PART 3 – EXECUTION

3.1 INSPECTION
   A. Verify openings are prepared with headers level, jambs plumb, floor level, without projections, and are correctly dimensioned to receive traffic doors. Begin installation of doors only when conditions are satisfactory.

3.2 INSTALLATION
   A. General:
      1. Install doors, complete with accessories and hardware, in strict accordance with shop drawings and manufacturer's installation instructions.

3.3 ADJUST AND CLEAN
   A. General:
      1. Follow traffic door manufacturer’s instructions as required to:
         a. Clean and lubricate operating parts.
         b. Adjust to open and close smoothly and freely without binding.
   B. Repair and Clean:
      1. Repair damage to doors to match manufacturer's original finish; if unable to repair damage, replace doors.
      2. Clean surfaces soiled by work as recommended by manufacturer.
      3. Leave work area clean and free of debris.

END OF SECTION 08 38 00
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes non-load-bearing steel framing members for the following applications:
      1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
      2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).
   B. Related Sections include the following:
      1. Division 5 Section "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
      2. Division 7 Section "Building Insulation" for insulation installed with Z-shaped furring members.

1.3 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. LEED Submittals:
      1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL
   A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
      1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS
   A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.
   B. Hanger Attachments to Concrete:
      1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by
construction as determined by testing according to ASTM E 488 by an independent testing agency.

a. Type: Postinstalled, chemical anchor, Postinstalled, expansion anchor.

2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.37 mm) and minimum 1/2-inch- (12.7-mm-) wide flanges.

1. Depth: As indicated or required by conditions of installation.

E. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges, 3/4 inch (19.1 mm) deep.

2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.

a. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).

3. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

F. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:


b. Chicago Metallic Corporation; 660-C Drywall Furring System.

c. USG Corporation; Drywall Suspension System.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.027 inch (0.7 mm). 0.0312 inch (0.79 mm) for framing supporting ceramic tile substrates.

2. Depth: As indicated or required by conditions of installation.

B. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (50.8-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top
runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.

2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (50.8-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      1) Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
      2) Superior Metal Trim; Superior Flex Track System (SFT).

C. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 0.0179 inch (0.45 mm).

D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
   2. Depth: 7/8 inch (22.2 mm).

E. Cold-Rolled Furring Channels: 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges.
   1. Depth: 3/4 inch (19.1 mm).
   2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch (0.79 mm).
   3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

F. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22.2 mm), minimum bare-metal thickness of 0.0179 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
   1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:
   1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL
A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
   1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
   2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
C. Install bracing at terminations in assemblies.
D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS
A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
C. Suspend hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
      a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system
members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Do not attach hangers to steel roof deck.
5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:
   a. Single-Layer Application: 16 inches (406 mm) o.c., unless otherwise indicated.
   b. Multilayer Application: 16 inches (406 mm) o.c., unless otherwise indicated.
   c. Tile backing panels: 16 inches (406 mm) o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
   a. Install two studs at each jamb, unless otherwise indicated.
   b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

D. Direct Furring:
   1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

E. Z-Furring Members:
   1. Erect insulation (specified in Division 7 Section "Building Insulation") vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
   2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.
   3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16
PART 1 – GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Non-load-bearing steel framing members for interior gypsum board assemblies.
      2. Gypsum board assemblies attached to steel framing.
      3. Sound attenuation blanket and acoustical sealant.

1.2 SUBMITTALS
   1. Product Data: For each type of product.

   B. Submittal List:

   Reference Submittal Item Quantity Action
   1.2A Product Data X R

   X Submit quantity specified in Division 01 Section Administrative Requirements.
   R Review each submittal, mark to indicate action taken, and return.
   I Submittal is for information or record purposes only. No action will be taken.

1.3 DEFINITIONS
   A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 DELIVERY, STORAGE, AND HANDLING
   A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.5 PROJECT CONDITIONS
   A. Environmental Conditions, General:
      1. Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

   B. Room Temperatures:
      1. For non-adhesive attachment of gypsum board to framing, maintain not less than 40° F. Do not exceed 95 deg F when using temporary heat sources.
C. Ventilation:
   1. Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

D. Product Condition: Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination or discoloration.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS
   A. Framing Members, General:
      1. Comply with ASTM C 754 for conditions indicated.
         a. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
         b. Protective Coating: Manufacturer’s standard rust-inhibiting coating.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED CEILINGS
   A. General:
      1. Provide components complying with ASTM C 754 for materials and sizes unless otherwise indicated.
   B. Wire for Hangers and Ties:
      1. ASTM A 641, Class 1 zinc coating, soft temper.
         a. Wire Hangers: 0.16 inch in diameter.
         b. Tie Wire: 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
   C. Channels:
      1. Cold-rolled steel, 0.053 inch minimum thickness of base (uncoated) metal and 1/2 inch wide flanges, and as follows:
         b. Furring Channels: 3/4 inch deep.
   D. Steel Rigid Furring Channels:
      1. ASTM C 645, hat-shaped, depth of 7/8 inch, and minimum thickness of base (uncoated) metal of 0.018 inch.
   E. Grid Suspension System for Interior Gypsum Ceilings:
      1. ASTM C 645, manufacturer’s standard direct-hung grid suspension system composed of main beams and cross furring members that interlock.
2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

A. General:
   1. Provide steel framing members complying with the following requirements:
      a. Component Sizes and Spacings: As indicated but not less than that required to comply
         with ASTM C 754.

B. Steel Studs and Runners:
   1. ASTM C 645.
      a. Minimum Base Metal Thickness: 0.033 inch (20 gage) or as indicated.
      b. Depth: As indicated.

C. Slip-Type Head Joints (Deflection Track):
   1. Where indicated, provide steel sheet top runner manufactured to prevent cracking of finishes
      applied to interior partition framing resulting from deflection of structure above; in thickness
      not less than indicated for studs and in width to accommodate depth of studs.

D. Fasteners for Metal Framing:
   1. Provide fasteners of type, material, size, corrosion resistance, holding power, and other
      properties required to fasten steel framing to substrates.

2.4 INTERIOR GYPSUM BOARD

A. General:
   1. Complying with ASTM C 1396.
   2. Provide gypsum board of types indicated in maximum lengths available to minimize end-to-
      end butt joints.
      a. Thickness: Provide gypsum board in thicknesses indicated or, if not otherwise indicated,
         in 5/8 inch thicknesses to comply with ASTM C 840 for application system and support
         spacing indicated.
      b. Long Edges: Tapered unless otherwise indicated.

B. Types:
   1. Type X Gypsum Board.
   2. Ceiling Type Gypsum Board: Manufactured to have more sag resistance than regular type
      gypsum board.
      a. Thickness: 1/2 or 5/8 inch
   3. Moisture and Mold-Resistant Gypsum Board
      a. Type X.
      b. Basis-of-Design Product: Georgia-Pacific Gypsum; "ToughRock" or "DensArmor Plus
         Fireguard "
      c. Thickness: 5/8 inch
      d. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES
A. Accessories for Interior Installation:

1. Corner beads, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:
   a. Material: Formed metal, or metal combined with paper, with metal complying with the following requirement:
      1) Sheet steel coated with zinc by hot-dip or electrolytic processes, or with aluminum or rolled zinc.
   b. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
   c. Cornerbead on outside corners, unless otherwise indicated.
   d. Bullnose bead with flanges formed to receive joint compound. Use rounded cornerbead for vertical corner joints.
   e. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwise indicated.
   f. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
   g. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
   h. One-piece expansion (control) joint formed with V-shaped slot, with removable strip covering slot opening.

2.6 JOINT TREATMENT MATERIALS

A. General:
   1. Provide joint treatment materials complying with ASTM C 475.

B. Joint Tape for Gypsum Board:
   1. Paper reinforcing tape, unless otherwise indicated.

C. Setting-Type Joint Compounds for Gypsum Board:
   1. Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
      a. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
      b. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
      c. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by the gypsum board manufacturer for this purpose.
      d. For topping compound, use sand-able formulation.

2.7 MISCELLANEOUS MATERIALS
A. General:
   1. Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Steel Drill Screws:
   1. Complying with ASTM C 1002 for fastening gypsum board to steel members less than 0.033 inch (22 gage) thick.
   2. Complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.

C. Sound-Attenuation Blankets:
   1. Un-faced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
      a. Mineral-Fiber Type: Fibers manufactured from glass-fiber or slag-wool-fiber/rockwool-fiber.

D. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION
   A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.3 INSTALLING STEEL FRAMING, GENERAL
   A. Steel Framing Installation Standard:
1. Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

2. Install supplementary framing, blocking, and bracing in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, wall mounted door stops, and similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.’s "Gypsum Construction Handbook."

3. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
   a. Where building structure abuts ceiling perimeter or penetrates ceiling.
   b. Where partition framing and wall furring abut structure, except at floor.
      1) Install deflection track top runner to attain lateral support and avoid axial loading.

4. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

A. Suspend ceiling hangers from building structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.

4. Do not attach hangers to steel deck tabs.

5. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   a. Do not connect or suspend steel framing from ducts, pipes, or conduit.

6. Sway-brace suspended steel framing with hangers used for support.

7. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.
   a. Wire Hangers: 48 inches o.c.
   b. Carrying Channels (Main Runners): 48 inches o.c.
   c. Furring Channels (Furring Members): 16 inches o.c.
8. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.

9. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

10. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. General:

1. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
   a. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.

2. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where otherwise indicated. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

3. Install steel studs and furring in sizes and at spacings indicated.
   a. Single-Layer Construction: Space studs 16 inches o.c., unless otherwise indicated.

4. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

5. Slip-Type Head Joints (Deflection Track): Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

6. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
   a. Install 2 studs at each jamb, unless otherwise indicated.

7. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards:

1. Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

2. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
3. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

4. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

5. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.

6. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

7. Attach gypsum panels to framing provided at openings and cutouts.

8. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

9. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.

10. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
    a. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
    b. Fit gypsum panels around ducts, pipes, and conduits.
    c. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

11. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed.

12. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

13. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.7 GYPSUM BOARD APPLICATION METHODS

A. Single-Layer Application:

1. Install gypsum wallboard panels as follows:
    a. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
b. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.

B. Wall Tile Substrates:
1. For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
   a. Install mold and moisture resistant gypsum wallboard panels with tapered edges taped and finished to produce a flat surface.

C. Single-Layer Fastening Methods:
1. Apply gypsum panels to supports as follows:
   a. Fasten with screws.

3.8 INSTALLING TRIM ACCESSORIES
A. General:
1. For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
2. Install cornerbead at external corners.
3. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
   a. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
   b. Install L-bead where edge trim can only be installed after gypsum panels are installed.
   c. Install U-bead where indicated.
4. Install control joints according to ASTM C 840 and manufacturer's recommendations.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES
A. General:
1. Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
2. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
3. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.
4. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
   a. Level 1 for ceiling plenum areas and concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
1) At joints and angles, embed tape in joint compound. Finish panel surfaces free of excess joint compound, but tool marks and ridges are acceptable.

b. Level 2 where panels form substrates for tile and where indicated.

1) At joints and angles, embed tape in joint compound and apply one separate coat of joint compound over tape, fastener heads, and flanges of trim accessories. Joint compound applied on the face of the tape when the tape is embedded is considered a separate coat. Finish panel surfaces free of excess joint compound, but tool marks and ridges are acceptable.

c. Level 4 for all gypsum board exposed surfaces, unless otherwise indicated.

1) At joints and angles, embed tape in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads, and flanges of trim accessories. Finish panel surfaces and joint compound smooth and free of tool marks and ridges.

5. Use the following joint compound combination as applicable to the finish levels specified:

a. Embedding and First Coat: Setting-type joint compound.

b. Fill (Second) Coat: Setting-type joint compound.

c. Finish (Third) Coat: Sand-able, setting-type joint compound.

6. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

7. Where Level 2 gypsum board finish is indicated, embed tape in joint compound and apply first coat of joint compound.

8. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.


10. Follow manufacturer finish recommendations for glass mat and mold resistant gypsum board which may be a high-hide primer for low gloss paints or a level 5 finish for glossier paints and when surface is illuminated from severe lighting angles.

3.10 INSTALLATION CRITERIA FOR ACOUSTICAL SEALANT

A. Acoustical Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.11 CLEANING AND PROTECTION
A. Promptly remove any residual joint compound from adjacent surfaces. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of final acceptance.

END OF SECTION 09 29 00
PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Glazed wall tile installation.
   2. Unpolished paver tile installation.
   3. Grout materials and installation
B. Related Sections:
   1. Division 07 Section Joint Sealants for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.2 DEFINITIONS
A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
C. Module Size: Actual tile size plus joint width indicated.
D. Face Size: Actual tile size, excluding spacer lugs.

1.3 PERFORMANCE REQUIREMENTS
A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028 1. Level Surfaces: Minimum 0.6

1.4 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Verification:
   1. Actual grout samples in specified colors or in manufacturer standard grout selector for selection and approval.
   2. Actual sealant sample in specified color or in manufacturer standard sealant selector for selection and approval.
   3. Metal edge strips in 6 inch lengths.
C. Submittal List:

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</tbody>
</table>

X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.5 QUALITY ASSURANCE
A. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
B. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
   1. Joint sealants.
   2. Cementitious backer units.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.
E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.7 PROJECT CONDITIONS
A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL
   A. Colors, Textures, and Patterns: Where manufacturer’s standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
      1. As indicated by manufacturer’s designations.

2.2 MANUFACTURERS
   A. Basis-of-Design Products: To establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers, a specific manufacturer’s product is named and accompanied by the words "basis of design", including make or model number or other designation. Subject to compliance with requirements, provide either the named products or equal products.

2.3 TILE PRODUCTS
   A. Porcelain Floor and Wall Tile:
      1. See Finish Legend / Schedule on Architectural Drawings for tile description and location.
   B. Ceramic Wall Tile:
      1. See Finish Legend / Schedule on Architectural Drawings for tile description and location.
   C. Trim Units:
      1. See Finish Legend / Schedule on Architectural Drawings for base, cap, and corner units.

2.4 METAL ACCESSORIES
   A. Aluminum Edging (AE)
      1. See drawings for basis of design product.

2.5 SETTING MATERIALS
   A. Latex-Portland Cement Mortar. ANSI A118.4:
      1. Provide prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene rubber liquid-latex additive at Project site.
      2. For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
      3. Provide bed depths as recommended by tile manufacturer.

2.6 GROUT MATERIALS
   A. Polymer-Modified Tile Grout. ANSI A118.7.
      1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
         a. Un-sanded grout mixture for joints 1/8 inch and narrower. Color as indicated.
b. Sanded grout mixture for joints 1/8 inch and wider. Color as indicated.

B. Water-Cleanable Epoxy Grout: ANSI A118.3.
   1. Provide product capable of withstanding continuous and intermittent exposure to
      temperatures of up to 140 deg F and 212 deg F, respectively, and certified by manufacturer
      for intended use.
   2. Use at all food handling and food processing areas where quarry or paver tile is used.

2.7 ELASTOMERIC SEALANTS
   A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with
      the following requirements and with the applicable requirements in Division 07 Section Joint
      Sealants.
      1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40
         CFR 59, Subpart D (EPA Method 24).
      2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
   B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints,
      unless otherwise indicated.

2.8 Crack Isolation Membrane and Tile-Setting Adhesive: One-part, fluid-applied product intended for use
   as both a crack isolation membrane and tile-setting adhesive in a two-step process

2.9 MISCELLANEOUS MATERIALS
   A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based
      formulation provided or approved by manufacturer of tile-setting materials for installations
      indicated.
   B. Temporary Protective Coating: Either product indicated below that is formulated to protect
      exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and
      grout products; and easily removable after grouting is completed without damaging grout or tile.
      1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a
         melting point of 120 to 140 deg F per ASTM D 87.
      2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially
         formulated and recommended for use as temporary protective coating for tile.
   C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and
      grout surfaces, specifically approved for materials and installations indicated by tile and grout
      manufacturers.
   D. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change
      color or appearance of grout.

2.10 MIXING MORTARS AND GROUT
   A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' 
      written instructions.
   B. Add materials, water, and additives in accurate proportions
C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations.

2. Verify that concrete substrates for tile floors installed with adhesives or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
   a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
   b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Contracting Officer.

B. Proceed with installation only after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

C. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

for Installation of Ceramic Tile” that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
   a. Tile floors in food processing areas.
   b. Tile floors composed of tiles 8 by 8 inches or larger.
   c. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting and the use of pieces that are less than half of a tile. Provide uniform joint widths, unless otherwise indicated.
   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
   2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
   3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Minimum width as recommended by tile manufacturer and TCNA

F. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Unless noted otherwise, locate joints in tile surfaces directly above movement joints in concrete slab.
   2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
   3. Indicate expansion joints and other sealant filled joints at perimeter of floor tiles where abutting wall base and columns, including control, contraction, and isolation joints, on Drawings.
G. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

H. Grouting Standards: Grout tile to comply with requirements of the following tile installation standards:
1. For ceramic tile grouts (latex-Portland cement grouts), comply with ANSI A108.10.

3.4 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove latex-Portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.5 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Tile Installations, Concrete Subfloor:
1. Tile Installation F113: Thin-set mortar; TCNA F113 and ANSI A108.5.
   a. Tile Type: Unpolished Paver Tile.
   c. Grout: Polymer-modified unsanded grout. Color to match existing.

B. Interior Wall Tile Installations, Wood or Metal Studs or Furring:
   a. Tile Type: Ceramic wall tile.
   c. Grout: Polymer-modified unsanded grout. Color as indicated on contract documents.
END OF SECTION 09 30 00
SECTION 09 51 00
ACOUSTICAL PANEL CEILINGS

PART 1 – GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Ceilings composed of acoustical panels and exposed suspension systems.

1.2 PERFORMANCE REQUIREMENTS
A. Seismic Performance:
   1. Acoustical ceiling system shall withstand the effects of earthquake motions determined
      according to ASCE/SEI 7-05, Chapter 13 as referenced by the International Building Code
      (IBC), Chapter 16. Specific seismic requirements for suspended ceiling are indicated in
      ASCE section 13.5.6.

1.3 SUBMITTALS
A. Product Data:
   1. For each type of acoustical panel specified.
B. Samples for Verification: For each component indicated and for each exposed finish required,
   prepared on Samples of size indicated below.
   1. Acoustical Panel: Set of 6-inch square minimum size Samples of each type, color, pattern,
      and texture.
C. Maintenance Data
   1. For finishes to include in maintenance manuals.
D. Submittal List:

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X Submit quantity specified in Division 01 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.4 QUALITY ASSURANCE
A. Installer Qualifications:
1. Engage an experienced Installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Single-Source Responsibility for Ceiling Units and Suspension System:
   1. Obtain acoustical ceiling panel and suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics:
   1. Provide acoustical panel ceilings that comply with the following requirements:
      a. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
         1) Smoke-Developed Index: 50 or less for Class A ceiling.

D. Seismic Standard:
   1. Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions indicated in Division 01 Section Summary of Work, according to ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures," Section 13, "Seismic Design Requirements for Nonstructural Components."

E. Testing Agency Qualification:
   1. Qualified according to NVLAP for testing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Space Enclosure and Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use, and work above ceilings is complete and accepted by Government.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition assemblies (if any).

1.8 EXTRA STOCK
A. General:
1. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Acoustical Ceiling Panels:
1. Full-size panels equal to 1.0 percent of quantity installed and no less than 10 full panels.

C. Suspension System Components:
1. Quantity of each exposed component equal to 1.0 percent of quantity installed.

D. Seismic Clips:
1. Equal to 1.0 percent of amount installed.

1.9 WARRANTY
A. General Warranty:
1. The special warranties specified in this Article shall not deprive the Government of other rights the Government 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 Acoustical Panel Ceiling System Warranty:
1. Submit a written warranty executed by acoustical panel ceiling system manufacturer to repair or replace acoustical panel ceiling system that falls within the warranty period. Failures include, but are not limited to:
   a. Acoustical Panels: Sagging or warping.
      1) Warranty Period: Ten years from date of Substantial Completion.
      1) Warranty Period: Ten years from date of Substantial Completion.
   c. Mold, Mildew, and Bacteria Resistance.
      1) Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis-of-Design Products: To establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers, a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation. Subject to compliance with requirements, provide either the named products or equal products.

2.2 ACOUSTICAL PANELS, GENERAL
A. Acoustical Panel Standard:
1. Provide manufacturer’s standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.


3. Test Method for Ceiling Attenuation Class (CAC): Where acoustical panel ceilings are specified to have a CAC, provide units identical to those tested per ASTM E 1414 by a qualified testing agency.

B. Acoustical Panel Colors and Patterns:
   1. Match appearance characteristics indicated for each product type.

2.3 ACOUSTICAL PANELS

A. See Room Finish Schedule for location of each Acoustical Panel Ceiling (APC) type.

B. APC-1: (Back of House)
   1. Provide panels complying with ASTM E 1264 and with characteristics described below:
      a. Modular Size: 24 x 48 inches as indicated on drawings.
      b. Pattern: Stipple.
      c. Colors: White.
      d. Facing: Vinyl.
      e. Edge/Joint Detail: Square.
      f. Sag resistant.
      g. Thickness: Manufacturer’s standard but not less than 5/8”.
      h. Manufacturer’s standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard
   1. Provide manufacturer’s standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
   2. Fire Class A.

B. Attachment Devices:
   1. Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated. Comply with seismic design requirements.

C. Wire Hangers, Braces, and Ties:
   1. Provide wires complying with the following requirements
      a. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.
b. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 0.106-inch diameter wire.

2.5 METAL SUSPENSION SYSTEM

A. Wide Aluminum Capped Double-Web Steel Suspension System (for use with APC-1 ceiling tile):

1. Main and cross-runners roll-formed from commercial-quality G-30 hot dipped galvanized steel coating. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester. 15/16-inch wide aluminum metal caps on flanges; other characteristics as follows:
   b. Cross Tees: Light gauge steel with rotary stitching to improve column strength and staked-on end detail allowing easy cross tee removal and remounting.
   c. End Condition of Cross-Runners: Override (stepped) or butt-edge type, as standard with manufacturer.

2. Cap Material and Finish: Aluminum sheet with baked polyester painted to match color of panels supported.

3. Capable of withstanding cleaning / disinfecting chemicals at tested in accordance with ASTM D5402.

4. Meets USDA/FSIS requirements for food processing conditions.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer’s standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer’s standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.

2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 – EXECUTION

3.1 EXAMINATION
A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Measure each ceiling area and establish the layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans.

3.3 INSTALLATION
A. General:
1. Install acoustical panel ceilings to comply with publications referenced below and per manufacturer's written instructions.
   a. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636 and seismic design requirements indicated according to CISCA's “Ceiling Systems Handbook”.
2. Suspend ceiling hangers from building's structural members and as follows:
   a. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.
   b. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   c. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   d. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   e. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   f. Do not attach hangers to steel deck tabs.
   g. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   h. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise shown; and provide hangers not more than 8 inches from ends of each member.
3. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   a. Attach moldings to substrate with screws at intervals not over 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

4. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

5. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide neat, precise fit.
   a. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   b. Paint the cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended for this purpose by acoustical panel manufacturer.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00
PART 1 – GENERAL

1.1 SUMMARY
   A. Section Includes:
      1. Surface preparation and the application of paint systems on the following substrates:
         a. Interior Painting:
            1) Gypsum board.
   B. Related Sections:

1.2 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Samples: For each finish and for each color and texture required.
   C. Product List: For each product indicated, include the following:
      1. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
   D. Submittal List:

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</table>

X Submit quantity specified in Division 1 Section Administrative Requirements.
R Review each submittal, mark to indicate action taken, and return.
I Submittal is for information or record purposes only. No action will be taken.

1.3 QUALITY ASSURANCE
   A. MPI Standards:
      1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
      3. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.
4. Applicator: Company specializing in performing the work of this section with minimum five years experience

1.4 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      1. Paint: One gallon of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING
   A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
      1. Maintain containers in clean condition, free of foreign materials and residue.
      2. Remove rags and waste from storage areas daily.
      3. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
      4. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

1.6 FIELD CONDITIONS
   A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
   B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
   C. Minimum Application Temperature for Varnish and Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
   D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL
   A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
   B. Material Compatibility:
      1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
      2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
4. Stains: VOC not more than 250 g/L.
5. Primers, Sealers, and Undercoaters: 200 g/L.
6. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
8. Pretreatment Wash Primers: 420 g/L.

D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Restricted Components: Paints and coatings shall not contain any of the following:
   a. Acrolein.
   b. Acrylonitrile.
   c. Antimony.
   d. Benzene.
   e. Butyl benzyl phthalate.
   f. Cadmium.
   g. Di (2-ethylhexyl) phthalate.
   h. Di-n-butyl phthalate.
   i. Di-n-octyl phthalate.
   j. 1,2-dichlorobenzene.
   k. Diethyl phthalate.
   l. Dimethyl phthalate.
   m. Ethylbenzene.
   n. Formaldehyde.
   o. Hexavalent chromium.
   p. Isophorone.
   q. Lead.
   r. Mercury.
   s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

E. Colors as indicated in "Room Finish and Color Schedule."

2.2 INTERIOR PAINT PRODUCTS

A. Interior Latex High-Build Primers/Sealers:
   1. Alkali-Resistant Primer Water Based: MPI #137.

B. Interior Latex Paints:
   1. Institutional Low-Odor/VOC Latex Semi-Gloss: MPI #54 (Gloss Level 5).
   2. Institutional Low-Odor/VOC Latex Eggshell MPI #52 (Gloss Level 3).
   3. Institutional Low-Odor/VOC Latex Flat / Matte MPI #53 (Gloss Level 1).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Primer is not required on shop-primed items that are compatible with system subsequent applied coats.

E. Provide barrier coats over incompatible primers or remove and re-prime.

F. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

G. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and re-prime substrate with compatible primers as required to produce paint systems indicated.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

D. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual".

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

4. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

5. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

6. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer, except as follows:


2. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING AND PROTECTION
A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.
   a. Prime Coat: Interior latex primer/sealer, institutional low odor/VOC.
   c. Topcoat: Institutional low-odor/VOC interior latex:
      1) Ceilings: As indicated on drawings.
      2) Walls and Soffits: As indicated on drawings.

END OF SECTION 09 90 00
SECTION 10 26 00
WALL AND DOOR PROTECTION SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes the following types of wall surface protection systems:
      1. Wall protection systems.
         a. Corner guards.
         b. Cart bumper rails.
   B. Related Sections: The following Sections contain requirements that relate to this Section:
      1. Wood blocking and grounds for corner guards are included in Division 6 Section “Rough Carpentry.”
      2. Stainless steel mop plates, kick plates, and armor plates are included in Division 8 Section “Door Hardware.”

1.3 SUBMITTALS
   A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
   C. Product data for each wall surface protection system component and installation accessory required, including installation methods for each type of substrate. Provide written data on each required component including physical characteristics, such as durability, resistance to fading, and flame resistance.

1.4 QUALITY ASSURANCE
   A. Installer Qualifications: Engage an experienced Installer who has previously installed wall surface protection systems similar in material, design, and extent to the systems indicated for this Project.
   B. Impact Strength: Provide wall surface protection system components with a minimum impact resistance of 16 ft. lbs per sq. ft. when tested in accordance with ASTM D 256 (Izod impact, ft. lbs per inch notch).
   C. Single Source Responsibility: Obtain each color, grade, finish, and type of wall surface protection system component from a single source with resources to provided products of consistent quality in appearance and physical properties without delaying progress of the Work.
1.5 DELIVERY, STORAGE, AND HANDLING
   A. Deliver materials to Project site in original factory wrappings and containers, clearly labeled with
      identification of manufacturer, brand name, quality or grade, and fire hazard classification.

1.6 MAINTENANCE
   A. Maintenance Instructions: Provide the manufacturer's instructions for maintenance of installed
      work. Include recommended methods and frequency for maintaining optimum condition under
      anticipated traffic and use conditions. Include precautions against cleaning materials and methods
      that may be detrimental to finishes and performance.
   B. Replacement Materials: After completion of work, deliver not less than 2 percent of each type,
      color, and pattern of wall surface protection materials and components. Include accessory
      components as required. Replacement materials shall be from the same production run as
      materials installed. Package replacement materials with protective covering, identified with
      appropriate labels.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. American Floor Products Co., Inc.
      2. Balco, Inc.
      4. Construction Specialties, Inc.
      5. K. J. Miller Corporation.
      7. Pawling Corporation.
      8. Tepromark International, Inc.
      10. Tubular Specialties.
      12. McCue Corporation.

2.2 MATERIALS
   A. Polycarbonate Plastic Sheet: Abrasion-resistant, clear, transparent polycarbonate plastic sheet
      with an impact resistant rating of 16 ft. lb. per inch tested in accordance with ASTM D 256.
   B. Fasteners for Corner Guards: Provide aluminum, nonmagnetic stainless steel, or other
      noncorrosive metal screws, bolts, and other fasteners compatible with aluminum components,
      hardware, anchors, and other items being fastened. Use theft-proof fasteners where exposed to
      view.
2.3  CORNER GUARDS  
A. Stainless-Steel Corner Guards: Paper-covered, satin-finish, 0.0625-inch (1.6-mm) minimum, stainless-steel sheet corner guards; height as indicated. Provide 90-degree turn, unless otherwise indicated; and formed edges. Stainless steel plate Type 304 minimum 0.625 inches thick.
1. Provide corner guards in shapes, as noted below and as detailed on the drawings.

PART 3 – EXECUTION (NOT USED)

END OF SECTION 10 26 00
SECTION 12 22 00
COILED WIRE FABRIC DRAPERY

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Coiled Wire Fabric Drapery and Attachment Systems.

1.2 DEFINITIONS
   A. Coiled Wire Fabric: A building material manufactured by Cascade Coil Drapery. The material is created by interlocking strands of coiled wire to form a larger flexible sheet. Coiled wire fabric is made from a variety of metals and gauges of wire, and in a wide variety of scales.
   B. Attachment Systems: Component materials required to present Coiled Wire Fabric in a specific manner (i.e., tensioned flat in two directions, tensioned in two directions with a percentage of fullness, tensioned flat in four directions, hanging in one direction, wrapping a form, etc.), for connecting it to the built environment and for attaining a specified performance capability. Engineered attachments may allow Coiled Wire Fabric panels to remain in a static position or to move, either manually or mechanically.

1.3 DESIGN / PERFORMANCE REQUIREMENTS
   A. Structural Requirements: Provide coiled wire fabric systems capable of withstanding the effects of gravity and applied loads and stresses within limits and under conditions indicated on the Drawings:
      1. Components: Design and size to withstand dead and live loads of components, and loads caused by positive and negative wind pressure acting normal to plane of the coiled wire fabric as calculated in accordance with applicable code.
   B. Coiled Wire Fabric systems shall accommodate expansion and contraction of metal components without causing undue stress, buckling, opening of joints, and distortion.
   C. Supports and hardware shall withstand loads encountered without excessive deflection or distortion when cables are tensioned to required amounts required to conform to applicable building codes.

1.4 SUBMITTALS
   A. Submit under provisions of Section 01 33 00 – Submittal Procedures.
   B. Product Data: Provide manufacturer’s standard catalog data for specified products demonstrating compliance with referenced standards. Provide list of fittings being provided with descriptions, load capabilities, and either photographs or drawings for each type. Manufacturer’s data sheets on each product to be used, including:
      1. Preparation instructions.
      2. Storage and handling requirements.
3. Installation methods.

C. Shop Drawings: Submit Shop Drawings for fabrication and installation. Include the following:
   1. Plans, elevations, and detail sections.
   2. Indicate materials, methods, finishes, fittings, hardware, anchorages, and accessory items.
   3. Provide setting diagrams and templates for anchorages and hardware to be installed by others.
   4. Where materials or fabrications are indicated to comply with design loadings, include material and safety factor properties, and other information needed for structural analysis.

D. Samples:
   1. Sample size of Coiled Wire Fabric is to be no less than 6 in. (457.2 mm) wide by 10 in. (457.2 mm) long.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company experienced in manufacturer's products, or similar, for a minimum of 5 years. The Contractor shall provide trained laborers with prior experience in the type of construction involved as well as experience installing the materials and techniques specified.

B. Pre-installation Meetings: Conduct meetings including Contractor, Architect, fabricator, installer and other subcontractors whose work involves Coiled Wire Fabric to verify project requirements, framing and support conditions, mounting surfaces and manufacturer's installation. Comply with Division 1 requirements.

C. Product Options:
   1. Information on the Drawings and in the specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including structural analysis, preconstruction testing, field-testing, and in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Handle and store products according to manufacturer's recommendations. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.

C. Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, and installation.

D. Store Material within limits of for temperature and humidity recommended by manufacturer.

1.7 PROJECT CONDITIONS
A. Verify actual openings by field measurements before fabrication; show recorded measurements on shop drawings.

1.8 COORDINATION AND SCHEDULING
A. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.9 WARRANTY
A. Manufacturer’s standard limited warranty for materials and workmanship. WARRANTY;
WARRANTY DISCLAIMER; SOLE REMEDY Cascade Coil warrants that its products will be (i) free from defects due to materials that do not meet Cascade Coil’s established quality standards and (ii) constructed in a workmanlike manner. As customer’s sole and exclusive remedy for the breach of either such warranty, Cascade Coil will replace any products or parts of products at no additional charge to customer. These warranties remain in effect until the date that is one year from the date of original product purchase from Cascade Coil. Cascade Coil shall have no responsibility with respect to any warranty claim made after such time period has run. These warranties are not transferrable and extend only to the original customer who purchased the product directly from Cascade Coil. These warranties do not apply to (1) products damaged by accident, neglect, misuse, abuse or any other customer error, or (2) costs of removal or reinstallation of defective products.

PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Acceptable Manufacturer: Cascade Coil Drapery, Inc., which is located at: PO BOX 3707 19505 SW 90th Ct.; Tualatin, OR 97062; Toll Free Tel: 800-999-2645; Tel: 971-224-2188; Fax: 971-224-2199; Email: (request info info@cascadecoil.com); Web:
http://www.cascadecoil.com/safety/security/capabilities/

2.2 COILED WIRE FABRIC SYSTEMS
A. Provide Coiled Wire Fabrics and Coiled Wire Fabric Attachment Systems as indicated on the Drawings. Manufacturer/Contractor shall engineer and fabricate components and assemblies for installation.
B. Coiled Wire Fabric:
   1. Product: Coiled Wire Fabric as manufactured by Cascade Coil Drapery.
      a. Material – Aluminum
      b. Panel Depth – 5/16”
      c. Wire Gauge – 15
      d. Finish – Antique Bronze
e. Fullness – 9%

C. Coiled Wire Fabric Attachment Systems
   1. Product: Double Steel or Aluminum Secura Track System for Coiled Wire Fabrics manufactured by Cascade Coil Drapery.
      a. Material – Steel or Aluminum
      b. Attachment – Direct Mount to Ceiling
      c. Attachment Brackets – None
      d. Finish – Powder Coated to Match Fabric

D. Guardian Coil Semi Security Gate Systems
   1. Product: Guardian Coil Security Hardware
      a. Material – Aluminum
      b. Configuration – Key Lock, Intermediate Channels & Keyed Locking Foot Bolts, Handles, & Batons
      c. Finish – Powder Coated to Match Fabric

E. Components
   1. Wire
   2. Metal Tracks: Steel, Stainless Steel, Galvanized Steel or Aluminum
   3. Connectors: Brackets, clips, plates and other connecting hardware.
   4. Fabric Fasteners, hooks and trolley carriers.
   5. Fasteners: Nuts, bolts, machine screws, and washers shall be steel.

F. Fabrication
   1. Metal sections shall comply with all requirements indicated for materials, thickness, design, and details of construction. Metal shall be fabricated accurately with no burrs.
      a. Welded connections shall comply with AWS standards for recommended practice in shop welding. Welds behind finished surfaces shall be without distortion or discoloration of exposed side.
      b. Components shall be accurately cut, drilled and/or tapped to receive coiled wire fabric, hardware, fasteners, and accessories.

G. Finish
   1. Metal components shall be factory-finished.

2.3 FINISH
   A. After fabrication and/or weaving, clean and prepare Coiled Wire Fabric System in accordance with ASTM A 380, if applicable.

2.4 FABRICATION
   A. Tolerances: Verify dimensions on site prior to shop fabrication.
   B. Fabricate steel and stainless steel in accordance with AISI Steel Product Manual and the manufacturer’s requirements.
C. Shop fabricate to designs indicated on Drawings and to meet performance requirements specified. Shop fabricate hardware, interfacing parts and assemblies so that field cutting adjustments are not necessary.

D. Coordinate requirements, dimensions and spacing of attachment systems to ensure required factory drilled holes in supporting framework are correctly located.

E. Make exposed joints butt, flush, and hairline.

F. Fabricate connections that will be exposed to weather in a manner to exclude water, per Architect.

PART 3 EXECUTION

3.1 EXAMINATION
A. Before beginning installation, verify that conditions installed under other sections are acceptable for installation of Coiled Wire Fabric and Attachment Systems in accordance with manufacturer's installation instructions.

B. Coordinate setting diagrams, plans, templates, and drawings and verify the proper installation of any necessary anchorages as detailed in the Drawings.

C. Verify supporting system for Coiled Wire Fabric is prepared for attachment of framework, hardware, anchors and wire rope and transfer of calculated loads.

D. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Coordinate with appropriate entity to correct unsatisfactory conditions, if any exist.

F. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION
A. Installer to verify inventory components to ensure all required items are available for installation. Inspect components for damage. Remove damaged components from site and replace.

B. Contractor shall verify alignment, support dimensions, and tolerances are correct.

C. Contractor shall verify all necessary framework and blocking is installed prior to mounting Coiled Wire Fabric Attachment Systems to existing structure.

3.3 INSTALLATION
A. Coiled Wire Fabric:
   1. Install Coiled Wire Fabric in accordance with the approved shop drawings.
   2. Assemblies shall be installed based on manufacturer's dimensions and specifications.
   3. Joints shall accommodate expansion and contraction of metal components without causing undue stress, buckling, joint fatigue and/or distortion. Follow manufacturer's installation.
4. Install manufacturer-supplied brackets and mounting hardware onto Coiled Wire Fabric as indicated in shop drawings for specific Coiled Wire Fabric Attachment Systems. Attach with approved fasteners and techniques to ensure that sections are horizontal and parallel to grade/slab or rake to within 1/16 inch (1.58 mm) in 4 feet (1.2 m).
5. Verify that support framing and other surfaces to receive Coiled Wire Fabric are clean and free of obstructions.
6. Follow shop drawings to attach Coiled Wire Fabric to support framing using appropriate manufacturer supplied hardware.
7. Provide anchorage devices and fittings to secure to in-place construction; including additional frame work, blocking, threaded rods and anchors.
8. Install infill plumb, level, square, and rigid without kinks or sags.
10. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
11. Use manufacturer's supplied hardware.
12. Tension Coiled Wire Fabric per drawings, or as necessary, so that no slack is visible.
13. After final adjustment provide tamper resistant lock tight materials on all fittings.

B. Coiled Wire Fabric Attachment Systems:
1. Install Coiled Wire Fabric Attachment Systems in accordance with the approved shop drawings.
2. Assemblies shall be installed based on manufacturer's dimensions and specifications.
3. Joints shall accommodate expansion and contraction of metal components without causing undue stress, buckling, joint fatigue and/or distortion. Follow manufacturer's installation.
4. Should Coiled Wire Fabric Attachment Systems require wall mounting, blocking shall be provided by the Contractor.
5. Install manufacturer-supplied brackets and mounting hardware onto Coiled Wire Fabric Attachment Systems as indicated in shop drawings for specific Coiled Wire Fabric Attachment Systems. Attach with approved fasteners and techniques to ensure that sections are horizontal and parallel to grade/slab or rake to within 1/16 inch (1.58 mm) in 4 feet (1.2 m).
6. Verify that support framing and other surfaces to receive Coiled Wire Fabric and Attachment Systems are clean and free of obstructions.
7. Follow shop drawings to attach Coiled Wire Fabric Attachment Systems to support framing using appropriate manufacturer supplied hardware.
8. Provide anchorage devices and fittings to secure to in-place construction; including additional frame work, blocking, threaded rods and anchors.
9. Install infill plumb, level, square, and rigid without kinks or sags.
10. Anchor Coiled Wire Fabric and Attachment Systems to mounting surfaces as indicated on the Drawings.
11. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
12. Use manufacturer's supplied hardware.
13. Tension Coiled Wire Fabric per drawings, or as necessary, so that no slack is visible.
14. After final adjustment provide tamper resistant lock tight materials on all fittings.

3.4 ADJUSTING AND CLEANING

A. Remove temporary coverings and protection of adjacent work areas. Clean installed products before owner's acceptance.
B. Cascade Coil Drapery is durable and virtually maintenance free. It tends to shed dust. Usually only an occasional brushing or vacuuming is required.
C. In heavy traffic areas, a program should be put in place to dust and vacuum the coiled wire fabric annually. This is best achieved using a Shop-Vac equipped with an extended soft hose, wand, and brush shoe. The shoe will kick the dust loose from the surface and interior of the coiled wire fabric. Both sides of the coiled wire fabric panel should be brushed. In areas with limited access the coiled fabric panels should be gently brushed with a push broom to remove dust accumulation.
D. If the coiled wire fabric becomes dirty, it may be cleaned with a mild detergent and water. Ivory dish soap applied with a wet wrap and wiped with a clean dry rag is recommended.
E. Do not use abrasive cleaners. It could remove the finish or discolor the wire.
F. Remove from project site and legally dispose of construction debris associated with this work.

3.5 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.
C. Protect installed products and finished surfaces from damage during construction.

END OF SECTION 12 22 00
SECTION 22 00 00

PLUMBING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. This section covers the furnishing fabrication, delivery, and installation of the plumbing system complete within 5 feet of the building line (or otherwise indicated on the plans), including but not limited to the following:
   1. Study work (and related drawings) of all other crafts whose work abuts, adjoins or is in any manner affected by work under this heading.
   2. Soil, waste and vent piping system.
   3. Cold water system.
   4. Hot water system.
   5. All plumbing fixtures and equipment, trim and accessories.
   6. Temporary piping and valves to supply water during construction for all Contractors, at all locations required by the Architect.
   7. Labeling and tagging all valves.
   8. Operating and maintenance instructions and manuals.
   9. Shop drawings and record drawings.
   10. Inspection, testing and guarantee.

B. General provisions of the contract, including the following, shall apply to division 22 specifications sections: Solicitation documents and division 00 and division 01 of the specifications.

1.2 CODES, REGULATIONS, AND STANDARDS

A. Installation of all work in this Section shall be made in accordance with Uniform Plumbing Code, Board of Water Supply Standards, State Regulations and International Building Code.

B. All applicable codes, regulations and ordinances of public bodies having jurisdiction are considered a part of these specifications; all work installed and materials provided must comply with the current edition of such codes, regulations and ordinances.

C. Present to the Architect certificates of inspection and approval from proper authorities.

1.3 DEFINITIONS

A. FURNISH: The term furnish means supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.

B. INSTALL: The term install describes operations at the project site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

C. PROVIDE: The term provides means to furnish and install, complete and ready for the intended use.

1.4 APPROVAL OF MATERIALS, FIXTURES, AND EQUIPMENT:
A. As soon as practicable after award of contract and before installation of any materials, fixtures of equipment is begun, Contractor shall submit complete list of materials, fixtures and equipment together with names and addresses of manufacturers, catalog number and trade names to Architect for approval.

B. Approval of materials will be based on manufacturer’s published rating. Any materials, fixtures, and equipment which are not in accordance with these specifications may be rejected.

C. Contractor shall check the submittals and shop drawings and certify that they are correct and in compliance with the drawings and specifications.

D. Contractor shall submit the following:
   1. Piping
   2. Fittings
   3. Product Data
   4. Operation and maintenance
   5. Warranty

1.5 INSPECTION OF SITE

A. The Contractor shall visit the site and examine the conditions affecting his work before submitting his proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra payments will be allowed to the Contractor on account of extra work made necessary by his failure to visit the site.

1.6 SUBSTITUTION OF MATERIALS

A. Request for substitutions, complete with catalog data, shall be submitted to the Architect for review and approval.

1.7 SUBMITTALS

A. Drawings and Diagrams: Submit six (6) complete sets of Shop Drawings together with six (6) sets of the manufacturers’ data and certificates for equipment, materials and finish and pertinent details for each system and have them approved before procurement, fabrication or delivery of the items to the job site. Due to space limitations the overall size of the mechanical equipment shall not exceed the physical dimensions of the manufacturer and model indicated on the Drawings. Refer to Drawings for make and model. Partial submittals will not be acceptable and will be returned without review. Partial and/or incomplete submittals shall be defined as causing delay to the project and shall be the Contractors liability. Provide a summary register or log sheets indicating all submittals and related data required. Submittals shall include Shop Drawings, the manufacturer’s name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry and technical society publication references and other information necessary to establish contract compliance of each item the Contractor proposes to furnish. Provide required items for a complete operational and integral system. Relocate items which are located in the clearance and service space of the equipment at no additional cost to the Owner. Maintain clearances as indicated on the Drawings or if not indicated use minimum clearances as specified by the manufacturer.

B. Shop Drawings: Drawings shall be a minimum of 24 inches by 36 inches in size, except as
specified otherwise. Drawings shall be a minimum of 1/4-inch scale but not less than indicated on the Drawings. Drawings shall include floor plans, sectional view, wiring and piping diagrams and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping, ductwork, locations and sizes of openings penetrating through walls, floors, roofs and structural members, access panels to valves and items requiring maintenance or inspection, and other items that must be shown to assure a coordinated installation. Drawings shall be coordinated with the architectural reflected ceiling plans and shall include but not limited to air devices, lights, speakers, and ceiling grid locations. Control and wiring diagrams shall identify circuit terminals and indicate the wiring for each item of equipment and interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, Drawings shall be reviewed to show acceptable equipment and be resubmitted. Contractor shall coordinate all flashing requirements with other trades water proofing work to assure a watertight installation.

1. Review, stamp with approval and submit Shop Drawings required by the Contract Documents or subsequently by the Architect as covered by modifications. At the time of submission, inform the Architect in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified field measurements, field construction criteria, materials, catalog numbers and similar data and that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that the equipment and related items fits in the allotted space and complete coordination between contractors involved. Contractor shall coordinate their Shop Drawings with other trades Shop Drawings to assure a complete coordination has been done.

1. Coordinate all mechanical work with finish work.
2. The Mechanical Contractor shall provide Shop Drawings for all their site work. Prior to submitting the shop Drawings for review, the key or prime Contractor shall coordinate all subcontractors; work on the Shop Drawings; certify that all related site work contractors have reviewed the Shop Drawings. Submit complete (not partial) certified Shop Drawings for Architect review.

2. Submitting reproductions of Bid Documents shall not be construed to be Shop Drawings and will not be acceptable and will be returned without review. Direct tracing of the Bid Drawings shall be construed to be reproduction of the Bid Documents.

3. Certify that this shop drawings equipment and material shown is in compliance with the Drawings and specifications and can be installed in the allocated spaces without interference to other related work and access spaces.

4. Additional related work caused by the product changes, installation and operational requirements shall be the Contractor’s responsibility at no additional cost to the Owner.

C. Manufacturer’s Data: Submittals for each manufactured item shall be manufacturer’s descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts.

D. Standards of Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standard Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories (UL), proof of such conformance shall be submitted to the Architect for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate
from an independent testing organization, which is competent to perform acceptable test and is approved by the Architect. The certificate shall state that the item has been tested in accordance with the specified organization’s test methods and that the item conforms to the specified organization’s standard. For materials and equipment whose compliance with organizational standards of specifications is not regulated by an organization using its own listing from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

E. Field Posted “As-Built” Drawings: Comply with the requirements. Record changes from the Contract Drawings for material and equipment. A set of prints showing layout as installed shall be kept up to date at the job site. Submit record Drawings for review prior to final inspection. Upon completion of work, a complete set of reproducible record drawings shall be submitted to the Architect before the project will be accepted as complete.

F. Maintenance Manuals: After installation submit four (4) copies of the operating and maintenance manuals for approval before final inspection.

1.8 DRAWINGS

A. Drawings shall show general arrangement of all piping; however, where local conditions necessitate rearrangement, Contractor shall prepare and submit proposed rearrangement to Architect for approval.

B. Because of small scale of drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Contractor shall carefully investigate structural and finish conditions affecting his work and arrange such work accordingly, furnishing such fittings, traps, valves, and accessories as may be required to meet such conditions.

1.9 SCOPE OF WORK

A. Furnish all labor, materials, and equipment for complete installation of Plumbing System as shown on drawings and specified herein.

B. Work shall include the following:
   1. Complete system of drain, waste, vent piping.
   2. Complete hot and cold water systems.
   3. Water heaters.
   4. Plumbing fixtures hereinafter specified.
   5. Access panels to plumbing valves.

1.10 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Electrical equipment furnished under this Section to be connected as specified in DIVISION 26 - ELECTRICAL.

B. Exterior excavation and backfill specified in EARTHWORK Section.

1.11 WARRANTY

A. Manufacturer’s warranty shall apply against defective materials and workmanship for one (1) year period from date of project acceptance. This warranty shall include any motor and electrical components for the equipment furnished under this Section. This warranty shall
also insure availability of factory trained personnel to service such warranted equipment.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS:

A. Sanitary piping:
   1. Below grade gravity drain piping shall be service weight cast iron with hub and spigot fittings, double asphalt-coated, ASTM A 74 with ASTM C 564 rubber compression gasket. At contractor’s option, PVC-DWV Schedule 40 or hubless cast iron pipe with MG mechanical cast iron couplings, conforming to Cast Iron Soil Pipe Institute’s Standard 310-97 may be used, however, only one type of fittings shall be used throughout the entire project. Stainless steel couplings for below-ground installation are unacceptable.

2. Above grade piping shall be service weight cast iron no-hub, with stainless steel couplings, conforming to Cast Iron Soil Pipe Institute’s Standard 301-00 with Cast Iron Soil Pipe Institute’s Standard 310-97 coupling joint.


4. Indirect waste piping may be cellular core schedule 40 acrylonitrile butadiene styrene(ABS) with drain, waste and vent (DWV) fittings, solvent jointed, conforming to ASTM D2661.

B. Cold water piping:
   1. Water Pipes Above Grade: Type “L” hard-drawn copper tube, ASTM B-88-66a, with solder-joint wrought copper pressure fittings. Use 95-5 tin antimony or lead free soldering alloys on all piping.

C. Hot water piping shall be same as for cold water piping. Provide 1” rigid fiberglass or flexible closed-cell elastomeric insulation for piping 1-1/2” and larger. 3/4” flexible closed-cell elastomeric pipe insulation may be used for hot water pipes smaller than 1-1/2”.

2.2 HANGERS AND SUPPORTS:

A. Hangers shall be “Superstrut” with cadmium plated finish or approved equal. In addition, supports in direct contact with copper pipes shall be plastic coated. Insulate all water piping in contact with hangers or building construction.

2.3 CLEANOUTS:

A. Floor cleanouts shall be Zurn Z-1400, Smith 4023, Wade 7000T or Josam 56010 or approved equal.

B. Wall cleanouts shall be Zurn Z-1440, Wade 8450 or Josam 58700 or approved equal.

2.4 VALVES:

A. Valve for copper piping shall be as follows:
   1. Ball Valves – 2” and Smaller: Bronze construction, two piece body, full-port, insulated quarter-turn handle, blowout-proof stem, single union/soldered end.

      Kitz No. 69U
      Nibco S585-70-SU
Watts B-6011

2.5 **SLEEVES:**

A. Furnish and install plastic “knock-out” sleeves for all risers through slabs and iron pipe size for sleeves through concrete walls. Proset Firestop sleeve may be used.

2.6 **FIXTURES AND EQUIPMENT:**

Brand names listed hereinafter are given ad guide to style and quality. Other makes may be substituted upon approval. Similar and equivalent fixtures will be acceptable without prequalification provided that they are listed as equal in INDEX CREATIONS cross reference (Blue Books).

A. Plumbing Fixtures and Equipment:

1. **Faucet-Double laboratory with bent riser spout<10152>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

2. **Faucet- Water tower-12in 305mm<10153>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

3. **Faucet- Double laboratory with swing spout<10215>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

4. **Faucet- Pre rinse sprayer wall mounted<10447>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

5. **Faucet- single handle<10597>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

6. **Faucet- water tower-14in 355mm<10837>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

7. **Faucet- Hot water dispenser gooseneck<10874>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

8. **Faucet- Mop sink wall mounted<10922>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

9. **Faucet- Single laboratory with swing spout<10943>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

10. **Faucet- Dipperwell<11003>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

11. **Faucet- Hand sink wall mounted<13588>:** Owner furnished, contractor installed. Provide with angle stops, risers, and escutcheons as required.

12. **Sink-rinse drop in- 27x20in 85x510mm<10505>:** Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.

13. **Sink- Water tower – 10x8in 255x215mm<10523>:** Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.
14. Sink- Rinse drop in SST – 12x20in 305x510mm: Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.

15. Sink- Mop 24"<10995>: Owner furnished, contractor installed. Provide with p-trap, escutcheons cleanout plug, grid drain, and strainer as required.

16. Sink-3 comp work SST – 93in 2350mm<13264>: Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.

17. Sink – Hand with side splash wall mounted SST<14688>: Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.

18. Sink – Hand with side splash wall mounted SST<14688>: Owner furnished, contractor installed. Provide with p-trap, escutcheons and adjustable tail piece as required.

B. Equipment (as listed or approved equal):

1. Electric Water Heater: Owner furnished, contractor installed. Capacity and characteristics as indicated on drawings. Commercial grade, thermostat step control, U/L listed minimum 3" foam insulation. Provide minimum factory 3 year tank and 1 year parts warranty. Provide with thermal expansions tank, shut off valves, check valves, water piping as required for complete installation.

2. Water filter system: Owner furnished, contractor installed. Provide with shut off valve, cold water piping, indirect waste piping and accessories as required for complete installation.

3. Floor Sink(FS): Owner furnished, contractor installed. Provide with p-trap, grating, and strainer as required

4. Floor Sink (FS-2): J.R. Smith 3120 or approved equal. 12 x 12 x 8" deep cast iron body and square, minimum 3" sanitary connection, light duty grate with ½ slotted openings, white acid resisting porcelain enamel interior and top, complete with white ABS anti-splash interior bottom dome strainer.

**PART 3 - EXECUTION**

3.1 PREPARATION:

A. Visit work site and become fully aware of all existing conditions. Investigate contract documents and make proper provisions to avoid interference or construction delays. Determine exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate structure and work of other trades. Furnish other trades with information to properly locate and size openings in structure required for this work. Furnish anchor bolts, sleeves, inserts, and supports required for this work.

3.2 INSTALLATION AND REQUIREMENTS:
A. Perform work using personnel skilled in trade involved, provide competent supervision. Furnish new equipment, fixtures, materials, and accessories bearing manufacturer’s identification and conforming to recognized commercial standards. Provide guard around all exposed moving machinery parts and around high temperature equipment and materials. When exposed to weather, provide weather protected enclosure around electrical equipment, controls, and other items that are not satisfactorily protected. Provide access panels for concealed items provided under this Section that require maintenance, adjustment or inspection. Provide all extra materials and labor for complete operable system at no extra cost to Owner.

B. Excavation, Backfill, and Concrete Work: All excavation and backfill in connection with plumbing work and mechanical work shall be accomplished in accordance with Plumbing Code. Provide proper support along pipe length and where rocks are encountered, provide minimum of 3 inches of backfill properly tamped for pipe. Coral shall not be used as backfill material for underground piping. Pipes shall be buried minimum of 12 inches below floor slab. Ditches parallel to footings shall run not closer than 3 feet to footings. Concrete work shall comply with DIVISION 03 - CONCRETE Sections of these specifications.

C. Cutting and Patching: Work shall be carefully laid out in advance providing sleeves, templates or details for chases and openings to be left in walls, floors, structural members of partitions. Cutting shall be carefully done, and damage to buildings, piping, wiring or equipment as result of cutting for this Section, shall be repaired promptly without any additional cost to Owner.

3.3 EQUIPMENT INSTALLATION:

A. Install equipment in space allotted with sufficient clearance for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in piping, supports, and appurtenances and cost of work of any other trades affected. Provide equipment accessories necessary for proper operation and support. Concrete equipment bases and supports are under DIVISION 03 - CONCRETE. Direct trade providing concrete in proper locations, dimensions, load carrying capacity, and anchor bolt locations. Concrete pads shall be not less than 3 inches above adjacent surfaces and shall extend at least 3 inches above adjacent surfaces and shall extend at least 3 inches beyond base of equipment.

3.04 FIXTURE INSTALLATION:

A. Set fixtures in approved workmanlike manner. Point up all edges against walls and partitions with white grout. Provide adequate supports for wall mounted fixtures. Provide supplies for all water line to fixtures, except those using flush valves; Brass-Craft or equivalent, compression joint type with chromium plated brass escutcheon and cover tube, loose key angle stop valve and drawn copper tube riser. Provide chromium plated brass P-trap, waste fittings and escutcheon as required for fixture. Exposed metal including pipe shall be polished chromium plated. Provide floor mounted or wall mounted supports.

3.05 PIPING INSTALLATION:

A. Conform to the requirements of the Uniform Plumbing code. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions where copper tubing connects to steel
pipe. Wrap pipe or tubing with 1/4” thick felt, secure with tape, where it contacts other materials. Have piping tested, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves where water pipes pass through structure, sufficiently large to provide 1/4” clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fireproof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome-plate brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar to membrane flange where pipe or drains penetrate waterproof membrane.

B. All underground steel piping shall be plastic coated or installed with 2 layers of “Scotch-wrap” or equivalent protective tape.

C. Perform all welding using qualified welders in accordance with American National Standards Institute’s Code B31.1 and American Welding Society Standard B3.0.

3.06 PIPING SYSTEM SUPPORTS:

A. Pipe Supports: For aboveground piping, support with clevis or trapeze hangers. Support underground piping on firm soil along its entire length. Where rocks are encountered, have trench excavated to minimum overdepth of 4-inches and backfilled with granular moist earth, thoroughly tamped. Materials used for backfilling over piping shall be granular earth, free from debris and stones. The Architect’s representative may reject any materials that he considers unsuitable for fill. Provide a minimum of one foot of cover for all pipes. Support steel and copper pipe at maximum spacing of 6 feet for pipes 1-1/2” and smaller, 10 feet for pipes 2” through 4”.

B. Pipe Hangers: Steel clevis hanger with adjustable hanger rod; 3/8” for pipe 2” and smaller, 1/2” for pipe 2-1/2” through 3-1/2” and 5/8” for channel with pipe clamp.

3.07 DRAINAGE, WASTE AND VENT PIPE SYSTEMS:

A. Slope drain lines at 1/4” per foot unless otherwise indicated. On roof vents and where other drains occur above the ground floor, provide clamping device with drain. Provide a four-pound lead flashing sheet extending eight inches out around drain body and secure with clamp device. On vents through roof, extend vent flashing 8-inches out all around base of vent, extend collar up vent and turn in at top. Install hubless cast-iron pipe in accordance with CISPI Pamphlet 100-1972. Provide cast iron and neoprene gasketed no-hub couplings below grade. MG stainless steel clamps and cast iron no-hub couplings shall be installed in accordance with manufacturer’s written instructions.

3.08 WATER PIPING SYSTEM:

A. Secure each water line where it penetrates partitions to serve fixtures, shower arms, hose bibs, and similar items. Wrap all lines passing through concrete with polyethylene tape. Install unions or flanges at all valves, equipment and system specialties. Set hose bibbs 18” above finished grade, unless otherwise indicated. Install dielectric unions at connections of copper and ferrous pipes.

B. Provide water hammer arrester on all cold water lines serving fixtures using flush valves sized in accordance with the PDI Standards WH201 for the total number of fixture units connected to the branch line. Install arrester between last two fixtures served or as shown. Provide access panel for concealed arresters.
3.09  **ELECTRICAL:**

A. Conform to requirements of ANSI C1, National Electrical Code, and to requirements of ELECTRICAL Section of these specifications. Obtain equipment manufacturer’s control wiring diagram for equipment furnished. Prepare control and interlock wiring diagram for complete system. Submit control diagram for review and approval. Furnish motor starters for all electricity driven plumbing equipment, complete with circuit breaker, one overload relay per phase, 120 volt control circuit and horsepower rating.

3.10  **FIELD QUALITY CONTROL:**

A. General: Test water piping and sanitary drainage systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of inspectors having jurisdiction over the work. Ask for final inspection by the Architect after all tests, adjustments and balancing has been performed.

1. Water Piping Systems:
   a. Test water piping systems in accordance with Section 609 of the Uniform Plumbing Code.
   b. Hydrostatically test the domestic water piping system at design pressure. Inspect the entire system while under pressure and correct all deficiencies.
   c. Test equipment to demonstrate its operations and compliance with the specifications.

2. Sanitary Piping System: Test drainage systems in accordance with Section 723 of the Uniform Plumbing Code.

3.11  **TESTING AND INSPECTION:**

A. Contractor shall furnish all equipment for tests and any required retests and pay for all cost of repairing any damage resulting from such test. Contractor shall adjust systems until they are approved. Tests shall be performed in presence of, and to satisfaction of Architect.

B. Defective Work: If inspection or test shows defects, such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material. No caulking of screwed joints or holes will be accepted.

C. Protection to Fixtures, Materials, and Equipment: Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. Upon completion of all work, fixtures, materials, and equipment shall be thoroughly cleaned, repainted as required, adjusted, and operational.

D. Removal and Capping of existing plumbing lines as required is included in this Section.

E. Chlorination: Domestic water lines shall be sterilized with chlorine before acceptance of work. Dosage of chlorine shall be not less than 50 ppm. After contact period of not less than 8 hours, system shall be flushed with clean water until residual chlorine content is not greater than 0.2 ppm. All valves in lines being sterilized shall be opened and closed several times during contact period. Certificate shall be furnished to Architect evidencing proper performance of sterilizations. Proper disposal of chlorinated water shall be in accordance with applicable regulations (State of Hawaii Department of Health).

3.12  **CLEANING AND ADJUSTING:**

A. At completion of work, all parts of installation shall be thoroughly cleaned. Equipment,
pipe, valves, and fittings shall be cleaned of grease and metal cuttings and sludge that may have accumulated by operation of system for testing. Any stoppage or discoloration or other damage to parts of building, its finish or furnishing, due to Contractor’s failure to properly clean piping system, shall be repaired by Contractor without cost to Owner. Automatic control devices shall be adjusted for proper operation.

3.13 OPERATION AND MAINTENANCE MANUAL

A. Furnish an operation and maintenance manual for each item of equipment. Furnish three copies of the manual bound in hardback binders or an approved equivalent. Furnish one complete manual prior to the time that equipment tests are performed and furnish the remaining manuals before the contract is completed. Inscribe the following identification on the cover; the words OPERATION AND MAINTENANCE MANUAL, the name and location of the equipment and the building, the name of the Contractor and the contract number. The manual shall include the names, addresses and the local representatives for each item of equipment. The manual shall have a table of contents and be assembled to conform instructions covering the subject. The instructions shall be legible and easily read with large sheets of drawings folded in. The manual shall include: Wiring and control diagrams with data to explain detailed operation and control of each item of equipment; a control sequence describing start-up, operation and shut-down; description of the function of each principle item of equipment; the procedure for starting; the procedure for operation; shut-down instructions; installation instructions; maintenance instructions; lubrication schedule including type, grade, temperature range and frequency; safety precautions, diagrams and illustrations; test procedures, performance data; and parts list. The parts lists for equipment shall indicate the sources of supply, recommended spare parts and the service organization which is reasonably convenient to the project site. The manual shall be completed in all respects for equipment, controls, accessories and associates appurtenances provided.

3.14 AS-BUILT DRAWING:

A. The mechanical contractor shall maintain an accurate and adequate record of change as it occurs, regardless of how ordered. At the conclusion of the job, transfer all such notations accurately and legibly to a clean set of mylar and deliver “As-Built Drawings” to the Architect.

3.15 INSTRUCTIONS:

A. Instruct Architect in the proper operation and maintenance of the systems.

3.16 INSTRUCTION TO BUILDING ENGINEERING PERSONNEL:

A. The Contractor shall furnish the services of competent instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment or system specified. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instructions shall be given for a period of two days.

3.17 SAFETY REQUIREMENTS:

A. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts located so that any person can come in close proximity there to shall be fully enclosed or
properly guarded. High temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of a type as specified herein. Items such as catwalks, ladders and guard rails shall be provided where required for safe operation and maintenance of equipment.

3.18 CLEANUP AND REPAIRS:

A. Debris shall not be allowed to accumulate as a result of this work. Upon completion of this work, remove all debris and excess materials, tools, etc. resulting from this work from the jobsite and leave the location of this work broom-clean in a manner acceptable to the Architect.

B. This Contractor shall clean all fixtures and equipment set by him of oil, grease, stains, etc. All plates, trim, etc., shall be polished. Traps and drains shall be clean and unobstructed.

C. All fixture piping and lines shall be thoroughly cleaned before leaving the work.

3.19 FINAL INSPECTION:

A. Final inspection shall be requested by the Mechanical Contractor only after submittal of all required certificates. No final inspection will be made until all moving parts or equipment are properly guarded, all controls and safety devices tested and operative, all painting required done and the site cleaned up.

3.20 GUARANTEE:

A. The Mechanical Contractor shall guarantee the installation for a period of one year from the date of acceptance of the project against any defects due to faulty materials, equipment, workmanship or installation. Upon notice of defect, the Mechanical Contractor shall correct or replace defective item at no additional cost to the Owner.

END OF SECTION 22 00 00
SECTION 23 00 00

HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

PART 1 - GENERAL

1.1 WORK INCLUDES

A. This section covers the furnishing, fabrication, delivery and installation of the air conditioning and ventilation system complete, including but not limited to the following:
   1. Ductless-spit system.
   2. Sheetmetal duct.
   3. Ductwork Accessories
   4. Air terminals, diffusers, registers and grilles.
   5. Air systems testing, adjusting and balancing

B. General provisions of the contract, including the following, shall apply to division 23 specifications sections: Solicitation documents and division 00 and division 01 of the specifications.

1.2 CODES, REGULATIONS, AND STANDARDS

A. Installation of all work in this Section shall be made in accordance with State Department of Health Regulations, National Fire Protection Association, and the International Building Code and ASHRAE Guide.

B. All applicable codes, regulations and ordinances of public bodies having jurisdiction are considered a part of these specifications; all work installed and materials provided must comply with the current edition of such codes, regulations and ordinances.

C. Present to the Architect certificates of inspection and approval from proper authorities.

1.3 DEFINITIONS

A. FURNISH: The term furnish means supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.

B. INSTALL: The term install describes operations at the project site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations

C. PROVIDE: The term provides means to furnish and install, complete and ready for the intended use.

1.4 CONTRACT DRAWINGS:

A. Contract drawings are essentially diagrammatic, indicating general layout and approximate locations toward establishing the scope for uniform estimating basis for all bidders. They are not intended to be detailed construction working drawings. Equipment, ductwork and piping arrangements shall fit into space allotted and shall allow adequate clearances for servicing and maintenance. Reasonable modifications to indicated locations and arrangement to suit job conditions shall not constitute basis for requesting additional funds from the Owner.
B. Capacities of all equipment and materials shall be not less than those indicated on drawings.

C. Nameplate: Each major component of equipment shall have the manufacturer’s name, address, and catalog number on a plate securely attached to the item of equipment.

D. Verification of Dimensions: The Contractor shall be responsible for the coordination and proper relation of this work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work.

1.5 SUBMITTALS

A. Shop Drawings: Prior to start of any field work, required copies of to-scale shop drawings of mechanical equipment, piping, ductwork and controls shall be submitted for review. No work shall be started without approval of the Architect. Where apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The shop drawings shall show the details of construction and installation of the particular equipment furnished. The shop drawings shall be fully dimensioned to show that the equipment and connections thereto fit the space provided. Drawings shall be a minimum of 24 inches by 36 inches in size, except as specified otherwise. Drawings shall be a minimum of 1/4-inch scale but not less than indicated on the Drawings. Drawings shall include floor plans, sectional view, wiring and piping diagrams and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping, ductwork, locations and sizes of openings penetrating through walls, floors, roofs and structural members, access panels to valves and items requiring maintenance or inspection, and other items that must be shown to assure a coordinated installation. Drawings shall be coordinated with the architectural reflected ceiling plans and shall include but not limited to air devices, lights, speakers, and ceiling grid locations. Control and wiring diagrams shall identify circuit terminals and indicate the wiring for each item of equipment and interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, Drawings shall be reviewed to show acceptable equipment and be resubmitted. Contractor shall coordinate all flashing requirements with other trades water proofing work to assure a watertight installation.

1. Review, stamp with approval and submit Shop Drawings required by the Contract Documents or subsequently by the Architect as covered by modifications. At the time of submission, inform the Architect in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified field measurements, field construction criteria, materials, catalog numbers and similar data and that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that the equipment and related items fits in the allotted space and complete coordination between contractors involved. Contractor shall coordinate their Shop Drawings with other trades Shop Drawings to assure a complete coordination has been done.

a. Coordinate all mechanical work with finish work.

b. The Mechanical Contractor shall provide Shop Drawings for all their site work. Prior to submitting the shop Drawings for review, the key or prime Contractor shall coordinate all subcontractors; work on the Shop Drawings; certify that all related site work contractors have reviewed the Shop Drawings. Submit complete (not partial) certified Shop Drawings for
2. Submitting reproductions of Bid Documents shall not be construed to be Shop Drawings and will not be acceptable and will be returned without review. Direct tracing of the Bid Drawings shall be construed to be reproduction of the Bid Documents.

3. Certify that this shop drawings equipment and material shown is in compliance with the Drawings and specifications and can be installed in the allocated spaces without interference to other related work and access spaces.

4. Additional related work caused by the product changes, installation and operational requirements shall be the Contractor's responsibility at no additional cost to the Owner.

B. Manufacturer’s Data: Submittals for each manufactured item shall be manufacturer’s descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts.

C. Standards of Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standard Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories (UL), proof of such conformance shall be submitted to the Architect for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable test and is approved by the Architect. The certificate shall state that the item has been tested in accordance with the specified organization’s test methods and that the item conforms to the specified organization’s standard. For materials and equipment whose compliance with organizational standards of specifications is not regulated by an organization using its own listing from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

D. Approval of Materials: As soon as practicable and within 20 days after award of contract and before installation of any materials or equipment is begun, Contractor shall submit complete list of materials and equipment together with names and addresses of manufacturers, catalog numbers, and trade names to Architect for approval. No consideration shall be given to partial list submitted from time to time.

E. Approval of materials will be based on manufacturer’s published rating. Any materials and equipment which are not in accordance with these specifications may be rejected.

F. Contractor shall check the submittals and shop drawings and certify that they are correct and in compliance with the drawings and specifications.

1.6 AS-BUILT DRAWINGS:

A. Upon completion of work, submit accurate as-built drawings to the Architect as required by the GENERAL CONDITIONS. With these drawings, also submit six (6) sets of operating instructions and other pertinent literature of fixtures and equipment incorporated into the project. Show exact locations and sizes, as actually installed, of air conditioning equipment, duct, piping, drains and controls of this record “as-built” drawing.
1.7 INSPECTION OF SITE:
   A. The Contractor shall visit the site and examine the conditions affecting his work before sub-
      mitting his proposal. The submission of the proposal shall be considered evidence that the 
      Contractor has visited the site and no extra payments will be allowed to the Contractor on 
      account of extra work made necessary by his failure to visit the site.

1.8 SUBSTITUTION OF MATERIAL:
   A. Request for substitutions, complete with catalog data, shall be furnished to the Architect 
      as required by SPECIAL CONDITIONS.
   B. Design is based on equipment as described in drawings and by Equipment Schedule. Any 
      changes in foundations, bases, connections, piping, controls, electrical equipment, specified 
      and required by approved substitutions shall be made by Contractor at no additional 
      cost to the Owner.

1.9 RELATED WORK SPECIFIED IN OTHER SECTIONS:
   A. All power wiring including disconnects and wiring to all motors specified in DIVISION 26 - 
      ELECTRICAL.
   B. Painting of all exposed piping and ductwork specified in PAINTING Section.

1.10 OMISSIONS:
   A. It is the intent of the plans and specifications to provide a complete installation. Should 
      there be omissions, the Contractor shall call the attention of the Architect to such omissions 
      in fifteen (15) days advance of the date of bid opening so that the necessary corrections 
      can be made.

1.11 GUARANTEE AND CERTIFICATE:
   A. Contractor and Installer shall guarantee and certify in writing all work in this section for a 
      period of one year from date of acceptance of the project as a whole by the Owner. Should 
      any equipment or material fail due to faulty workmanship or materials within this period, 
      replace or repair that item at no cost to the Owner. Replacement of lost refrigerant and 
      correction of undue noise or vibration is included in this guarantee. Contractor shall be 
      responsible for all damages to any part of the premises during equipment installation work 
      under this section.
   B. In addition, furnish emergency service and all refrigerant required during one-year period 
      from date of acceptance, free of charge.
   C. 45 days after date of acceptance, return to job, drain and change oil of compressor, and if 
      required, remove refrigerant and recharge.

1.12 SPARE-PARTS DATA:
   A. After approval of materials and equipment and one month prior to the date of beneficial 
      occupancy, the Contractor shall furnish a complete list of parts and supplies, with current 
      source of supply.
1.13 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. **BOUND INSTRUCTIONS:** Six (6) complete sets of instructions containing the manufacturer’s operating and maintenance instructions for each piece of equipment shall be furnished to the Architect. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time the test procedure is submitted, and the remaining sets shall be furnished before the contract is complete. The following identification shall be inscribed on the covers: the words "OPERATING AND MAINTENANCE INSTRUCTIONS," the name and location of the building, the name of the Contractor and the contract number. Flysheet shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2 x 11 inches, with large sheets of drawings folded, in. The instructions shall include, but shall not be limited to the following:

1. Table of Contents.
2. System layout showing piping, valves and controls.
3. Wiring and control diagrams, with date to explain the detailed operation and control of each component.
4. A control sequence describing start-up, operation and shutdown.
5. Operating and maintenance instructions for each piece of equipment, including lubrication instructions.
6. Manufacturer's bulletins, cuts and descriptive data.
7. Parts list and recommended spare parts.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials shall be new, of equal or better quality of materials specified, and approved by the Architect. For ease of maintenance and parts replacement, select equipment from a single manufacturer as much as possible. Substitutions required pre-bid approval in accordance with Substitution Procedures Section.

2.2 VRF SYSTEM

A. Air Cooled Condensing Unit: shall be hermetic inverter driven scroll compressor with accumulator, charging valve, crankcase heater, timer circuit, internal vibration isolation and thermal overload protection. Non-ferrous copper condenser coil with lanced or corrugated plate fins. Direct drive, variable speed, propeller type condenser fan with permanently lubricated, totally enclosed and inherently protected motor. Factory applied Blue Fin corrosion protection coating on condenser fins and tubes. Galvanized steel unit casing, bonderized and finished with a powder coated baked enamel.

B. Ceiling Cassette Fan Coil Unit: Ceiling suspended four-way cassette, direct expansion coil, direct drive fan, washable filter, four-way grille with individually adjustable vanes, and condensate drain pump. Capacity and characteristics of units shall be as indicated on drawings. Unit to be equipped with digital thermostat controls with on-off/timeclock features and locking covers. Provide control voltage transformers and relays as required.

C. VRF System AC shall be LG, Daikin, Fujitsu, Sanyo, Mitsubishi, or equal.

2.3 DUCTWORK AND ASSOCIATED SHEETMETAL WORK

A. All low pressure air conditioning, toilet, general exhaust (excluding lab hood exhaust), transfer ducts shall be galvanized sheetmetal steel with gages and construction in accordance with SMACNA Standards "Low Pressure Duct Construction Standards". Caulk/seal all joints/seams in ductwork airtight. All lab hood exhaust ductwork shall be of
type 316 welded stainless steel fabrication in accordance with SMACNA Standards.

B. All air conditioning supply and return air ducts shall be wrapped with 2" thick, 1 psf density fiberglass insulation with vapor barrier. Flame spread not to exceed 25 and smoke developed rating not to exceed 50.

C. Flexible Duct Connections: Neoprene coated glass fabric prefabricated connections, UL approved. Flexible duct connectors shall be provided at each inlet and discharge of air handling units and all fans.

D. Splitter Dampers: Provide on all taps, including low pressure branches to diffusers. Shall be adjustable with locking quadrant.

E. Deflectors: Provide fixed deflecting vanes at all branch take-offs and elbows. Shop fabricated blades; fit into side strips and screw or rivet to duct.

F. Insulated flexible ducts: Reinforced metalized vapor barrier 2" thick fiberglass, CPE liner on coated spring wire helix, UL standard

2.4 DIFFUSERS, REGISTERS AND GRILLES

A. Diffusers shall be louver faced aluminum, Type 248S-T4 with volume control. Diffuser shall be adjustable pattern type with removable adjustable assembly. Finish shall be off-white. Metalaire 5000-6, Titus TDC-AA, Kreuger, Tuttle & Bailey or approved equal.

B. Registers and grilles shall be of aluminum, Type 24S-T4 construction with one inch frame and removable core. Blades shall be double deflection for supply and fixed for return/exhaust. Finish shall be off-white. Metalaire V4004-1, Metalaire RHED, Titus 350FL, Kreuger, Tuttle & Bailey, or approved equal.

2.5 VOLUME DAMPERS AND BALANCING DAMPERS

A. Volume dampers shall be installed where shown and as required for air balancing. Dampers shall be two gauges heavier than the duct in which they are installed and shall be reinforced to prevent vibration and noise.

B. Balancing dampers for branches and mains shall be equipped with Young Regulator (Hand quadrant) or approved equal.

2.6 PIPING

A. Refrigerant piping shall be hard drawn copper tubing, type K, with wrought copper fittings. Material and dimensional requirements for field assembled ACR refrigerant piping, calces, fittings, and accessories shall conform to ANSI B9.1 and ANSI B31.5. Provide 3/4" flexible closed-cell elastomeric insulation. For exposed or exterior piping, insulation shall be covered with aluminum jacket and made weather-tight.

B. Condensate drain piping shall be hard drawn copper tubing, type L, with copper or brass drainage fittings and 95-5 tin-antimony (non-lead) soldered joints. Use noncorrosive flux. Schedule 40 PVC with solvent welded joints may be used in lieu of copper at contractor's option. Use only one type throughout the project. Provide 3/4" flexible closed-cell elastomeric insulation. For exposed or exterior piping, insulation shall be covered with aluminum jacket and made weather-tight.
A. Provide relays, detectors, and wiring for interlocking stair pressurization supply fans.

B. Any wiring not shown and required to properly connect equipment, including connections to special safety control or apparatus not shown, shall be included under this Section.

2.8 ACCESS PANELS

A. Furnish access panels for dampers, fans, filters, exhaust duct cleanout locations, and where indicated of size shown or necessary.

2.9 VIBRATION ISOLATION

A. Unless otherwise noted on Equipment Schedule, all mechanical equipment shall be mounted on vibration isolators to prevent transmission of vibration and mechanically transmitted sound to building structure. Vibration isolator shall be selected in accordance with weight distribution so as to produce reasonably uniform deflection.

PART 3 – EXECUTION

3.1 COOPERATION WITH OTHER TRADES AND CONFLICT IN WORK

A. Contractor shall examine all drawings of proposed work and coordinate his work with other trades. Work conflicts shall be brought to the attention of the Architect and work rearranged or modified in accordance with his decision.

B. If changes in indicated locations or arrangements of work are required, they shall be made by Contractor without additional charge to the Owner provided that these changes were ordered before work is installed and no extra material or labor is required.

C. Should Contractor determine that extra material and labor will be required to accommodate any rearrangement, he shall first submit estimate of cost for required changes and proceed with work only upon written authority of the Architect.

3.2 EQUIPMENT INSTALLATION

A. Necessary supports shall be provided for equipment, appurtenances and pipe, as required. These include frames or supports for air conditioners, and other similar type items requiring supports.

3.3 WORKMANSHIP AND FABRICATION

A. Ductwork:
   1. Fabricate all ductwork and related work to highest industry standards and recommendations of ASHRAE and SMACNA.
   2. Duct dimensions shown are required net inside dimensions.
   3. Sides of ductwork greater than 24” shall be cross broken. Long seams shall be snap lock or Pittsburgh lock groove, hammered flat or double seamed. Ducts shall also have supplemental stiffening as required to prevent drumming and to provide structurally sound assembly.
   4. Center line radius of curves, bends, offsets for branch and connections shall be equal to 1-1/4 times duct width or larger. Duct turns in all square elbows shall be accomplished by using pre-fabricated turning vanes such as Tuttle & Bailey “Ducturn” or other approved equal. Double thickness turning vanes in ducts
deeper than 16-inches may be used in lieu of “Ducturn” provided prior approval of design is given by the Architect.

5. Volume and splitter dampers shall be installed where required and shall be provided with extension rods for adjusting and locking. Dampers shall be made of not lighter than 18-gauge steel for dimensions up to 18-inches and multi-louvered type on ducts over 18-inches high. All dampers shall have Young Regulator No. 401 locking quadrants or approved equal.

6. Ducts shall be supported at joints every 6 feet or less with steel hanger straps one inch wide and made of material not lighter than 18 gauge riveted to seams. Bolts or sheet metal screws may be used to fasten straps to ductwork provided prior approval is given by the Architect.

7. Paint inside of all supply, return, and exhaust ducts with one coat of flat black paint wherever duct is visible through register or grille opening.

8. Ducts passing through roof or through outside walls shall be suitably and properly flashed and counter-flashed to prevent leaks. Fresh air intake of ventilation opening shall be provided with screened louvers.

9. Access doors which shall be at least two gauges heavier than duct material shall be installed with reinforced frames made airtight with felt or sponge rubber strips and shall be attached to ductwork with Ventlock No. 260 hinges and latches or approved equal.

3.4 EQUIPMENT SUPPORT

A. Refer to Architectural drawings and Mechanical drawings for type of construction from which equipment is to be supported.

B. Drilled In Threaded Inserts: Where supports in beams and joints are required after concrete has been poured, Phillips “redhead” Drilled-In Threaded Inserts shall be provided and installed in accordance with manufacturer’s recommendations.

3.5 VIBRATION ISOLATION

A. Vibration transmission from all reciprocating and/or rotating equipment such as fan coil units and fans, etc., shall be effectively isolated, by use of vibration mountings or hangers. Mounting and hanger sizes shall be determined by the manufacturer to assure adequate deflection and vibration isolation, and shall be installed in accordance with manufacturer’s recommendations to provide not less than 90 percent isolation efficiency.

3.6 PAINTING

A. All ductwork visible through register, grilles, and diffuser openings shall be given one coat of flat black paint.

B. All ferrous metal shall be given one shop coat of red lead or other approved rust resisting paint. Where zinc coated metal is furnished, it shall not be shop primed unless specifically called for, but all abraded places and welds shall be touched-up with Galvalloy or approved equal.

3.7 CLEANING AND ADJUSTING

A. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction and after all construction dirt has been removed from the building, new filters shall be installed. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. All control valves and other miscellaneous
3.8 TESTING AND BALANCING AIR DISTRIBUTION SYSTEMS

A. The Contractor shall obtain the services of an independent test and balance agency that specializes in and whose business is the testing and balancing of air conditioning systems. All final reports shall be signed by the test and balance Architect.

B. Testing and balancing shall be performed in complete accordance with AABC National Standards for Field Measurement & Instrumentation, Form Number 81266, Volume One, section applicable to air balancing or NEBB, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.

C. Instruments used for testing and balancing of air must have been calibrated within a period of six months and checked for accuracy prior to start of work.

D. Six copies of the complete test report shall be submitted to the Architect prior to final acceptance of the project.

E. Balancing:
   1. Duct systems shall be balanced as follows: system (or air moving device) to not less than 5 percent of design CFM.
   2. Test Data: The Contractor shall provide the Architect with typewritten schedules of readings taken during the balancing and testing operations indicating the required or specified reading, the first reading taken, and final balanced reading for the following items:
      a. Air outlets and inlets: Size, velocity, and air quantity in cfm.
      b. Ducts: Size, velocity in fpm, and air quantity in cfm.

3.9 TESTS

A. Contractor shall completely adjust and readjust temperature control system so that all thermostats are maintaining required temperatures in all portions of the building so equipped.

B. All above tests shall be verified in presence of Architect.

3.10 SPARE-PARTS DATA

A. After approval of materials and equipment and one month prior to the date of beneficial occupancy, the Contractor shall furnish a complete list of parts and supplies, with current source of supply.

3.11 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Bound Instructions: Six complete sets of instructions continuing the manufacturer’s operating and maintenance instructions for each piece of equipment shall be furnished to the Contracting Officer. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time the test procedure is submitted, and the remaining sets shall be furnished before the contract is complete. The following identification shall be inscribed on the covers: the words “OPERATING AND MAINTENANCE INSTRUCTIONS,” the name and location of the building, the name of the contractor and the contract number. Flysheet shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. The instructions shall include, but shall not be limited to the following:
1. Table of Contents
2. Wiring and control diagrams, with data to explain the detailed operation and control of each component.
3. Operating and maintenance instructions for each piece of equipment, including lubrication instructions.
4. Manufacturer’s bulletins, cuts and descriptive data.
5. Parts lists and recommended spare parts.

3.12 GUARANTEE
A. The entire mechanical installation described hereinbefore shall be guaranteed as a complete working unit for a period of one year. In the event of failure due to faulty material and workmanship during this period, all said failures shall be corrected to the satisfaction of the Architect at no additional cost to the Owner for labor and material.
B. The one-year guarantee shall start at the end of thirty (30) consecutive days of trouble-free operation after acceptance by the Owner.

3.13 FINAL INSPECTION
A. Final inspection shall be requested by the Mechanical Contractor only after submittal of all required certificates. No final inspection will be made until all moving parts of equipment are properly guarded, all controls and safety devices tested and operative, all painting required is done and the site cleaned up.

3.14 WARRANTY
A. All air conditioning and ventilation systems, controls shall be provided with a one year warranty.

END OF SECTION 23 00 00
SECTION 23 01 00
MECHANICAL – GENERAL PROVISIONS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. General provisions of the contract, including the following, shall apply to division 23 specifications sections: Solicitation documents and division 00 and division 01 of the specifications.

B. The work to be performed under this division shall include all labor materials, equipment, transportation, construction plant, and facilities necessary to provide a complete and satisfactory system ready to use. Wherever the words “the Contractor” or

1.2 CODES, REGULATIONS, AND STANDARDS

A. Installation of all work in this Section shall be made in accordance with State Department of Health Regulations, National Fire Protection Association, and the Uniform Building Code and ASHRAE Guide.

B. All applicable codes, regulations and ordinances of public bodies having jurisdiction are considered a part of these specifications; all work installed and materials provided must comply with the current edition of such codes, regulations and ordinances.

C. Present to the Architect certificates of inspection and approval from proper authorities.

1.3 DEFINITIONS

A. FURNISH: The term furnish means supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.

B. INSTALL: The term install describes operations at the project site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations

C. PROVIDE: The term provides means to furnish and install, complete and ready for the intended use.

1.4 GENERAL REQUIREMENTS

A. Provide all work described by the drawings and specifications, including work specified and not indicated, and work indicated and not specified.

B. Completely examine the drawings and specifications and report to the Owner any error, inconsistency, omission, or error in the work of others affecting the mechanical work. If the Contractor proceeds with the work affected without instructions from the Owner, he shall correct or pay for any resultant damage or defect.

C. Provide all supplementary or miscellaneous items, details, appurtenances and devices incidental to or necessary for a complete operating system where work required is not specifically indicated or specified.
D. Maintain at the job site one copy of all drawings, specifications, addenda, approved shop drawings, change orders, and other modifications, in good order and marked to record all changes made during construction. These documents shall be made available to the Owner.

E. The Contractor shall schedule a date and time with the Owner, a minimum of 7 days in advance, for all testing.

F. Reference to standards and publications are intended to be the latest revision of the standard or publication. In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, “shall” had been substituted for “should” wherever it appears. Interpret references in these publications to the “authority having jurisdiction” or words of similar meaning, to mean the Owner.

G. The words “or approved equal”, or other words of similar intent or meaning, means that the equipment or material to be substituted is subject to review by the Architect and must be acceptable to the Owner.

1.5 QUALITY ASSURANCE

A. County, City, State, Federal and Industry Regulations: Comply with the County of Honolulu, building, fire and plumbing codes; State of Hawaii Department of Health and Department of Labor and Industrial Relations Regulations; U.S. Occupational Safety and Health Act; U.S. Environmental Protections Agency Regulations; National Fire Protection Association Codes; and other laws, codes and regulations, and ordinances and manufacturer’s recommendations and requirements, when applicable and as referenced in these specifications. The Contractor shall schedule and pay for all inspections required by any government agency.

B. Permits: Obtain all permits and pay all fees required by the applicable government agencies.

C. Warranty: Warrant all equipment and material furnished, and workmanship of the mechanical systems for a period of one year starting only after 30 consecutive days of trouble free operation after system acceptance. Submit the manufacturer’s warranty documents for all equipment furnished to the Owner. The warranty shall cover all labor and material required to correct, replace, or repair any defective item at no cost to the Owner.

D. Material and Equipment Qualifications: Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to award of this contract. The 2 year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturer’s catalogs, or brochures during the 2 year period. Air conditioning equipment to be considered for bid purposes must be a manufacturer that has locally stocked spare parts, representative, and support of a service organization reasonably convenient to the site of installation which has serviced manufacturer’s unit of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two years prior to bid opening. The Contractor shall provide a list of locations in Hawaii with addresses and telephone number when requested by the Owner. All equipment with local manufacturer’s representation shall be purchased thru the local factory authorized distributor. Preference should be given to products made or manufactured in the United States of America.

E. Alternative Qualifications: Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer’s factory or laboratory tests, can be shown.
F. Service Support: The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

G. Manufacturer’s Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer’s name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of distributing agent will not be acceptable.

1.6 SUBMITTALS

A. Submit in accordance with Section 01 33 00 - SUBMITTAL PROCEDURES.

B. Submit 6 copies of each required submittal to the Architect. Submittals shall include the manufacturer’s name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry, and technical society reference standards, years of satisfactory service, and other information necessary to establish contract compliance of each item the Contractor proposes to be provided. Photographs of existing installations and date submitted in lieu of catalog data are not acceptable and will be returned without review. Partial submittals are not acceptable and will be returned without review.

C. At the time the submittals are submitted, the Contractor shall inform the Architect, in writing, of any deviation in the shop drawings and other submittals from the requirements of the contract documents.

D. Manufacturer’s Catalog Data: Submittals for each manufactured item shall be current manufacturer’s descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts.

E. Shop Drawings: Submit drawings a minimum 24 by 36 inches in size, using a minimum scale of 1/8 inch per foot. Include floor plans, section views, wiring diagrams, and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Indicate locations of items requiring maintenance or inspection. Wiring diagrams shall identify circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of equipment devices.

F. Provide a written certification with the shop drawing submittal stating that the Contractor has determined and verified all field measurements, sizes and obstructions, and that he has coordinated the shop drawings with the field conditions and the work of other trades.

G. Manufacturer’s Instructions: Where installation procedures or part of installation procedures are required to be in accordance with the manufacturer’s instructions, submit printed copies of those instructions prior to installation. Installation of the item shall not proceed until the manufacturer’s instructions are received. Failure to submit can be cause for rejection of the equipment or material.

H. Certificates of Compliance: Submit a certificate of compliance from the manufacturer for approval for products, finishes, and equipment as specified in the technical sections whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance. The certificate shall identify
the manufacturer, the products, equipment, or materials and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to the requirements specified.

I. Reference Standards Compliance: Where equipment or materials are specified to conform to industry and technical society reference standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), American Society of Mechanical Engineers (ASME), American Gas Association (AGA), American Refrigeration Institute (ARI), and Underwriters Laboratories (UL), submit proof of such conformance. If an organization uses a label or listing to indicate compliance with a particular reference standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections.

J. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing and approved by the Architect. The certificate shall state that the item has been tested in accordance with the specified organization’s test methods and that the item complies with the specified organization’s reference standard.

K. Operation and Maintenance Manuals: Submit operation and maintenance manuals (5 sets) for each system and principal item of equipment.

L. Operating Instructions: Submit text of posted operating instructions for each system and principal item of equipment as specified in the technical sections.

M. Submit as-built drawings to the Architect prior to final inspection.

1.7 DELIVERY, STORAGE AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer’s recommendations, and as approved by the Owner. Replace damaged or defective items.

1.8 POSTED OPERATING INSTRUCTIONS

A. Provide for each system and principal item of equipment as specified in the technical sections for the use of the operation and maintenance personnel. Include the following in the operating instructions.

1. System Descriptive Information: Wiring diagrams, control diagrams, piping diagrams, control sequence and operating points for each principal system and item of equipment. Post instructions where indicated.

2. Equipment Instructions: Attach to or post adjacent to each principal item of equipment and include directions under glass.

3. Start up, proper adjustment, operating, lubrication and shutdown procedures.

4. Safety precautions, procedure in the event of equipment failure.

5. Other areas as recommended by the manufacturer of each system of item of equipment.

B. Print or engrave, and frame under glass or in an approved laminated plastic. Operating instructions exposed to weather shall be made of weatherproof materials or provided with a weatherproof enclosure. Operating instructions shall not fade
when exposed to sunlight and shall be secured to prevent easy removal.

1.9 SAFETY REQUIREMENTS

A. Equipment Safety: Fully enclose or properly guard, in accordance with DOSH regulations, belts, pulleys, chains, gears, couplings, projecting setscrews, keys, rotating parts, and other power transmission apparatus, located where persons can come in close proximity thereto. Points of operation, in going nip points, and machinery producing flying chips and sparks shall be guarded in accordance with the applicable portions of DOSH regulations. Provide positive means of locking out equipment so that the equipment cannot be accidentally started during maintenance procedures. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of the type specified. Ensure that access openings leading to equipment are large enough to carry through routine maintenance items such as filters and tools.

B. Warning Sign: Provide a permanent placard or sign at the entrance to confined spaces contained in the equipment. The sign shall warn personnel not to enter the space until the atmosphere inside has been tested and systems have been de-energized.

1.10 INSTRUCTIONS TO PERSONNEL

Furnish the services of competent instructors to give full instruction to the designated personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of each specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Owner for regular operation. The number of man days (8 hours per day) of instruction furnished shall be as specified in the individual sections. When more than 4 man days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

All materials and equipment shall be new and free from defects. Unless otherwise specified, each equipment or material of its kind shall be the standard product of a single manufacturer. All mechanical equipment, fans, pumps and compressor motors shall be sized to not overload anywhere on the operating curve. Safety factor shall be a minimum of 1.15.

PART 3 - EXECUTION

3.1 FACTORY PAINTING OF EQUIPMENT

Factory applied painting of equipment shall be as specified herein, and provided under each section. Manufacturer’s standard factory painted systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt
spray fog test. Salt spray fog test shall be in accordance with ASTM B117. Immediately after completion of the test, the paint shall show no signs of blistering, wrinkling or cracking; no loss of adhesion; and the specimen shall show no signs of rust creepage beyond 0.125 inch on either side of the scratch mark. The film thickness of the factory painted system applied to the equipment shall be not less than the film thickness used on the test specimen. If manufacturer’s standard factory painting system is being proposed for use in lieu of the shop painting systems, submit certifications that the manufacturer’s standard factory painting system conforms to the heat resistance requirement in addition to other certifications.

3.2 FIELD PAINTING

A. Conform to Section 09900 - PAINTING. Provide labels/signs for all piping including refrigerant piping, chilled water, condenser water, condensate drain lines.

B. The following items furnished under this section are to be painted and identified under Section 09900 - PAINTING. Do not paint over name plates or other identifying labels.

1. Paint exposed black iron work including pipe, fittings, iron body valves, pipe hangers, etc., with two coats of zinc rich paint.

2. Stencil all exposed piping with painted black letters indicating the service and with an arrow indicating the direction of flow. Stencil where pipes enter and leave each area and at not over 30 ft. intervals within an area. Paint color band at stencils; yellow for fuel and green for water systems. Width of color band, size of legend letters, and position of legend shall conform to the requirements of ANSI A13.1, Scheme for the Identification of Piping Systems.

3.3 MANUFACTURER’S RECOMMENDATIONS

Equipment installed under this Division of the Specifications shall be installed according to the manufacturer’s recommendations, unless otherwise indicated or specified otherwise.

3.4 OPENINGS, CUTTING AND PATCHING

A. The Contractor shall be responsible for the cutting, drilling and patching of walls, partitions, floors, roofs, ceilings and other building structures, required for the installation of piping, ductwork, conduits and other material equipment. This work may be subcontracted to other Contractors, or arranged to be performed by the General Contractor.

B. Holes through existing concrete and existing masonry shall be sawcut or core drilled. Holes through new concrete and masonry shall be provided with sleeves. Holes through other building materials shall be sawcut or core drilled and provided with sleeves.

3.5 PIPING INSTALLATION

Conform to the requirements of the Uniform Plumbing Code and all manufacturers’ recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings.
Bushings are not permitted. Pull-tees are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions or separation at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institutes Code B31.1 and American Welding Society Standard B3.0. Soil for bedding and backfill shall be tested for soil resistivity. If soil resistivity is less than 20,000 ohms-cm, provide cathodic protection of underground steel (including gas) and copper lines. Coordinate all pipe openings in pre-stressed tri-tee concrete flooring. Trenching/backfilling shall be in accordance with the Plumbing Code. Support underground piping on firm soil along its entire length. Where rocks are encountered, have trench excavated to a minimum over-depth of four inches and backfilled with granular moist earth, thoroughly tamped. Materials used for backfilling over piping shall be granular earth, free from debris and stones. The Owner may reject any materials which he considers unsuitable for fill. Clay and adobe type soil is not allowed. Provide a minimum of two feet of cover for all pipes. Where sewer and water lines are laid in the same trench, place water line on solid shelf with bottom of waterline twelve inches above top of sewer. Where sewer and water lines cross, encase sewer in four inch thick concrete envelope.

3.6 FIELD TESTS

The Contractor shall provide all labor, material, equipment, and instruments needed for the tests. During pressure test, all items in the system to be tested, which are not designed for the test pressure shall be removed or isolated from the system, and shall be reconnected or unblocked after the tests are completed. If operating tests require the supervision of the manufacturer’s representative, the Contractor shall assist the representative by providing any labor, material, or equipment needed by the representative.

3.7 CLEANUP AND CLEANING

The Contractor shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials, and rubbish from the project site as well as his tools, construction equipment, and surplus materials. Clean all new equipment and materials prior to final inspection.

END OF SECTION 23 01 00
SECTION 26 20 00

INTERIOR DISTRIBUTION SYSTEM

PART I – GENERAL

1.1 SCOPE OF WORK

A. Provide complete electric power and lighting system and signal systems for this project. Work shall include:

1. Complete service equipment and feeder distribution system.
2. Complete lighting and receptacle system.
3. Empty raceway, pullboxes, cabinets and outlets for telecommunication systems.
5. Replace Building Main circuit breaker.
6. Maintain at project site a copy of Drawings to record daily any additions or changes. After final inspection two (2) copies of "as-built" drawings shall be prepared from the site copy and turned over to the Government. This is mandatory.

6. Test complete installation.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Mechanical equipment is specified in Mechanical Section.

1.3 RULES AND REGULATIONS

A. Comply with local ordinances; National Electrical Code; National Electrical Safety Code; applicable regulations of the National Board of Fire Underwriters; specifications of ANSI, NEMA, EEI, and IPCEA.

1.4 DRAWINGS

A. Specifications are accompanied by architectural plans of building, site plans and diagrammatic electrical plans showing locations of outlets, fixtures, switches, service runs, feeder runs, devices, and other electrical equipment. Locations are approximate and before installing, Contractor shall study adjacent construction details and make installation in most logical manner. Any device may be relocated with 10'-0" before installation at direction of Government without additional charge to Government.

B. Before installing, verify all dimensions and sizes of equipment at job site. Circuit and conduit routing is typical and may be altered in any logical manner; however, all changes shall be approved by Government and shown on "as-built" drawings.
1.5 SUBMITTALS

A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.

B. Submit for approval shop drawings or catalog cuts of following equipment and resubmit until approval is received before placing order:

1. Light fixtures.
2. Panelboard, circuit breakers and safety switches.
3. Any built-to-order equipment.

C. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Approval of shop drawings and catalog cuts shall not release Contractor from complying with intent of specifications and drawings. Any deviations from approved shop drawings shall have prior approval by the Government.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Materials and equipment shall be new and those listed by Underwriters' Laboratories shall bear "UL" label of approval. Brand names, manufacturer's names and catalog numbers indicate standards of design and quality required. Substitute materials may be used if qualified by written permission from Government.

2. List of substitute materials together with qualifying data shall be submitted for approval as provided in the SPECIAL PROVISIONS. Failure to obtain approval of substitute materials prior to bidding shall mean that materials as specified shall be provided.

3. Qualifying data shall include cuts, shop drawings, samples if requested by the Government and specifications to show equality with material specified herein and in drawings.

B. Wiring:

1. Rigid steel, zinc-coated, 3/4 inch minimum diameter, except as noted. Other sizes to conform to NEC requirements, based on RHW Wires.

2. Electrical metallic tubing, 3/4 inch minimum, galvanized.

3. Intermediate Metal Conduit: Steel conduit, zinc coated inside and outside with additional silicone epoxy-ester lubricating coating inside; 3/4 inches minimum diameter.

4. Flexible conduit - galvanized with high density plastic jacket.
C. Gutters, pullboxes, enclosures and cabinets for panelboards, breakers, and switches unless otherwise specified shall be NEMA 1 for interior locations and NEMA 4X for exterior locations exposed to rain. Fabricate from code gauge galvanized steel, prime painted, and enamel finished according to NEMA specifications.

D. Cabinets shall be fabricated from galvanized NEC gauge steel with hinged door and latch, finished to match panelboards, and with 3/4" treated plywood backing inside. Locks shall be keyed to panelboard locks.

E. Outlet Boxes:
   1. Concealed boxes shall be pressed from NEC gauge steel, galvanized 4” square x 1-1/2” deep minimum.
   2. Exposed boxes and weather exposed boxes recessed boxes, including lighting outlets on exteriors shall be galvanized cast iron or alloyed aluminum with threaded hubs for conduit connections. Aluminum boxes shall be prime painted and enamel finished.
   3. Extension or raised rings for pressed boxes pressed from NEC gauge steel and galvanized.

F. Wires:
   1. Conductors shall be copper, 600 volts, No. 12 AWG minimum. Conductors No. 10 and smaller, solid and round. Conductors No. 8 and larger, 7 or 19 strands, concentric. All conductors No. 6 and smaller shall be NEC Type TW and THW. All conductors No. 4 and larger shall be NEC Type RHW or THW. Wiring fixtures and fixture wiring channels shall be NEC type RHH or THHN.
   2. Color Code:

G. Devices:
   1. Switches: Single or double pole, 3 or 4 way as required, non-mercury quiet, 20 amperes, 120-277 volts, UL Labeled AC type, tumbler switch with endurance or 10,000 make-breaks. Arrow #1991, #1993 or #1994.
   2. Duplex Convenience Receptacle: Duplex, 20 ampere, 125 volts, side wired, 3 wires, grounding type in plastic body. Arrow 5362.
   3. Special Purpose Receptacles: Specification grade, size as indicated. Provide one matching cap per receptacle.
      Equal wiring devices by General Electric Company, Hubbell, Bryant, Leviton and Sierra are approved.

H. Device and Cover Plates:
   1. Plate for interior flush construction shall be smooth face plastic with suitable hole for device. Ivory or brown to match color of wall.
2. Plates for exposed and weather exposed boxes shall be cast metal for neoprene gasket for sealing against entry of water or moisture into box. Switch plates provided with neoprene cover over handle or rain-tight lever mechanism. Receptacle plates shall be provided with stainless steel spring-loaded gasketed weatherproof lids for “in-use” conditions.

I. Panelboards: Type and rating as indicated with molded plastic case circuit breaker complement. Enclosure shall be galvanized steel with hinged door, circuit directory with complete circuit assignment typed neatly. General Electric, Westinghouse, Cutler Hammer, Square D and Siemens.

J. Circuit Breakers: Circuit breakers shall be molded plastic case circuit breaker with toggle operated mechanism thermal-magnetic overload trips. Interchangeable trip shall be provided when available. Toggle positions "ON", "TRIPPED" and "OFF", engraved on body of toggle. Enclosed in NEMA style steel box. Boxes shall be NEMA 1 for interior locations and NEMA 4X stainless steel for exterior locations. General Electric, Westinghouse, Square D, Siemens and Cutler Hammer.

K. Disconnect Switches: Heavy duty fusible or nonfusible safety switch. Horsepower rated when used as motor disconnect. Contacts shall be lever operated and spring loaded. When for use with fuses, conventional NEC or of current limiting type, blades shall be rejection type. Enclosures to have provision for padlocking. Enclosed in NEMA 1 enclosure for interior locations and NEMA 4X stainless steel for exterior locations. General Electric, Westinghouse, Siemens, Cutler Hammer and Square D.

L. Lighting:

1. Provide light fixtures complete with necessary lamps, ballasts, starters and accessories according to “Luminaire Schedule”.

M. Hardware, Support, Backing, Etc.: Provide all hardware, supports, backing and other accessories necessary to install electrical equipment. Wood materials shall be treated, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be galvanized steel.

PART 3 - EXECUTION

3.1 INTERIOR ELECTRICAL INSTALLATION

A. Comply with local ordinances and regulations of the Government. Workmanship subject to approval of the Government who shall be afforded every opportunity to determine skill and competency. Concealed work re-opened at random during formal inspection by the Government without additional charge to the Government.

B. Construction shall conform to construction practices as recommended by American Electricians Handbook by Croft (latest edition), Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instruction of manufacturers of equipment and materials supplied for project.

C. Raceways:

1. Conceal all raceways unless otherwise noted on the drawings.
2. All conduits in wet locations within building line shall be rigid steel conduits. Electric metallic tubing may be used in dry locations within building. Install rigid galvanized steel conduit in all exterior locations.


4. Make bends and offsets with hickey or conduit bending machine. Do not use vise or pipe tee. Bends made so that interior cross-sectional area will not be reduced. Radius of curve of inner edge of field bend not less than ten times internal diameter of raceway. Use of running threads not permitted. Where raceways cannot be joined by standard threaded couplings, use approved water-tight raceway unions.

5. Cap raceways during construction with plastic or metal-capped bushings to prevent entrance of dirt of moisture. Swab all raceways out and dry before wires or cables are pulled in.

6. Mount raceways free from other piping, valves, or mechanical equipment.

7. Fish wires, cords, strings, chains or the like shall not be placed or inserted in the raceway system during installation of the raceway.

8. Install insulating bushings and two locknuts on each end of every run of raceway at enclosures and boxes. Provide grounding bushings as required to grounding receptacles and connect metal raceways to service ground, per NEC Article 250.

9. Project adequate number of threads through box for bushings.

10. Run exposed raceways parallel with, or at right angles to structural or architectural elements.

11. Securely fasten conduits with galvanized pipe straps with screws or bolts.

12. Install #10 gage galvanized steel pull wire or nylon pull line in all empty raceways.

D. Outlet Boxes: Provide outlet boxes to suit conditions encountered. Provide outlet boxes in spaces with extension or raised rings of such depth that metal will be flush with surrounding surfaces of opening. When two or more switches are installed at single locations, mount in gang box under single device plate. Use gang boxes wherever 3 or more switches are installed at one location. Concealed boxes shall be pressed steel, galvanized, 4” square by 1-1/2” deep minimum. Exposed boxes shall be galvanized cast steel, prime painted cast aluminum or copper free cast aluminum.

E. Conductor Fill in Raceway: Conductor fill in raceways shall conform to NEC Chapter 9, Table 3A (based on Type RHW wires) unless otherwise indicated on the drawings.

F. Wire Pulling: Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires. Pulling tension shall not exceed wire manufacturer's recommendations. Where necessary, powdered soapstone used as lubricant for drawing wires through conduit. Other means of lubricating allowed with written approval of the Government.
G. Wire Splicing:

1. Form wires neatly in enclosures and boxes.

2. Splice in accordance with NEC Article 110. Twist conductors #10 and smaller and dip solder with "Western Union" joint or crimp connect. Splice conductors #8 through #4/0 with high pressure compression (indent) copper sleeve connectors. Do not use bolt-on connectors. Reinsulate splices and waterproof splices. Reinsulate splices according to wire manufacturer's instructions. Splice insulation shall be 200% in thickness of original wire insulation and of same electrical and mechanical characteristics. Tape shall be vinyl plastic.

H. Installation of Lighting Fixtures: Support fixtures securely and safely by means of fixture studs in the outlet boxes or other approved means. Ceiling fixtures arranged to hang vertically unless otherwise directed by Government. Provide accessories, such as straps, mounting plates, nipples or brackets for proper installation. Provide additional suspension wires and channels for mounting on suspended ceilings as recommended by fixture manufacturer.

I. Grounding:

1. Service entrance, motors, metallic enclosures, raceways and electrical equipment grounded according to requirements of National Electrical Code, Article 250. At service entrance, install 5/8" x 8'-0" copper clad steel ground rods (number as required to obtain desired ground), with top 12" below finished grade to obtain ground to 25 ohms or less as measured by three-point potential method with electrical ground megger. Connect service entrance ground to building service entrances equipment via ground wire (size per NEC Article 250-94) and nearest cold water pipe with No. 1/0 bare copper. Ground connection to equipment, raceways, motors, grounding type receptacles and other metallic parts directly exposed to ungrounded electric conductors by continuous metal raceways, or No. 14 AWG minimum, AWG copper, NEC type TW, green insulated. At water meter and "Di-electric" union joints, install pipe clamps, Thomas & Betts Co. No. 3900 series, on both sides of meter on metallic pipes and connect together with No. 1/0 bare copper. Connection shall not interfere with installation or removal of water meter.

2. All grounding wire runs within buildings shall be in rigid steel conduits. Where practicable, all ground wires shall be run together with circuit conductors.

3. A No. 6 bare copper wire shall be used to connect ground to telephone cabinet. A four-foot slack of grounding wire shall be left in cabinet.

J. Equipment Connections: Connect all equipment and appliances. Make power connections to motor on equipment with short section of flexible conduit.

K. Finishing:

1. Patch, repair and restore all structural and architectural elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing and restoring shall be subject to approval of the Government.
2. Attach electrical equipment to wood by wood screws, and attach to concrete by embedded or expansion inserts and bolts. Use powder driven charge with approval only. Close unused knock-outs on boxes or enclosures with metal cap. Powder actuated fasteners shall not be used on precast concrete. Do not use powder activated fasteners to attach enclosures and boxes to the building.

3. Wipe clean all exposed raceways and enclosures with rag and solvent. Prime paint and finish paint of unfinished raceways and enclosures. Factory finished enclosures shall not be painted. Panelboards identified by stenciling with paint on backs of doors the voltage and designation. Voltage ratings stenciled on front of disconnect switches and junction boxes where wires are terminated for connection to equipment that are not part of contract.

4. Connect circuits to circuit assignments shown on drawings. Provide neatly typewritten circuit directory for all panelboards.

3.3 PAINTING

Wipe all exposed raceways clean of dirt, oil, grease, etc., with rag and solvent, primed and finished to match surrounding finish under Section 09 90 00. Factory-finished enclosures not to be painted, except apartment living unit load center shall be painted to match wall finish.

3.4 TESTING

A. All wiring shall be tested to insure proper operation according to functions specified.

B. Measure insulation resistance of all feeder wires. All feeder cables, #4 or larger shall have insulation resistance of 1.5 megohms or higher. Insulation resistance shall be measured by 500 volts megger. Resistances of feeder cables shall be recorded and turned over in four (4) copies to Government during final inspection. Proper operation of all electrical devices shall be demonstrated at request of Architect during final inspection.

C. Balance loading on each feeder.

3.5 GUARANTEE

Installation shall be complete in every detail and ready for use. Any item supplied by Contractor developing defects within one (1) year of final acceptance by the Government, except lamps which shall be guaranteed for 50% of rated life as published by manufacturer, shall be replaced by such materials, apparatus or parts including installation labor to make such defective portion of complete system conform to true intent and meaning of drawings and specifications, at no additional charge to the Government.

END OF SECTION
EXHIBIT A
HAZMAT REPORT
March 17, 2016

Subject: Hazardous Materials Survey  
Renovation of Food Court Kiosk, Building B-1250  
Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i

Environet, Inc. (Environet) conducted a hazardous materials survey of suspected asbestos-containing materials (ACM) and lead-based paint (LBP) scheduled to be disturbed during planned renovation activities at one food court kiosk located within Building B-1250, Joint Base Pearl Harbor-Hickam, O‘ahu, Hawai‘i (hereinafter referred to as the Site; Figure 1, Appendix A). The limited hazardous materials survey was conducted by Environet on March 13, 2017.

Max Solmssen, certified Asbestos Inspector (State of Hawai‘i Certification Number HIASB-3280) and LBP Inspector (State of Hawaii Certification Number PB-0480), conducted the survey at the Site. A copy of his certification documents are attached at the end of this report (Appendix B).

ASBESTOS SURVEY

Regulatory Framework

The United States Environmental Protection Agency (EPA), under its National Emission Standard for Hazardous Pollutants (NESHAP) regulations (40 Code of Federal Regulations [CFR] 61 Subpart M), defines ACM as those which contain greater than 1 percent (%) asbestos. NESHAP also categorizes ACM as either being a friable material, a Category I non-friable material, or a Category II non-friable material. Friable materials are defined as those that can be reduced to powder by hand pressure. Category I non-friable materials can include asphalt roofing materials, resilient floor covering excluding linoleum (e.g., floor tiles), packings, and gaskets. Category II non-friable materials are cementitious materials, such as stucco and asbestos cement board (CFR, 1995).

NESHAP has also established requirements and recommendations for controlling emissions of asbestos fibers during the demolition of buildings containing asbestos. When a building containing asbestos is to be demolished, NESHAP requires that the friable ACM and some types of non-friable ACM be removed before demolition of the structure. Non-friable ACM must be assessed on a case-by-case basis to determine whether the materials will become friable during the demolition activities (CFR, 1995).

In addition, the State of Hawai‘i Department of Health (DOH) institutes minimum requirements pertaining to the processing, handling, and disposal of ACM. These requirements also minimize the release of asbestos fibers from facilities being demolished or renovated (Hawai‘i Administrative Rules [HAR] 11-501). DOH’s Noise, Radiation, and Indoor Air Quality Branch, Asbestos Division, must be notified before a building is demolished and the “Asbestos Notification of Demolition & Renovation” form must be completed and submitted prior to demolition to the same regulatory agency as a courtesy (HAR 11-501).
Methodology

Sample collection followed the EPA publication, *Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials* (EPA, 1985). The sampling locations were selected to characterize suspected ACM scheduled to be disturbed during planned renovation activities at the Site.

An approximate one-inch square section was carefully cut and placed in a labeled, re-sealable plastic bag for each sample. The condition of the suspect ACM was noted. The samples were logged and recorded following strict chain-of-custody (COC) procedures and submitted to Hawaii Analytical Laboratory (Hawaii Analytical) for analysis.

The samples were analyzed by polarized-light microscopy (PLM) using the method outlined in 40 CFR 763, Appendix A to subpart F, *Interim Method for the Determination of Asbestos in Bulk Insulation Samples* (EPA, 1982). Hawaii Analytical is accredited for bulk asbestos analysis through successful participation in the United States Department of Commerce, National Institute of Standards and Technologies (NIST), National Voluntary Laboratory Accreditation Program (NVLAP).

Results and Discussion

Environet collected 15 ACM samples from the Site on March 13, 2017. The laboratory analytical results for the ACM survey are summarized in Appendix C. Copies of the laboratory analytical reports and COC forms are also included in Appendix D. Photographs of the sampling activities are shown in the photographic log (Appendix E).

Asbestos was not detected in any of the collected samples. Therefore, none of the 15 samples collected on March 13, 2017 contained asbestos fibers.

Conclusions and Recommendations

Based on the laboratory sample results, the components sampled at the Site during the hazardous materials survey are not ACM. Therefore, abatement and special handling of these materials, in regard to ACM, are not required prior to or during renovation activities.

LEAD-BASED PAINT SURVEY

Regulatory Framework

The EPA and the Department of Housing and Urban Development (HUD) define LBP as paint or other surface coatings containing lead levels equal to or greater than (≥) 1.0 milligram per square centimeter (mg/cm²) or 0.5% by weight (other equivalent units are: 5,000 micrograms per gram [µg/g], 5,000 milligrams per kilogram [mg/kg], 5,000 parts per million [ppm] by weight). Lead-containing paint (LCP) is paint containing lead at any level less than (<) 5,000 mg/kg. The EPA RCRA regulations set the limit of leachable lead in lead-containing waste at 5.0 milligrams per liter (mg/L). This level is established by an analytical method called Toxicity Characteristic Leaching Procedure (TCLP). Waste that contains leachable lead at concentrations ≥5.0 mg/L is defined as hazardous waste and must be transported to a hazardous waste treatment, storage, or disposal (TSD) facility. Lead-containing waste or potential waste shown to have a total lead
content ≥100 mg/kg may exceed the RCRA TCLP standard for leachable lead, and must be analyzed by TCLP prior to disposal. Thus, while the EPA does not regard work performed on paint containing <5,000 mg/kg to be a LBP activity, the waste from such activities may still be regarded as hazardous under RCRA.

Methodology

Environet collected five paint chip samples from painted surfaces at the Site in accordance with EPA guidelines and recommendations. Each paint chip sample consisted of an approximately two- to four-inch square section of paint scraped off the building material with a paint scraper and placed in a labeled, re-sealable plastic bag. The samples were then placed into a second re-sealable plastic bag for storage. Sampling equipment was cleaned between each sample to avoid cross-contamination. The conditions of the potentially lead-containing material were noted.

The samples were logged and recorded following strict COC procedures and submitted to Hawaii Analytical for analysis by flame atomic adsorption spectrometry (FAAS) using National Institute for Occupational Safety and Health (NIOSH) Method 7082M. Hawaii Analytical is accredited for lead analysis in paint chips through the American Industrial Hygiene Association (AIHA) Environmental Lead Proficiency Analytical Testing (ELPAT) Program.

Results and Discussion

No paint chip samples collected at the Site contained concentrations of lead detected at or above their laboratory detection limits (Appendix D). Therefore, neither lead-based paint or lead-containing paint are present within the painted surfaces sampled. No special handling or disposal procedures are necessary during demolition.

Conclusions and Recommendations

Environet collected representative samples of paint chips from the Site. Results indicated the following:

- None of the paint chip samples collected from the Site contained concentrations of lead detected at or above the laboratory detection limits. Therefore no special handling or disposal procedures are necessary during demolition (Appendix D).

LIMITATIONS

Due to the highly variable nature of building construction, the potential remains for undiscovered hazardous materials to be present onsite. Suspect material not sampled in this report and encountered during renovation activities should be considered hazardous until analyzed and proven otherwise.
Should you have any questions, please do not hesitate to call me at (808) 833-2225 ext. 1012.
Sincerely,

Max Solmssen
Project Manager

APPENDICES

Appendix A: Project Location Map
Appendix B: Environet Personnel ACM and LBP Inspector Certification Documents
Appendix C: Suspect ACM and LBP Analytical Results
Appendix D: Laboratory Reports and COCs
Appendix E: Photographic Log

REFERENCES

Samples. December.
____, 1985. Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing
Materials. October.
HAR 11-501, Asbestos Requirements.
Appendix A: Project Location Map
Appendix B: Environet Personnel ACM and LBP Inspector Certification Documents
State of Hawai'i
Lead Based Paint Activities Certification
Expiration Dates:
Inspector: 11/22/2019
Supervisor: n/a
Risk Assessor: n/a
Project Designer: n/a
Worker: n/a

Solmssen
Max
Certification # PB-0480
State of Hawai'i
Asbestos Certification

Training Course Exp. Dates

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W = Worker
CS = Coord./Sup.
INS = Inspector
PD = Project Designer
MP = Mgmt. Planner
PM = Project Monitor

Solmsen
Max R.
Environet, Inc.
HIASB-3280
State Exp. Date 10/04/2017
Appendix C: Suspect ACM and LBP Analytical Results
### Suspect ACM Analytical Results

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Notes:
AHERA = Asbestos Hazard Emergency Response Act
N/A = not applicable
ND = none detected
NF = non-friable
No. = number
### Suspect LBP Analytical Results

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Notes:
ID = identification
< = less than
Appendix D: Laboratory Reports and COC
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General Comments

The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document proficiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions

> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Jennifer Hsu Liao
Laboratory Manager
### Bulk Asbestos Determination

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<th>Sample No.</th>
<th>Your Sample Description</th>
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Hawaii Analytical Laboratory is a NIST NVLAP accredited laboratory (NVLAP Lab Code 200655-0) and is accredited in accordance with the recognized ISO/IEC 17025:2005. Controlled doc.: Asbestos Report, rev. 1 - 20160830
### Bulk Asbestos Determination

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Hawaii Analytical Laboratory is a NIST NVLAP accredited laboratory (NVLAP Lab Code 200655-0) and is accredited in accordance with the recognized ISO/IEC 17025:2005. Controlled doc.: Asbestos Report, rev. 1 - 20160830
The bulk sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency’s “Interim Method for the Determination of Asbestos in Bulk Insulation Samples” (EPA-600/M4-82-020, Dec. 1982) and / or “Method for Determination of Asbestos in bulk Building Materials” (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable. We utilize calibrated visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 50% relative (1 to 5%); 25% relative (6 to 25%) and 20% (>26% v/v). We will not separate layers which in our opinion are not readily discernable. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government. Unless otherwise indicated, the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
None Detected = asbestos was not observed in the sample. If trace amount of asbestos was detected below our quantifiable limits of 1.0%, <1% (trace) would be indicated and the asbestos type listed. Point counting, where applicable, are recommended to improve accuracy.

Jennifer Hsu Liao
Laboratory Manager
**New Client?**

- **Report To:** Max Salines
- **Company:** EnviroNat
- **Address:** 234 Queen Emma St
  Honolulu, HI 96815
- **Phone / Cell No.:** 808-341-3546
- **Report results to:** Max
- **Email / Fax:** Msalnesia@enviroNat.com

**Need Results By:**

- [ ] 8 Working Days (WD)
- [x] 4 WD
- [ ] 3 WD
- [ ] 2 WD
- [ ] 24 hours
- [ ] 6 hours or less
- [ ] 4 hours or less
- [ ] 1-2 hours

**Site/Project Name:**

- JBPHH Starbucks

**Special Instructions:**

**Sample Identification / Description**

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**Relinquished By (Print and Sign):**

Max Salines / Max Salines

**Date/Time:** 3/13/17 / 11:05 am

**Received By (Print and Sign):** Rozlyn Luber

**Date/Time:** 03-13-17A11:06 RCVD

**PLM POSITIVE STOP Instructions:**

- [ ] + stop / SAMPLE
- [ ] + stop / LAYER

**Lab Report No.:** 20171746

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*Sample description can be paint chips, concrete, specific sample collection location, etc...

If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.

All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.

*Required fields, failure to complete these fields may result in a delay in your samples being processed.
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Relinquished By (Print and Sign)       Date/Time       Received By (Print and Sign) Date/Time
Max Selmers 3/13/17 16:05am          Rozlyn Luber 03-13-17 11:07 RCVD
Appendix E: Photographic Log
Photo Log

Photo 1: Grey floor tile located in the kiosk.

Photo 2: Sheet rock wall with white paint on interior of the kiosk.

Photo 3: White ceiling tile located on the interior of the kiosk.

Photo 4: Red floor tile in the interior of the kiosk.

Photo 5: White sheetrock ceiling located at the exterior of the kiosk.

Photo 6: White door frame at the Site